Schoolcraft County Building and Zoning Department
300 Walnut Street, Courthouse Room 207
Phone (906) 341-3678 FAX (906) 341-0282

MICHIGAN RESIDENTIAL

CODE BOOKLET

2015

AVAILABLE AT

www.schoolcraftcounty.net

OR

MAY BE PURCHASED FOR

$10.00

GENERAL ADMINISTRATION

SUSPENSION OF PERMIT: Your permit remains **VALID** as long as work is progressing and inspections are requested and conducted. A permit shall become INVALID if the authorized work is not commenced within 6 months after issuance of the permit or if the authorized work is suspended or abandoned for a period of 6 months after the time of commencing the work. **A permit will be cancelled when no inspection are requested and conducted within the six months of the date of issuance or the date of a previous inspection. Cancelled permits cannot be refunded or reinstated and a new permit with fees is required.**

TEMPORARY CERTIFICATE OF OCCUPANCY:
A Temporary Certificate of Occupancy may be issued provided Inspections disclose that a **full bathroom** is operational **with privacy doors installed, doors installed for all bedrooms,** a **kitchen sink** of nonabsorbant material is installed with hot and cold water running water, and **all safety, ventilation and sanitary requirements of the Code** are met; such as, but not limited to: **Handrails, Guards, Smoke Detectors, a minimum 3'x 3' Landing at Exterior Entrances, proper seperation wall, ceiling and door between house and attached garage and draftstopping. Insulation installed per MUEC and approved material covering walls.**

JOB WEATHER CARD:
Please post the **Job Weather Card** in a **Conspicuous, Accessible Location** at the project site.

BUILDING PLANNING

1. R 302.1 EXTERIOR WALLS: Exterior Walls with a **fire separation distance** less than **5 feet** shall have not less than a **one hour fire-resistive rating** with exposure from **both sides.** Projections shall not extend to a point closer than 2 feet from the line used to determine the fire separation distance.

2. R 304 MINIMUM ROOM AREAS: Every Dwelling Unit shall have at least **One Habitable Room** which shall have not less than **120 Sq. Ft.** of floor area. Other **Habitable Rooms** shall have not less than **70 Sq. Ft.. Habitable Rooms**, except kitchens, shall not be less than **7 feet** in any horizontal dimension.

3. R 305.1 CEILING HEIGHT: Habitable Rooms, hallways, corridors and basements shall have **a ceiling height** of not less than **7 feet.** Bathrooms, toilet rooms and laundry rooms have ceiling height of not less that 6' 8".
EXCEPTION: Not more than **50** percent of the required floor area of a room or space is permitted to have a sloped ceiling less than **7 feet** in height with no portion of the required floor areas less than **5 feet** in height.

LIGHT, VENTILATION & HEATING

4. R 303.1 ALL HABITABLE ROOMS: Shall be provided with **aggregate glazing area** of not less than **8%** of the floor area of such rooms. Natural ventilaton shall be approved openings to the outdoor air. **EXCEPTION:** The glazed area need not be openable if a mechanical ventilation system is provided capable of producing **0.35 air changes per hour.**

5. R 303.3 BATHROOMS, WATER CLOSET COMPARTMENTS & SIMILAR ROOMS: Shall be artificially lighted **or** be provided with an aggregate glazing area not less than **3 Sq. Ft., one-half of which must be openable.** Windows are not required where artificial light and a mechanical system are provided. Minimum ventilation rates shall be **50 cfm** intermittent **or 20 cfm** continuous **exhausting directly** to the outside atmosphere.

6. R 303.9 HEATING: Every Dwelling Unit shall be provided with **Heating Facilities** capable of maintaining a room temperature of **68 degrees F.** at a point **3 feet** above the floor and **2 feet** from exterior walls in all Habitable Rooms. Portable space heaters shall not be used to achieve complience with this section.

SANITATION

7. R 306.1 TOILET FACILITIES: Every Dwelling Unit shall be provided with a **Water Closet**, a **Lavatory,** a **Bathtub** or **Shower** and **automatic clothes washer connection.**

8. R 306.2 KITCHEN: Each Dwelling Unit shall be provided with a **kitchen area** and **every kitchen area** shall be provided with a **sink with hot and cold water.**

9. R 306.3 SEWAGE DISPOSAL: All Plumbing Fixtures shall be connected to a Sanitary Sewer or to an approved Private Sewage Disposal System.

GLAZING

10. R 308.4 SAFETY GLAZING: shall be installed in **All** of the following **Hazardous Locations;**

a.) Glazing in swinging doors except jalousies.

b.) Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.

c.) Glazing in storm doors.

d.) Glazing in all unframed swinging doors.

e.) Glazing in enclosures for or walls facing hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any part of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches measured vertically above any standing or walking surface.

f.) Glazing in a fixed or operable panel within 24 inches of the vertical edges of a door in a closed position.

g.) Glazing in a fixed or operable panel, other than those locations described in Items **e.)** and **f.)** above that meet all of the following conditions:

1. Exposed area of an individual pane greater than 9 square feet
2. Bottom edge less than 18 inches above the floor.
3. Top edge greater than 36 inches above the floor.
4. One or more walking surfaces within 36 inches horizontally of the glazing.

h.) All glazing in railings regardless of an area or height above a walking surface. Included are structural baluster panels and nonstructural in-fill panels.

i.) Glazing in walls and fences enclosing indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches above a walking surface and within 60 inches horizontally of the water's edge.

j.) Glazing adjacent to stairways, landings and ramps within 36 inches horizontally of a walking surface when the exposed surface of the glass is less than 60 inches above the nose of the tread.

k.) Glazing adjacent to stairways within 60 inches horizonally of the bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches above the nose of the tread.

ATTACHED GARAGE

11. R 302.5.1 OPENING PROTECTION: Doors opening between a garage and residence shall be one of the following; **1⅜ inch Solid Wood Door, 1⅜ inch Solid or Honeycomb Core steel Door** or a **20 Minute Fire-Rated Door.** Openings from a private garage directly into a room used for sleeping purposes **shall not be permitted**.

12. R 302.6 A Garage Attached to the side of a residence shall be separated per requirements by **Table R302.6**. **½" gypsom attached to garage side; including attic area. 5/8" gypson or equalivent required for habital rooms above garage structure.**

13. R309.4 AUTOMATIC GARAGE DOOR OPENERS: If provided, shall be listed in accordance with UL 325.

PULL-DOWN LADDERS: for garage attic access shall be covered with not less than 5/8 inch Gypsum Board or equivalent **or** be framed above with **2x** material, with a cover not less than 5/8 inch gypsum board or equivalent.

EMERGENCY ESCAPE AND RESCUE OPENINGS

14. R 310.1 EMERGENCY EGRESS REQUIRED: BASEMENTS , HABITAL ATTICS and EVERY SLEEPING ROOM shall have at least one openable **Emergency Escape and Rescue Window or Exterior Door Opening.** Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be reqjuierd in each sleeping room. **The Unit** must be openable from the inside to a **full clear opening** without the use of a key or tool. The **Egress Window Sill Height** shall be a maximum of **44 inches** above the floor.

HABITAL ATICS: A finished or unfinished area , not considered a story, complying with the following requirements:

1. The occupied floor area is a least 70 square feet.
2. The occupiable floor area has a ceiling height in accordance with Section R305.
3. The occipiable space is enclosed by the roof assembly above, knee walls (if applicable) on the sides, and the floor-ceiling assembly below.

HABITABLE SPACE: A space in a building for Living, Sleeping, Eating or Cooking. Bathrooms, Toilet Rooms, Closets, Halls, Storage or Utility Spaces and similar areas are not considered habitable spaces.

15. R 310.2.1 MINIMUM EGRESS WINDOW SIZE: All Egress or Rescue Windows from Basements with Habitable Space and Sleeping Rooms shall have a **Clear Opening of 5.7 Sq. Ft.**. The **Minimum Clear Opening Height** shall be **24 inches**. The **Minimum Clear Opening Width** shall be **20 inches.** Removal of sashes or mullions to achieve the required opening is **not** permitted.

EXCEPTION: **GRADE FLOOR WINDOWS:** May have a **Minimum Clear Opening of 5.0 Sq. Ft.**
A GRADE FLOOR WINDOW: is a window located such that the **Sill Height** is **not more than 44 inches** above **or** below the finished grade adjacent to the window.

16. R310.2.3 WINDOW WELLS FOR EMERGENCY EGRESS shall be a minimum **9 sq. ft.** in area, with a minimum horizontal dimension of **36 inches.** This area shall allow the escape opening to be fully opened.

17. R310.2.3 LADDER and STEPS: Window wells with a vertical depth greater than 44 inches shall be equipped with a permanently affixed ladder or steps usable with the window in the fully open position. Ladder rungs shall have an inside width of at least 12 inches, shall project at least 3 inches from the wall and shall be spaced not more than 18 inches vertically for the full height of the window well.

MEANS OF EGRESS

18. R 311.1 MEANS OF EGRESS : All dwellings shall be provided with a means of egress as provided in this section. The means of egress shall provide a continous and unobstructed path of vertical and hortizontal egress tavel from all portions of the dwelling to the exterior of the dwelling at the required egress door without travel through a garage.

19a. R311.2 EGRESS DOOR: The required exit door shall be a Side-Hinged and not lesss than 3 feet in width. The minimum clear height of the door opening hsall not be less than 78 inches in height measured from the top of the threshold to the bottom of the stop. . Other doors shall not be required to comply with these minimum dimensions.

19b. R311.2.1 INTERIOR DOORS: Shall be not less than 24 inches in width and 6 feet, 6 inches in height.
EXCEPTION: Doors to areas with less than 10 square feet of floor area.

LANDINGS

20. R 311.3 There shall be a **floor** or **landing** on each side of each exterior door. The **interior floor** at the required exit door shall not be more than **1½ inches** lower than the top of the threshold.

EXCEPTION: The landing at an exterior doorway shall not be more **7 ¾ inches** below the threshold, provided that the door, other than an **exterior storm** or **screen door**, does not swing over the landing.

EXCEPTION: Where a stairway of two or fewer risers is located on the exterior side of a door, **other than the required exit door**, a landing is not required for the exterior side of the door.

The **width of each landing** shall not be less than the width of the **stairway** or **door** served. **Every landing** shall have a minimum dimension of **36 inches** measured in the **direction of travel.**

21. R311.7.10 SPECIAL STAIRWAYS: Circular stairways, spiral stairways, winders and bulkhead enclosure stairways shall comply with all requirements of Section R311.7. Except as specified in section R311.7.10.1 and R311.7.10.2.

STAIRWAYS

22. R 311.7 STAIRS: shall have a minimum **Tread Width of 9 inches**; a maximum **Riser Height of 8 ¼ inches;** a minimum **Clear Width** between Walls of **36 inches**; and a minimum **Head-Room of 6 feet, 8 inches. FOR WINDERS & SPIRAL STAIRS shall be in accordance of Scetion R311.7.5.2.** A **Nosing** not less than **¾ inch** but not more than **1¼ inches** shall be provided on stairways with **Solid Risers. Open Risers** are permitted provided that the **opening** between adjacent treads does not exceed **4 inches**. The **opening** between adjacent treads is **not limited** on stairs with a total rise of **30 inches or less.** Within any flight of stairs, the greatest riser height and the greatest tread width shall not exceed the smallest by more than **3/8 inch.**

23. R 311.7.9 STAIRWAY ILLUMINATION: All stairs shall be provided with illumination in accordance with Section R303.7.

24. R 303.7.1 LIGHT ACTIVATION: The Control for Activation of the required **Interior Stairway Lighting** shall be accessible at the **top** and **bottom** of each Stairway**, where the stairway has 6 or more risers. Exterior Stair Lighting** shall be controlled from inside the Dwelling Unit

25. R 302.7 UNDER STAIR PROTECTION: Enclosed Accessible Space Under Stairs shall have Walls Under Stair Surface and any Soffits protected on the enclosed side with **½ inch** gypsum board. **See Section; R602.8 (3) requireing Fire Blocking under stairs.**

26. R 311.7.7 HANDRAILS: shall be provided on **at least one side** of stairways with **4 or more risers**, and shall be installed a **minimum of 34 inches** and a **maximum of 38 inches** above the nose of the tread. **Handrails** shall be **continuous the full length** of a stair flight, and shall **clear the wall** a minimum of **1½ inches. Handrail Ends** shall be returned or shall terminate in newel posts or safety terminals.

27. R 311.7.7.3 HANDRAIL GRIP SIZE: shall have **either** a Circular Cross Section with a diameter of **1¼ inches** minimum to **2 inches maximum.** Other handrail shapes that provide an **equivalent grasping surface** are permissible.

GUARDRAILS

28. R 312.1 GUARDRAIL DETAILS: Porches, Balconies and Raised Floor Surfaces located more than **30 inches** measured vertically to the **Floor** or **Grade** below at any point within **36 inches** horizontally to the edge of the open side. **Open Side of Stairs** shall have Guardrails not less than **34 inches** in height measured vertically from a line connecting the leading edges of the treads. Insect screening **shall not** be considered as a guard.

29. R 312.3 GUARDRAIL OPENINGS: Required Guardrails on Open Sides of Stairways, Raised Floor Areas, Balconies and Porches shall have Intermediate Rails or Ornamental Closures which do not allow passage of a sphere **4 inches** or more in diameter.

EXCEPTIONS:

1. The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway shall not pass a 6 inch sphere.
2. Openings for required guards on the sides of stair treads shall not allow a sphere **4 3/8** inches to pass through.

ALARMS

30. R 314.1 SMOKE ALARMS: shall be installed **1.) In Each Sleeping Room 2.) Outside of Each Separate Sleeping Area; in the Immediate Vicinity of the Sleeping Rooms** and **3.) On Each Story of the dwelling,** including basements and cellars. **All** Detectors shall be **Interconnected , AC Powered** and have **Battery Backup.**

31. R314 When **INTERIOR ALTERATIONS, REPAIRS or ADDITIONS** require a building permit; the **TOTAL DWELLING UNIT** shall be provided with **SMOKE ALARMS** located as required for **NEW DWELLINGS.** The **SMOKE ALARMS** shall be **Interconnected and Hard Wired; EXCEPT** where the **Alterations or Repairs** do not result in the removal of interior wall or ceiling finishes exposing the structure; **UNLESS** there is an **Attic, Crawl Space, or Basement** available which could provide access for Hard Wiring and Interconnection **without** the removal of Interior Finishes.

32. **R314.3.3 EQUIPMENT POWER SOURCE.** The equipment shall be operable by power from 1 of the following primary sources.
    a. The building wiring provided that such wiring is cerved from a commercial source and is equippend with a battery backup. Wiring shall be permanent and wihtout a dsiconnetin switch other than as requried for overcurrent protecetion.
    b. A non-rechargeable battery that is capable of operating the smoke alarm in the nomral conditon foe a life of 5 years.
    c. A rechargeable battery, with proper charging , able to power the alarm for a life of 5 years and shall be automatically recharged by an AC circuit of the commercial light and power source.
    d. A household use alram system with abattery backup listed and approved in accordance with the household fire warning equipement provisions of NFPA 72, as referenced in section R314.4 of the code.

33. **R315.1 CARBON MONOXIDE ALARMS.** For new construct, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in dwelling units within which fuel-fired appliacances are installed and in dwelling units that have attached garages.

34. **R315.3 EXISTING DWELLINGS.** Where work reqjuiring a permit occurs in existing dwelling that have attached garages or in existing dwelling within which fuel-fired appliacnes exist, carbon monoxide alrams shall be provided in accordance with Section R315.1.

35. **R315.4 ALARM REQUIREMENTS.** Single station carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.

INTERIOR FINISHES

36. **R 302.9.1 WALLS & CEILINGS:** shall have a **Flame-Spread Classification** of not greater than **200.** The Smoke **Developed Factor** shall not be greater than **450.**

37. **R 302.10.1 EXPOSED INSULATION:** All Exposed Insulation Material , including facing, such as vapor barriers or breather papers installed within floor-ceiling assemblies, roof-ceiling assemblies, wall assemblies, crawl spaces and attics shall have a **Flame-Spread Index** not to exceed **25** with an accompanying **Smoke Developed Index** not to exceed **450,** when tested in accordance with ASTM E 84.

38. **CHAPTER 11 & MICHIGAN ENERGY CODE 2015 - ALL INSULATION:** Shall be installed as to **type, size and R-value** shown on the required **MICHIGAN UNIFORM ENERGY CODE Form** submitted for this project. **401.3 Certificate**. A permanent certificate shall be posted on or in the electrical distribution panel.

PRESSURE TREATED MATERIAL

39. **R 317.1 THE FOLLOWING LOCATIONS:** shall require the use of an approved Grade of Lumber; Pressure Preservatively Treated in accordance with **AWPA C1, C2, C3, C4, C9, C15, C18, C22, C23, C24, C28, P1, P2** and **P3 or** Decay-Resistant **Heartwood of Redwood, Black Locust, or Cedars:**

    1.) WOOD JOISTS or THE BOTTOM OF A WOOD STRUCTURAL FLOOR: when closer than **18 inches;** and **WOOD GIRDERS** when closer than **12-inches** to exposed ground in crawl spaces or unexcavated areas.

    2.) ALL WOOD FRAMING MEMBERS: Which rest on concrete or masonry exterior walls and are less than **8 inches** from the exposed ground.

    3.) SILLS & SLEEPERS: On a concrete or masonry Slab which is in direct contact with the ground **unless** separated from such slab by an impervious moisture barrier.

    4.) ENDS OF WOOD GIRDERS: Entering exterior masonry or concrete walls having a clearance of less than **½ inch** on **top, sides and ends.**

    5.) WOOD SIDING, SHEATHING & WALL FRAMING: On the exterior of a building having a clearance of less than **6 inches** from the ground or less than 2 inches measured vertically from concrete steps, etc. and similar hortizontal surfaces exposed to the weather.

    6.) WOOD STRUCTUAL MEMBERS: Supporting moisture-permable floors or roofs that are exposed to the weather unless seperated from such floors or roofs by an impervious moisture barrrier.

    7.) WOOD FURRING STRIPS or WOOD FRAMING MEMBERS: Attached directly to the Interior or Exterior masonry walls or concrete walls below grade, **except** where an approved vapor retarder having a maximum **perm rating of 1.0** is applied between the walls and the furring strips or framing members.

40. **R317.3.1 FASTENERS** for Preservative Treated and Fire-Retardant Wood shall be **Hot-Dipped Galvanized Steel, Stainless Steel, Silicon Bronze or Copper. EXCEPTION:** One-half-inch diameter or greater steel bolts.

41. **R317.1.5 EXPOSED GLUED-LAMINATED TIMBERS.** The portions of glued-laminated timbers that form the structural supports of a building or other structure and are exposed to weather and not properly protected by a roof, eave or similar covering shall be pressure treated with preservative, or be manufactured from naturally durable or preservative-treated wood.

SITE ADDRESS

42. **R 319 DISPLAY OF ADDRESS NUMBERS:** Numbers on houses or buildings must be of contrasting color to the background and/or be of reflective material, and shall not be less than **3 inches high**. If a building or house is set back more than **three hundred feet** or is not visible from the road; **a post** with reflective numbers is required. **The post** shall be **five feet** above the level of the street, adjacent to the driveway and not more than **fifteen feet** from the edge of the road. A **wood post** shall be a minimum **4 inches by 4 inch** in width. **Similar quality** may be installed as approved by the Street and Road Numbering Director. The Numbers shall be **plainly visible from either direction of approach.** ► **REQUIRED PRIOR TO FIRST INSPECTIONS** ◄

FOOTINGS/FOUNDATIONS

43. **R 401.4.1 SOIL CLASSIFICATIONS:** Are in accordance with the United Soil Classification System and Design Lateral Soil Loads are for moist conditions without Hydrostatic Pressures.

44. **R 402.1 WOOD FOUNDATION SYSTEMS:** Shall be Designed, and Installed in accordance with the **provisions of The BuildingCode. R 402.1.1 Fasteners Used Below Grade to attach Plywood to Exterior Walls and Fasteners used in Knee Wall Construction** shall be **stainless steel TYPE 304 or 316. R 402.1.2 All Lumber and Plywood** shall be treated in accordance with **AWPA U1** and shall **bear the label** of an accredited agency showing **0.60 retention WITH A FOUNDATION QUALITY MARK. R 402.1.1 The height of backfill** against a wood foundation wall shall not exceed **4-feet. WOOD FOUNDATION WALLS WITH BACKFILLS GREATER THAN 4-FEET SHALL BE DESIGNED BY AN ARCHITECT OR ENGINEER.**

45. **R 402.2 / TABLE-402.2 MINIMUM 28 DAY COMPRESSIVE STRENGTH OF CONCRETE:**
   1.) Basements Walls and Foundations - not exposed to the weather ----------**2500 psi.**
   2.) Basement Slabs and Interior Slabs on Grade, except garage floor slabs----------**2500 psi.**
   3.) Basement Walls, Foundation Walls, and other vertical concrete exposed-------**3000 psi.**
   4.) Porches, Carport Slabs, Steps exposed to weather & Garage Floors Slabs-------**3500 psi.**
   Concrete subject to freezing and thawing during construction shall be Air Entrained. Total Air Content shall not be less than **5 percent** or more than **7 percent. All Concrete shall be Cured** for not less than **3 days** and maintained above **50 degrees** during the curing period.

46. **R 403.1.1 CONCRETE FOOTINGS:** All Exterior Walls supporting Residential Use Buildings shall have a **6-inch thick Continuous Footing**, with a **width** not exceeding **8 inches** wider than the Masonry or Concrete Foundation Walls they support. Footings shall be **placed on undisturbed natural soil** or **engineered fills**. The **bottom of the footings** shall be not less than **16 inches** below Finished Grade **in Sand** or **42 inches** below Finished Grade in **Heavier Soils.**

47. **R 403.1.4.1 FOOTINGS FOR SINGLE STORY UNATTACHED GARAGES & STORAGE SHEDS Exceeding 400 sq. ft. in Area or 10 feet in Wall Height** shall extend **24 inches** below grade **in sand** and **42 inches** below grade in **heavier soils,** with a minimum **base width of 12 inches.**
   1. **FOOTINGS FOR FREE STANDING ACCESSORY STRUCTURE less than 600 sq. ft. in Area and 10 feet or less in Height** frost protection not required. (LIGHT FRAME STRUCTURES)
   2. **FOOTINGS FOR FREE STANDING ACCESSORY STRUCTURE less than 400 sq. ft. in Area and 10 feet or less in Height** frost protection not required. (OTHER THAN LIGHT FRAME STRUCTURES)

48. **R 1003.2 FIREPLACE FOOTINGS:** Shall be a minimum of **12 inches thick** and **6 inches wider** than the base of fireplace on all sides.

49. R 403.1.8 FOUNDATIONS & FLOOR SLABS ON EXPANSIVE SOILS shall be designed in accordance with **SECTION 1808.6 IBC.**

EXPANSIVE SOILS DEFINITION: All of the following: Plasticity Index (PI) ≥ 15; More than 10% Passing 200 sieve; More than 10% soil particles < 5 micrometers in size; Expansion Index > 20

FOUNDATIONS WALLS

50. R 404.1.1 CONCRETE MASONRY, CLAY MASONRY AND CONCRETE FOUNDATION WALLS shall be constructed as set forth in **Table R 404.1.1(1), R 404.1.1(2), R 404.1.1(3),** or **R 404.1.1(4).**

51. R 404.1.6 CONCRETE & MASONRY FOUNDATION WALLS shall extend above **finished grade at all points** a minimum of **6 inches.**

52. R 404.1.7 BACKFILL PLACEMENT: Adjacent to the wall **shall not** be placed until the wall has sufficient strength and has been anchored to the floor, or has been sufficiently braced to prevent damage by the backfill.

53. ASHRAE 4.5.4 SILL SEALER: Shall be placed between Sill Plates and Concrete or Masonry Foundations.

54. R 403.1.6 SILL PLATES: Shall be Anchored to Foundation Walls with **½ inch** minimum diameter **Anchor Bolts** spaced a **maximum of 6 feet** on center. There shall be a **minimum of two bolts per plate section**, and shall be installed a **maximum 12 inches from each end.** Anchor Bolts shall be embedded in Concrete or Grouted Masonry a minimum of **7 inches. EXCEPTION: Foundation Anchor Straps** may be installed in lieu of bolts provided their spacing is **Equivalent to the Anchorage** of **½ inch Diameter Anchor Bolts** spaced at **6 feet.**

FOUNDATION DAMPPROOFING & WATERPROOFING

55. R 406.1 CONCRETE AND MASONRY FOUNDATION DAMPPROOFING: Except where required by Section R406.2 to be waterproofed, foundation walls that retain earth and enclose interior spaces and floors below grade shall be **Dampproofed** from top of footing to finished grade. They shall be **Parged with not less than ⅜inch portland cement applied to the exterior of the wall.** The **parging** shall be dampproofed with a **bituminous coating; 3 pounds /sq. yd.** of **acrylic modified cement; ⅛inch** coat of **surface-bonding mortar**; or any material permitted for Waterproofing.

56. R 406.2 CONCRETE & MASONRY WALLS Below Ground Water Table shall be **Waterproofed** with a membrane consisting of: **1.) 2 ply hot-mopped felts; 2.) 55 pound roll roofing; 3.) 6 mil polyvinyl chloride; 4.) 6 mil polyethylene 5.) 40 mil polymer-modified asphalt 6.) 60 mil (1.5 mm) flexible polymer cement. 7.) 1/8 inch (3 mm) cement-based, fiber-reinforced, water-proofing coating. 8.) 60 mil (0.22 mm) solvent free liquid-applied synthetic rubber.**

All joints in membrane waterproofing shall be lapped and sealed with an adhesive compatible with the membrane.

COLUMNS

57. R 407.3 COLUMNS shall be restrained to prevent lateral displacement at the bottom end. Wood columns shall not be not less than 4x4s and steel columns shall not be less than 3 inches diameter.

UNDER- FLOOR SPACE

58. R 408.4 CRAWL SPACE ACCESS: A minimum of **18 inch by 24 inch Access Opening** shall be provided to all Crawl Space Areas. **R408.2 Opening for under-floor ventilation within 3 feet** of each corner. The vent area shall be **1 Sq. Ft. per 150 Sq. Ft.** of crawl space area **without plastic** or **1 Sq. Ft. per 1500 Sq. Ft. with plastic.**

59. R408.3 Unvented Crawl Space. Ventilaton openings in under-floor psaces specified in Section R408.1 and R408.2 shall not be required where: 1.) Exposed earth is covered with a continuous vapor retarder. 2.) One of the following is provided for the under-floor space: Continuously operated mechanical exhaust ventalation, Conditioned air Supply, or Plenum complying with Section M1601.5 (if under floor space is used as a plenum).

MATERIALS

60. LOAD BEARING DIMENSION LUMBER: R 502.1 Joists, Beams and Girders/ R 602.1 Studs, Plates and Headers / R 802.1 Rafters, Trusses and Ceiling Joists shall be identified by a **Grade Mark** of a lumber grading or inspection agency that complies with **DOC PS 20.** In lieu of a **Grade Mark,** a **"Certificate of Inspection"** as to species and grade issued by an approved Agency shall be accepted. This includes **House Logs of Sawn Round Timber and Walls.**

DESIGN LOADS

61. R 301.5 BUILDINGS & STRUCTURES: shall be designed and constructed to support all loads, without exceeding allowable material stresses. Some minimum Loads are shown below:

1.) ROOF: MINIMUM GROUND SNOW LOAD – 60/70 psf. (see chart R301.2(5))
2.) WIND LOAD: 90 MPH WITH EXPOSURE CATEGORY B ASSUMED.
3.) FLOOR LOADS: NONSLEEPING AREAS -- 40 psf; SLEEPING AREAS -- 30 psf.
4.) DECKS -- 40 psf.
5.) INDIVIDUAL STAIR TREADS shall be designed for the uniformly distributed live load of **40 psf** or a **300 lb.** concentrated load acting over an area of **4 Sq. In.,** whichever produces the greater stress.
6.) GUARDRAILS & HANDRAILS: A single concentrated load of **200 lbs.** applied in any direction at any point along the top rail.

FLOORS

62. R 502.3 Allowable Joist Spans shall be in accordance with **Tables R 502.3.1(1) and R 502.3.1(2)** of the **Code.**

63. R 502.4 JOISTS UNDER BEARING PARTITIONS: shall be of adequate size to support the load. Double Joists which are separated to permit the installation of piping or vents shall be solid blocked spaced not more than **4 feet** on center.

64. R 502.8 DRILLING AND NOTCHING: Structural floor members shall not be cut, bored or notched in excess of the limitations specified in this section

65. R 502.10 FRAMING IN FLOOR OPENINGS: Openings in floor framing shall be framed with a **header** and **trimmer joists.** When the header joist span does not exceed **4 feet,** the header joist may be a single member the same size as the floor joist. Single Trimmer joists may be used to carry a single header joist that is located within **3 feet** of the trimmer joist bearing. When the header joist span exceeds **4 feet,** the trimmer joists and the header joist shall be doubled and of sufficient cross section to support the floor joists framing into the header. Approved hangers shall be used for the header joist connections when the header joist span exceeds **6 feet.**

66. R 502.11.3 WOOD TRUSSES: Truss members and components **shall not** be **cut, notched, spliced** or **otherwise altered** in any way without the approval of a **Registered Design Professional Engineer.**

67. R 502.11.4 TRUSS DESIGN DRAWINGS. Truss design drawings, prepared in compliance with Section **R502.11.1,** shall be provided to the building official and approved prior to installation. Truss design drawings shall be provided with the shipment of trusses delivered to the job site and be available on site during **Rough Building Inspection.**

68. R 302.12 DRAFTSTOPPING: In accordance with R302.12 when there is **usable space** both above and below **floor/ceiling assemble; draftstopping** shall be installed so that the **concealed area** of the floor/ceiling assemble space **does not exceed 1,000 Sq. Ft..** Draftstopping shall be provided in floor/ceiling assemblies under the following situations:

1.) Ceiling is suspended under the **Floor Framing.**
2.) Floor Framing is constructed of **Truss-Type Open-Web** or **Perforated Members.**

69. R302.12.1 DRAFTSTOPPING MATERIAL: Shall not be less than **½ inch** Gypsum Board, **⅜ inch** Wood Structural Panels, or **⅜ inch** Type 2-M-W Particleboard. The integrity of all Draftstops shall be maintained.

70. R 503.1 LUMBER FLOOR SHEATHING shall conform to **Tables R503.1**

71. R 503.2.1 WOOD STRUCTURAL PANEL SHEATHING: USED FOR FLOORING OR ROOFING SHALL COMFORM TO TABLES R503.2.1(1) and R503.2.1(2), and shall be Identified by an approved Structural Rating Stamp indicating the intended application is consistent with its use in the building.

72. R 506.1 CONCRETE (SLABS-ON-GROUND FLOORS): Shall be a minimum of **3 ½ inches** thick, placed on **4 inches** of base course except when constructed on well drained soils.

WALL CONSTRUCTION

73. R 602.2 STUDS shall be minimum **No. 3, Standard or Stud Grade Lumber. EXCEPTION: Bearing Studs** not supporting floors and **Nonbearing Studs** may be **Utility Grade Lumber** provided the studs are spaced in accordance with **Table R 602.3(5).** All components of Exterior Walls shall be fastened in accordance with **Tables R 602.3(1) through R 602.3(4).**

74. R 602.3.2 TOP PLATE: Wood Stud Walls shall be Capped with a Double Top Plate installed to provide overlapping at corners and intersections with bearing partitions. End Joints in Top Plates shall be offset at least **24-inches.**

75. R 602.6 NOTCHES IN STUDS in an **Exterior Wall** or **Bearing Partition** shall not exceed **25%** of the stud width. In **non-bearing Partitions**, notching shall not exceed **40%** of stud width. Holes bored or drilled in any stud shall not: **1.)** exceed **40%** of stud width **2.)** be no closer than **⅝inch** to edge of stud **3.)** hole shall not be in same section as cut or notch.

76. R 602.6.1 DRILLING & NOTCHING TOP PLATE: When **piping or ductwork** is placed in or partly in an **exterior wall** or **interior load-bearing wall**, necessitating cutting of the **top plate** by more than **50-percent** of its width; **a galvanized metal tie** not less than **0.054 inch** thick and **1½ inches** wide shall be fastened to each plate across and to each side of the opening with not less than **six 16d** nails.

77. R 602.7 HEADERS: See tables R602.7(1); R602.7 (2) and R602.7 (3) of the Code.

78. R 302.11 FIREBLOCKING: Approved **Fireblocking Material** shall be installed in wood-frame construction in the following locations: **1.) Concealed Wall Spaces**, including furred spaces, at the ceiling and floor level and at **10 foot** intervals both vertical and horizonal. **2.) At Soffits, Dropped Ceilings, and Cove Ceilings. 3.) In concealed spaces Between Stair Stringers** at the **Top, Bottom and under stairs on walls and ceiling. 4.)** At Openings around penetrations for **wiring, plumbing, & ductwork.**

79. R 302.11.1 APPROVED FIREBLOCKING MATERIALS: Except for **Item 4.)** above; Fireblocking shall consist of **2 inch Lumber**,or **two thicknesses of 1 inch lumber** with broken lap joints, or **one thickness of 23/32-inch** wood structural panels with joints backed by 23/32-inch wood structural panels or one **thickness of ¾ inch particleboard,** or **½ inch gypsum board,** or **¼ inch cement-based millboard.** Batts or blankets of mineral wool glass fiber shall be permitted, **but** loose-fill insulation is not permitted unless specifically tested for fireblocking useage.

80. R 602.10 & Tables R 602.10.1.2(1); R602.10.1.2 (2); R602.10.1.2(3) WALL BRACING: Shall be braced in accordance with this section.

MASONRY CONSTRUCTION

81. R 606.1 Masonry Construction. Shall be designed and constructed in accordance with the provisions of this section or in accordance with the provisions of TMS 402/ACI 530/ASCE 5..

82. R 606.9 Masonry Walls shall be laterally **supported in either the horizontal or the vertical direction.**

83. R 606.13 Reinforcment Bars exposed to weather or soil shall have a coverage of not less than 2 inches.

84. R 606.6.3 Beams & Girders supported by solid masonry walls or columns shall have a bearing length of not less than **3 inches** measured parallel to the Beam or Girder. **Joists** shall bear not less than **1 ½ inches.**

85. R 312.2.1 WINDOW SILLS. In Dwelling units, where the opening of an operable window is located more than 72 inches above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches above the finished floor. Operable sections of windows shall not permit openings that allow passage of a 4-inch-diameter sphere where such opeings are located within 24 inches of the finished floor.

WALL COVERING

86. R 702.3.5.1 Minimum Thickness and Application of Gypsum Board shall be in accordance with **Table R 702.3.5. Screws** shall be **Type W or Type S** and shall Penetrate the Wood Framing not less than **⅝ inch.**

87. R 702.5 Wood Veneer Paneling & Hardboard Paneling shall be placed on **Wood Framing** spaced not more than **16-inches on center. Paneling less than ¼ inch** shall have a minimum of **⅜ inch gypsum board backing.**

ROOF FRAMING

88. R 802.10.2 ROOF TRUSS DESIGN: Truss design drawings. Truss design drawings, prepared in conformance with Section R802.10.1, shall be provided to the building official and approved prior to installation. The truss design data sheet, Figure R802.10.1, may be provided to the building official at the time of permit application, as an alternative to design drawings as permitted in Section R106.1.4. Truss design drawings shall include, at a minimum, the information specified below. Truss design drawings shall be provided with the shipment of trusses delivered to the jobsite.

1. Slope or depth, span, and spacing.
2. Location of all joints.
3. Required bearing widths.
4. Design loads as applicable.
    a. Top chord live load (including snow loads).
    b. Top chord dead load.
    c. Bottom chord live load.
    d. Bottom chord dead load.
    e. Concentrated loads and their points of application.
    f. Controlling wind and earthquake loads.
5. Adjustments to lumber and joint connector design values for conditions of use.
6. Each reaction force and direction.
7. Joint connector type and description (e.g., size, thickness, or gauge) and the dimensioned location of each joint connector except where symmetrically located relative to the joint interface.
8. Lumber size, species, and grade for each member.
9. Connection requirements for the following:
    a. Truss to truss girder
    b. Truss ply to ply.
    c. Field splices.
10. Calculated deflection ratio and/or maximum description for live and total load.
11. Maximum axial compression forces in the truss members to enable the building designer to design the size, connections, and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the truss design drawing or on supplemental documents.
12. Required permanent truss member bracing location.

89. R802.10.4 WOOD TRUSS: Truss members and components **shall not** be **cut, notched, spliced or otherwise altered** in any way without the approval of a **Registered Design Professional Engineer.** Alterations resulting in the addition of load such as HVAC equipment water heater that exceeds the design load for the truss shall not be permitted without verification that the truss is capable of supporting such additional loading.

90. R 802.3.1 CEILING JOIST & RAFTER CONNECTIONS: Ceiling joists and rafters shall be nailed to each other in accordance with Table R802.5.1(9), and the rafter shall be nailed to the top wall plate in accordance with Table R602.3(1). Ceiling joists shall be continuous or securely joined in accordance with Table R802.5.1(9) where they meet over interior partitions and are nailed to adjacent rafters to provide a continuous tie across the building where such joists are parallel to the rafters.

Where ceiling joists are not connected to the rafters at the top wall plate, joists connected higher in the *attic* shall be installed as rafter ties, or rafter ties shall be installed to provide a continuous tie. Where ceiling joists are not parallel to rafters, rafter ties shall be installed. Rafter ties shall be not less than 2 inches by 4 inches (51 mm by 102 mm) (nominal), installed in accordance with the connection requirements in Table R802.5.1(9), or connections of equivalent capacities shall be provided. Where ceiling joists or rafter ties are not provided, the ridge formed by these rafters shall be supported by a wall or girder designed in accordance with accepted engineering practice.

Collar ties or ridge straps to resist wind uplift shall be connected in the upper third of the *attic* space in accordance with Table R602.3(1).

Collar ties shall be not less than 1 inch by 4 inches (25 mm by 102 mm) (nominal), spaced not more than 4 feet (1219 mm) on center.

91. R 502.8.1 CUTTING AND NOTCHING Of Rafters, Joists and Beams shall not exceed **one-sixth** of the depth of the member, shall not be longer then **one-third** the depth of the member and shall not be located in the **middle one-third** of the span. The **diameter of holes** bored or cut into members shall not exceed **one-third** the depth of the member. Holes shall not be closer than **2 inches** to top or bottom of the member or any other hole.

94. R 802.7.2 CUTS, NOTCHES AND HOLES BORED in Laminated Veneer Lumber, Glued-Laminated Members, or I-Joists is not permitted without written permission from the Manufacture.

95. R 802.9 FRAMING OPENINGS in roof and ceiling: same criteria as FRAMING IN FLOORS--Item 58.

96. R 802.11 ROOF TIE-DOWNS:

R802.11.1 Uplift resistance. Roof assemblies shall have uplift resistance in accordance with Sections R802.11.1.1 and R802.11.1.2.

Where the uplift force does not exceed 200 pounds (90.8 kg), rafters and trusses spaced not more than 24inches (610 mm) on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1). Where the basic wind speed does not exceed 115 mph, the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, rafters and trusses spaced not more than 24 inches (610 mm) on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

R802.11.1.1 Truss uplift resistance. Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the truss design drawings for the ultimate design wind speed as determined by Figure R301.2(4)A and listed in Table R301.2(1) or as shown on the construction documents. Uplift forces shall be permitted to be determined as specified by Table R802.11, if applicable, or as determined by accepted engineering practice.

R802.11.1.2 Rafter uplift resistance. Individual rafters shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by Table R802.11 or as determined by accepted engineering practice. Connections for beams used in a roof system shall be designed in accordance with accepted engineering practice.

ROOF VENTILATION

97. R 806.2 ATTIC VENTILATION: The Net Free Ventilation Area shall not be less than **1 Sq. Ft. to 150 Sq. Ft.** of the Attic Area being Ventilated. **EXCEPT,** where the upper ventilating area is **3 Ft.** or more above the eave, the Net Ventilating Area can be **1 Sq. Ft. to 300 Sq. Ft.**

98. R 806.3 VENT CLEARANCE: Where eave or cornice vents are installed, Insulation shall not block the free flow of air. A minimum of **1 inch space** shall be provided between the Insulation and the Roof Sheathing at the location of the vent.

99. R 807.1 ATTIC ACCESS: An Attic Access Opening measuring a minimum of **22 inches by 30 inches** shall be **provided to each Attic Area** that exceeds **30 sq. ft. and** has a vertical height of **30 inches** or greater. The access shall be **located in a hallway** or **other readily accessible location.**

ROOF ASSEMBLIES

100. R 905.1.1 ASPHALT SHINGLES: shall not be installed on Roofs Slopes less than **2:12. Roof Slopes from 2:12 to 4:12** shall be installed with an underlayment consisting of **two layers of No.15 lbs. Felt** applied shingle fashion starting at the eave; each subsequent **36 inch** sheet shall be lapped **19 inches** horizonially. **Roof Slopes 4:12 or greater** shall have an underlayment of not less than **one Ply of No.15 lbs. Felt** lapped **2 inches** horizonially and end laps offset **6 feet.**

101. R 905.1.2 **All Sloped Roofs over heated buildings** shall have an **Ice Protection** that consists of at least **two layers** of underlayment **cemented together** or of a **self-adhering polymer modified bitumen sheet** **EXTENDING** from the **Eave's Edge** to a Point at least **24 inches** **Inside** **the Exterior Wall Line.**

102. R 907.1 REROOFING New Roof Coverings shall not be installed on roofs with **two or more** applications of **any type** of roof covering.
A Building Permit is required to remove and replace existing roof covering. (OPTIONAL CONTACT OFFICE).

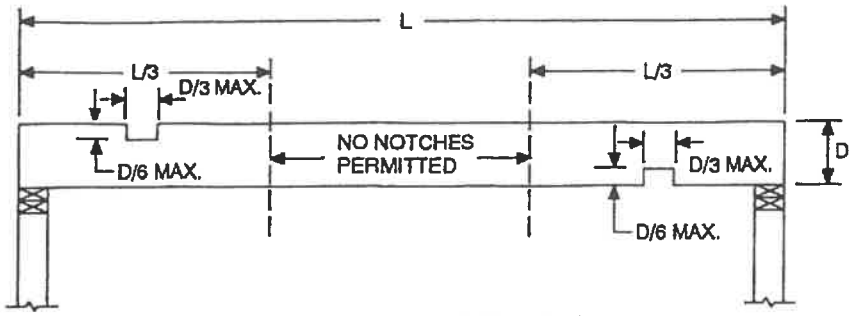
MISCELLANEOUS

103. R 401.3 FINAL GRADING: All final grades shall slope away from the Building a minimum fall of **6 inches** in the first **10 feet,** or a minimum of **6 inches** to the **Lot Line**, whichever comes first.
►REQUIRED AT FINAL INSPECTION ◄

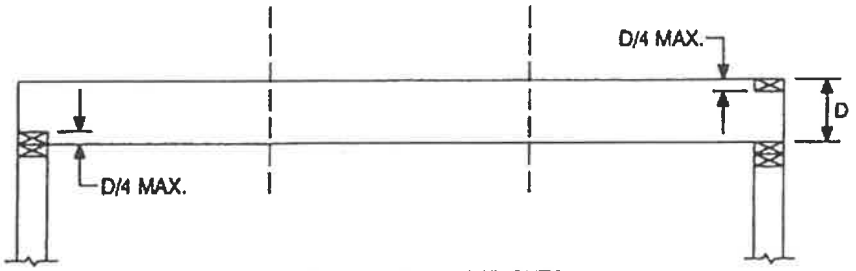
104. G2406.2 APPLIANCE LOCATION: FUEL APPLIANCES SHALL NOT BE LOCATED IN, OR OBTAIN COMBUSTION AIR FROM, ANY OF THE FOLLOWING ROOMS OR SPACES:
a.) SLEEPING ROOMS. b.) BATHROOMS. c.) TOILET ROOMS. d.) STORAGE CLOSETS.

This list Does Not address ALL of the requirements of the Michigan Residential Code 2015. It shall be the duty of every person performing work on a permitted project to comply with ALL the requirements of the Michigan Residential Code 2015.

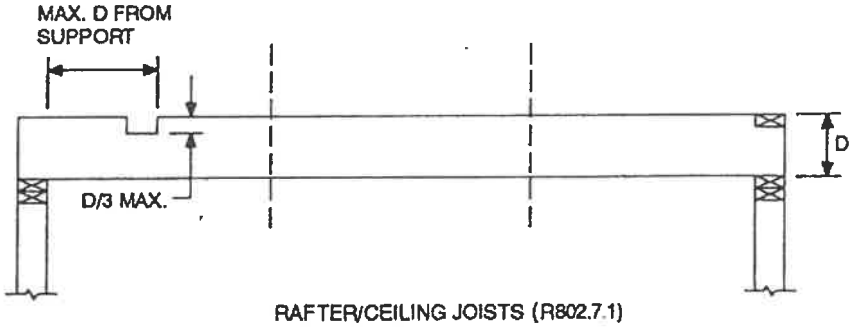
Revised February 12, 2016



FLOOR JOIST—CENTER CUTS



FLOOR JOIST—END CUTS



RAFTER/CEILING JOISTS (R802.7.1)

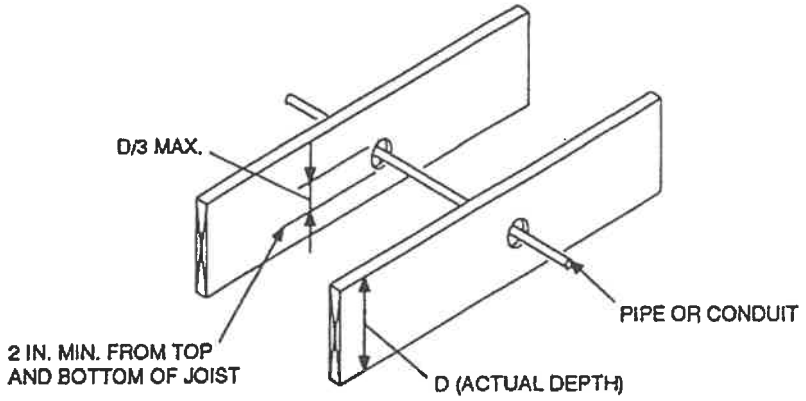
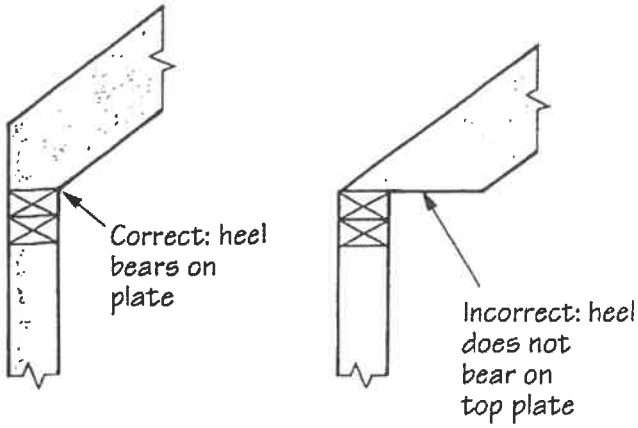


FIGURE R502.8
CUTTING, NOTCHING AND DRILLING



Bolting Schedule for Deck Bands

Joist Span	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
Bolt Size	1/2"	1/2"	1/2" 5/8"	1/2" 5/8"	1/2" 5/8"	1/2" 5/8"	1/2" 5/8"	1/2"	1/2" 3/4"	5/8"	5/8"
Bolt Spacing	24"	24"	18" 24"	18" 21"	16" 18"	12" 18"	12" 16"	12"	12" 16"	12"	12"
16d Nail Spacing	9"	8"	7"	6"	5"	5"	4"	4"	4"	3"	3"

Note: *This table assumes a deck design load of 50 psf (40 psf live load, 10 psf dead load), and Southern Pine 2-by dimension lumber. As an example, for a deck spanning 8 feet, you can use 1/2-inch bolts on 18-inch centers or 5/8-inch bolts on 24-inch centers.*

RAFTERS

SETTING A RAFTER'S TOE ON THE TOP PLATE (RIGHT) RISKS SPLITTING THE RAFTER AND CAUSING THE ROOF TO SAG. THE INSIDE EDGE OF THE LEVEL CUT, OR HEEL, SHOULD REST ON THE PLATE (LEFT).

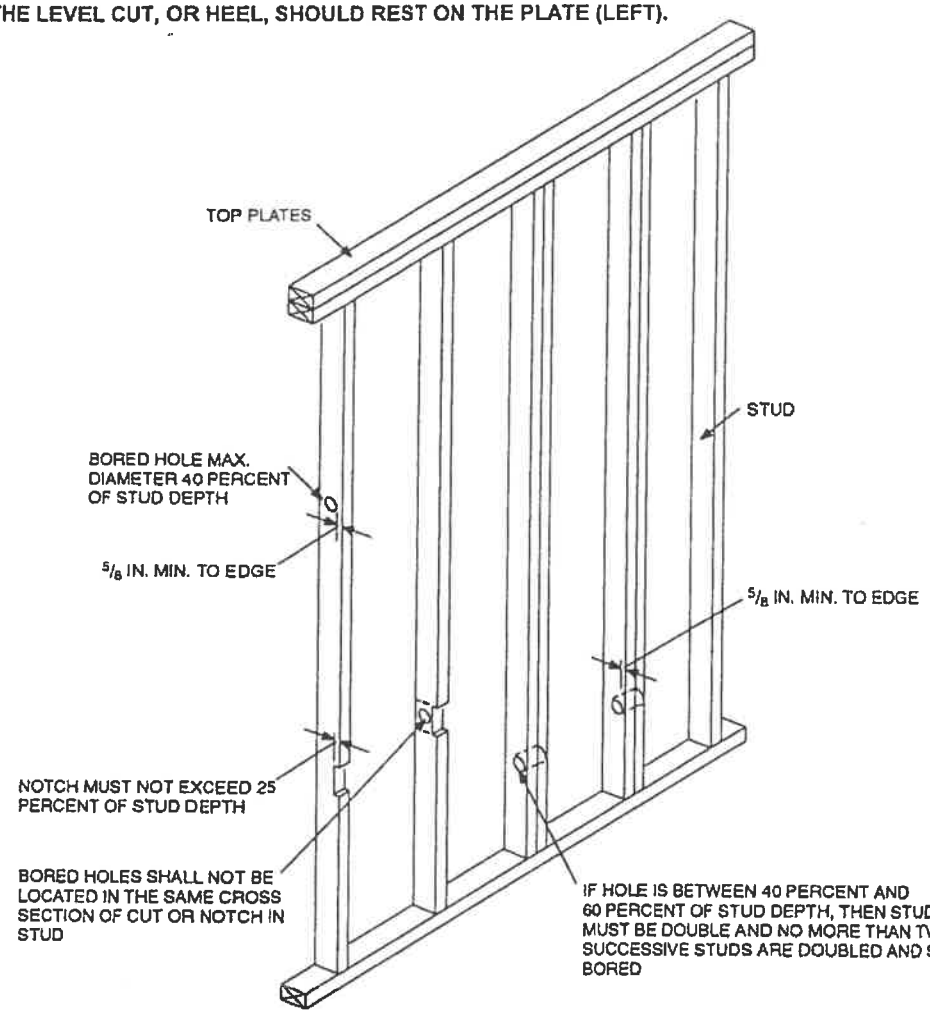


FIGURE R602.6(1)
NOTCHING AND BORED HOLE LIMITATIONS FOR EXTERIOR WALLS AND BEARING WALLS

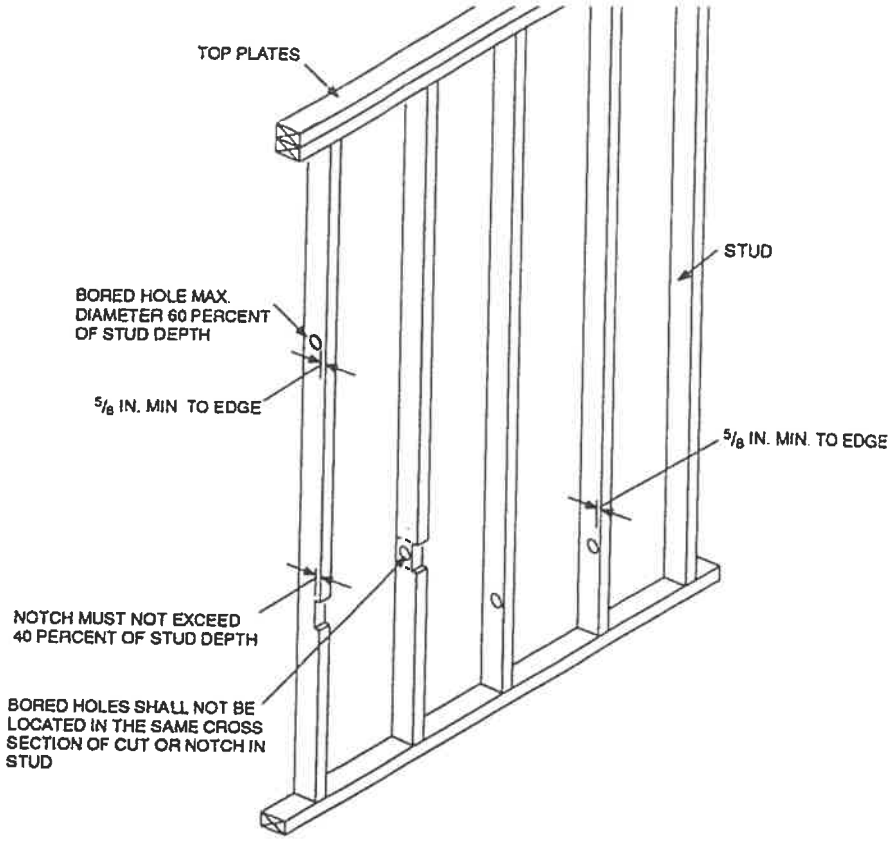


FIGURE R602.6(2)
NOTCHING AND BORED HOLE LIMITATIONS FOR INTERIOR NONBEARING WALLS

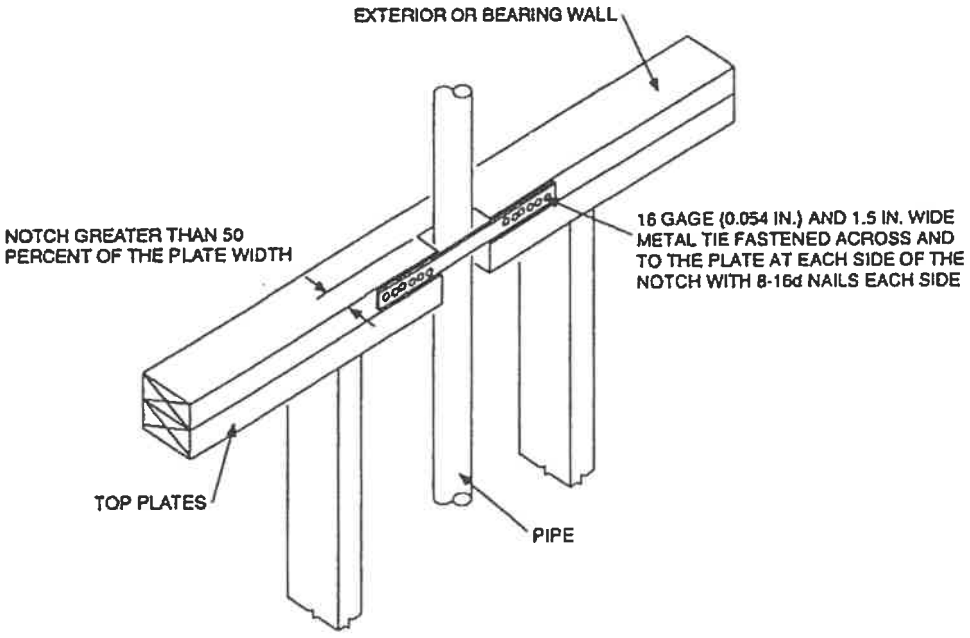
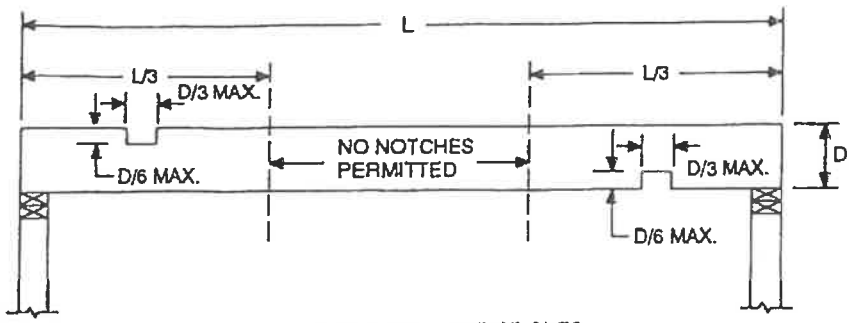
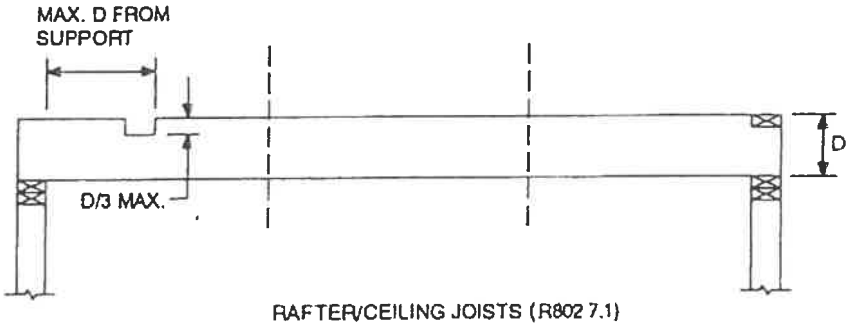


FIGURE R602.6.1
TOP PLATE FRAMING TO ACCOMMODATE PIPING



FLOOR JOIST—CENTER CUTS

FLOOR JOIST—END CUTS



RAFTER/CEILING JOISTS (R802 7.1)

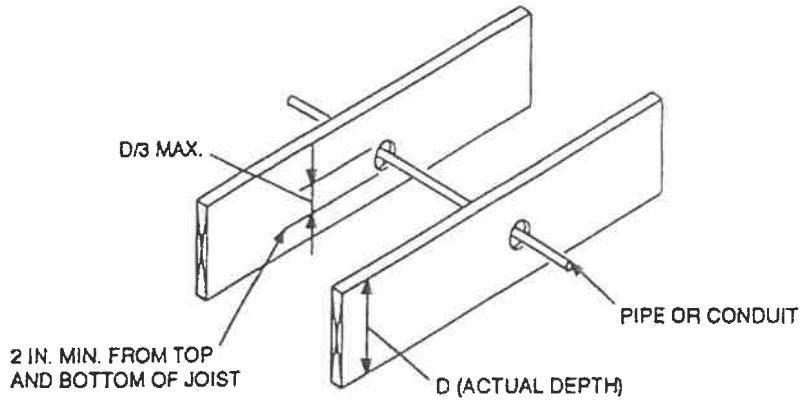


FIGURE R502.8
CUTTING, NOTCHING AND DRILLING

Though the prescribed slopes as previously discussed are concerned with the first 10 feet away from the structure, the IRC also has requirements for drainage to an approved location such as a storm drain, storm sewer inlet, or the street gutter that leads to a storm drain. The drainage design must consider the entire lot for any impediments to drainage during heavy rains. **[Ref. R401.3, R403.1.7.3]**

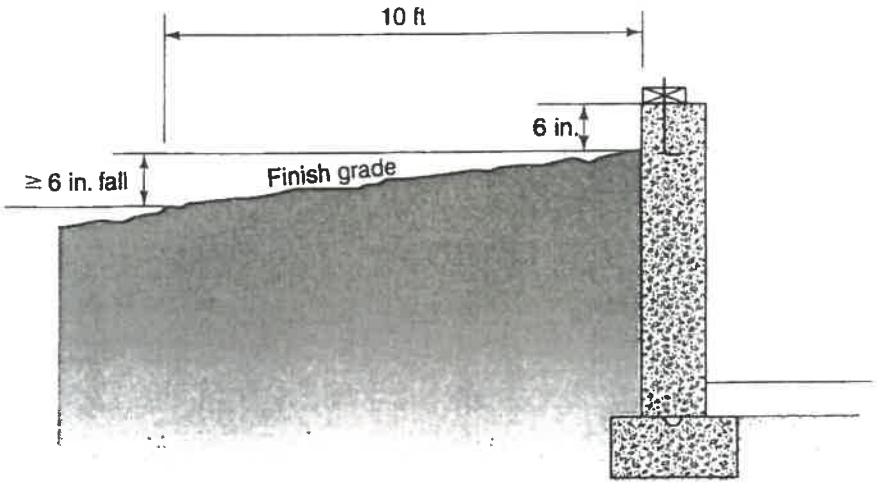


FIGURE 3-8 Grade sloped 6 inches in 10 feet to provide surface drainage away from foundation

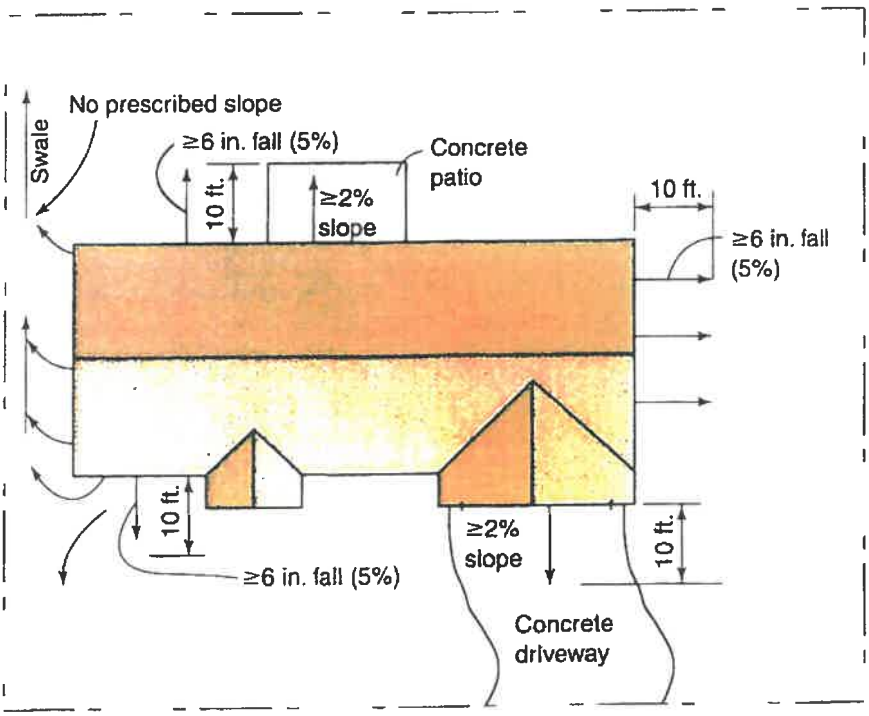


FIGURE 3-9 Grade to ensure surface drainage away from structure

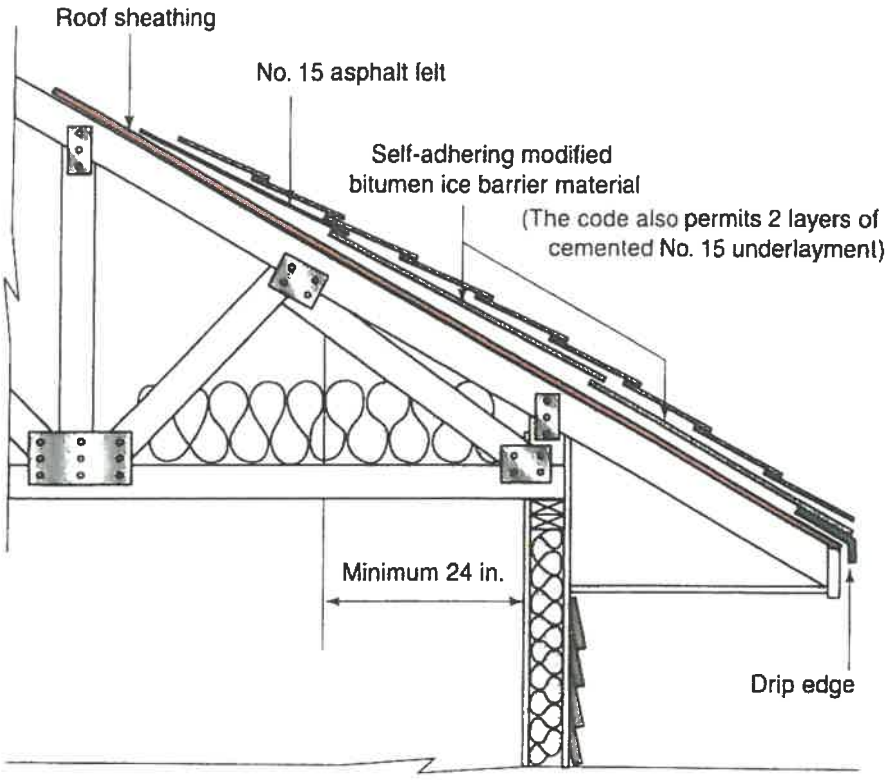
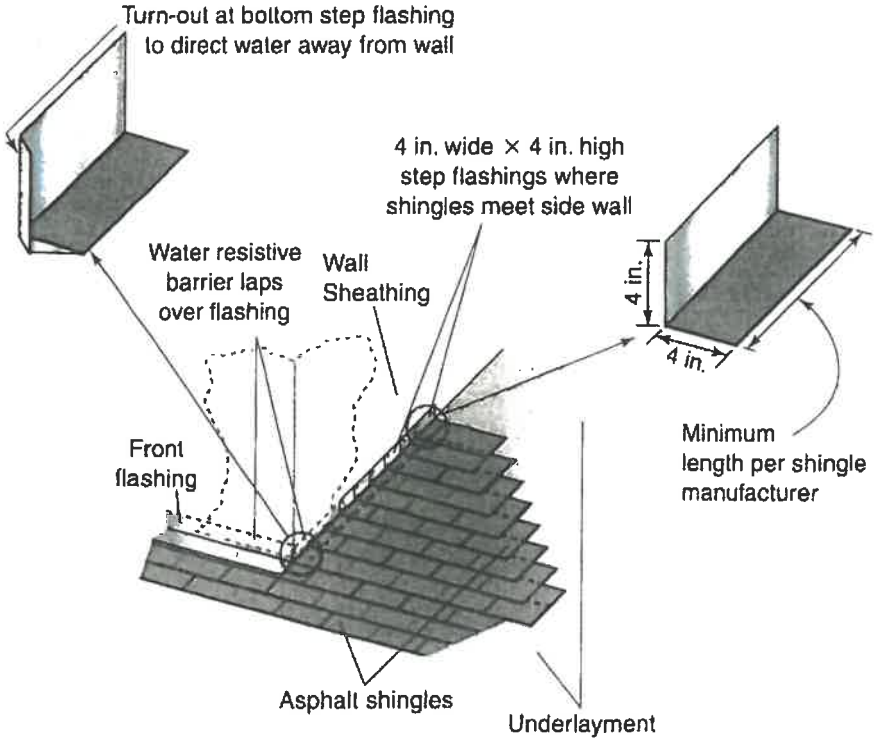


FIGURE 7-9 Ice barrier



Sidewall flashing for asphalt shingles

FIGURE 7-10 Sidewall step flashing

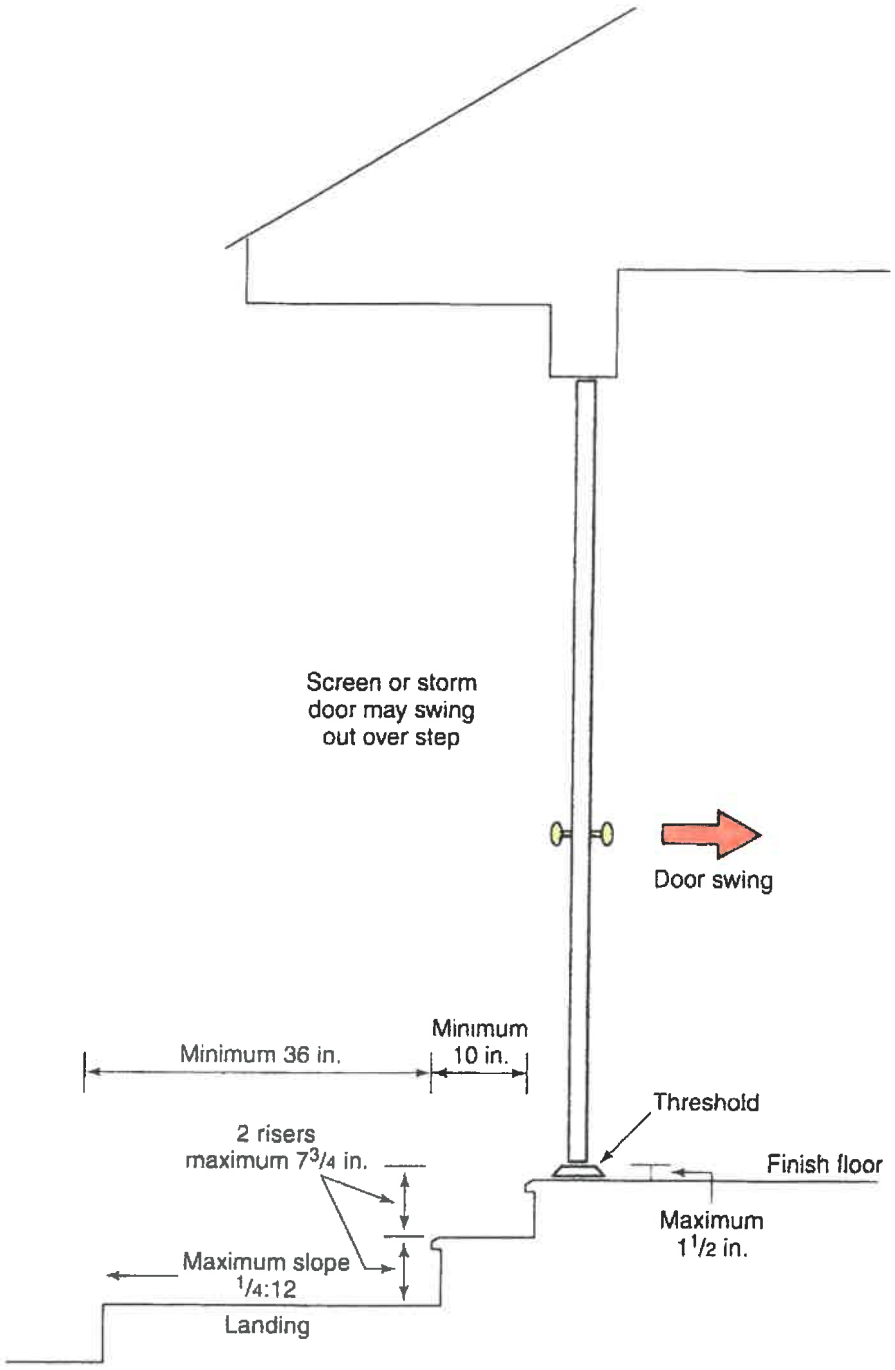


FIGURE 8-6 Steps at exterior door that is not the required exit

PROTECTION FROM FALLS

The IRC intends to protect dwelling occupants from fall injuries at prescribed locations considered hazardous by regulating the design and installation of guards and the height of window sills.

Guards

The IRC generally requires a minimum 36-inch-high guard as protection against falling from a walking surface to a lower surface more than 30 inches below. In determining where a guard is required, the vertical

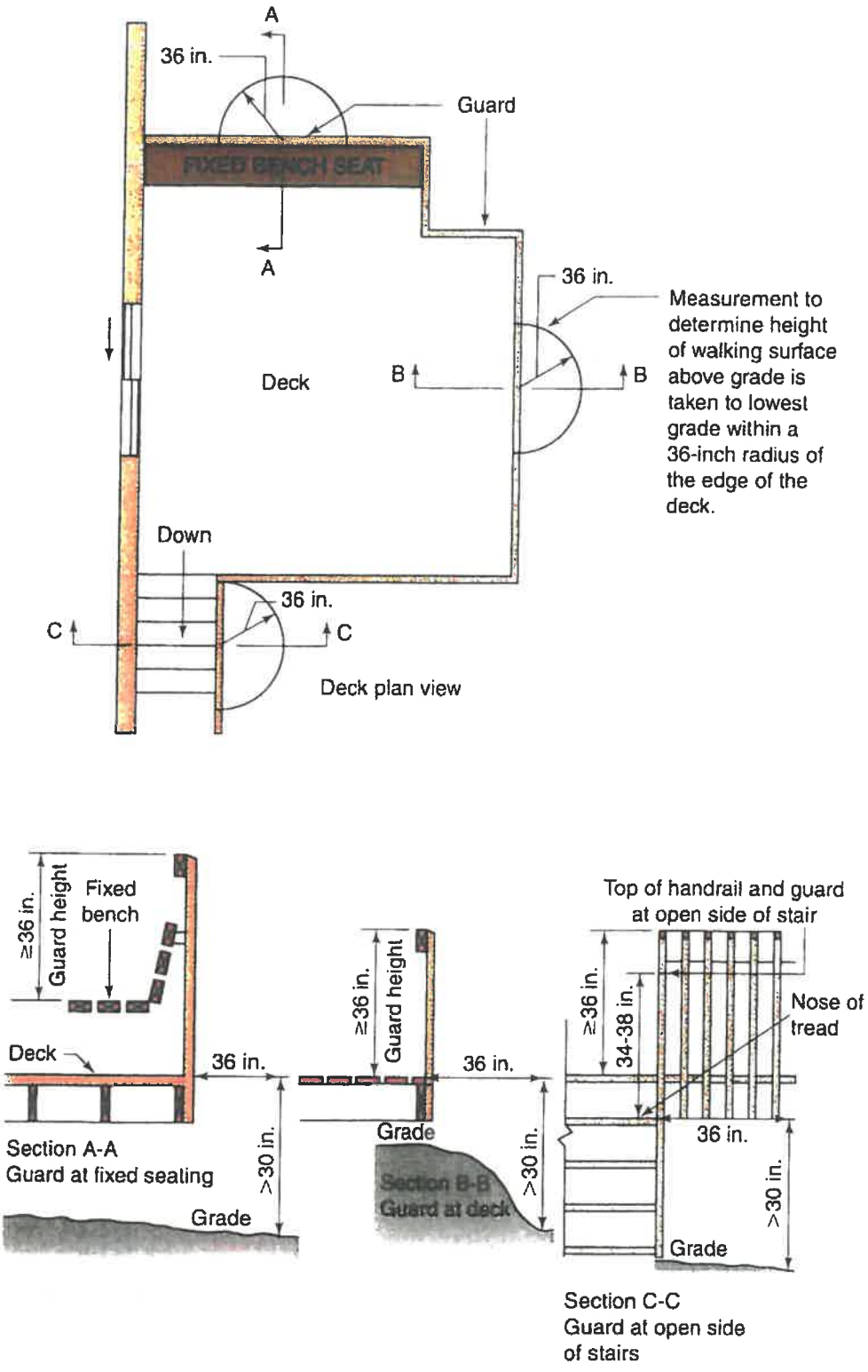


FIGURE 8-15 Determining guard locations and minimum heights

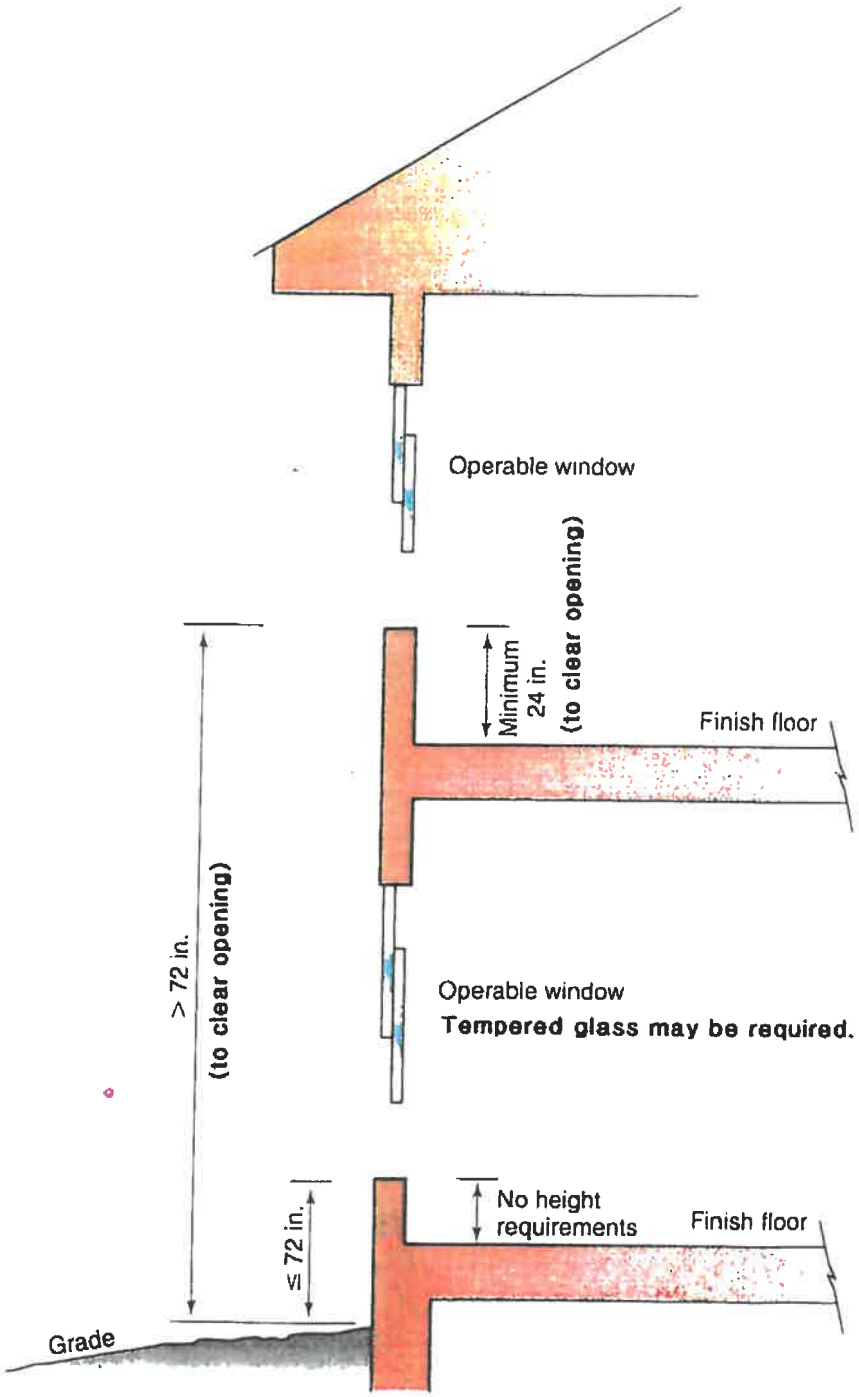


FIGURE 8-17 Window-sill height

EMERGENCY ESCAPE AND RESCUE OPENINGS

One of the most important safety provisions in the IRC concerns openings for emergency escapes and rescues. These openings provide alternate means to escape from a sleeping room or basement in the event that a fire or other emergency blocks the usual path of egress. They allow occupants to escape directly to the safety of the outdoors and

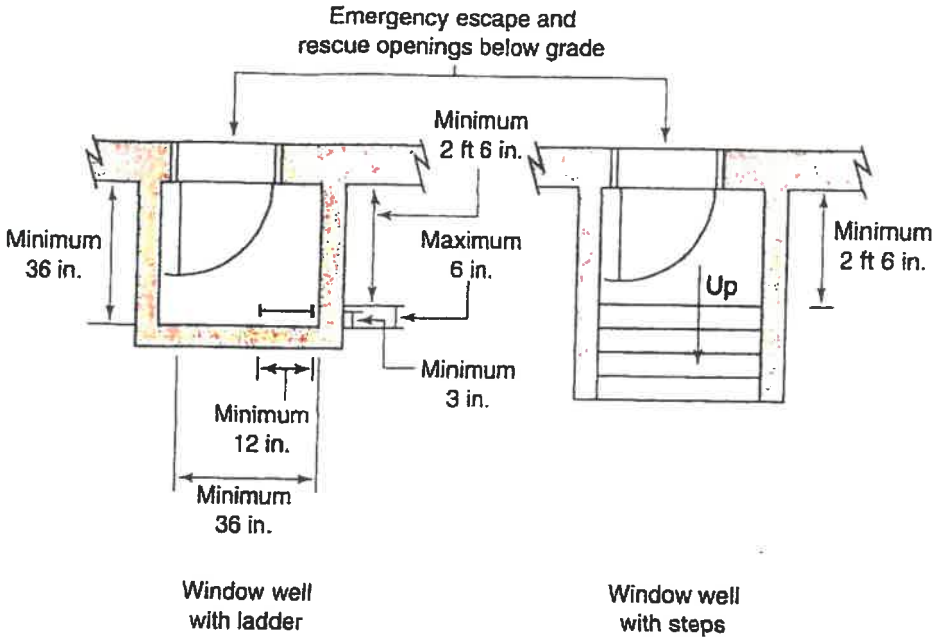


FIGURE 8-21 Window wells for emergency escape and rescue windows

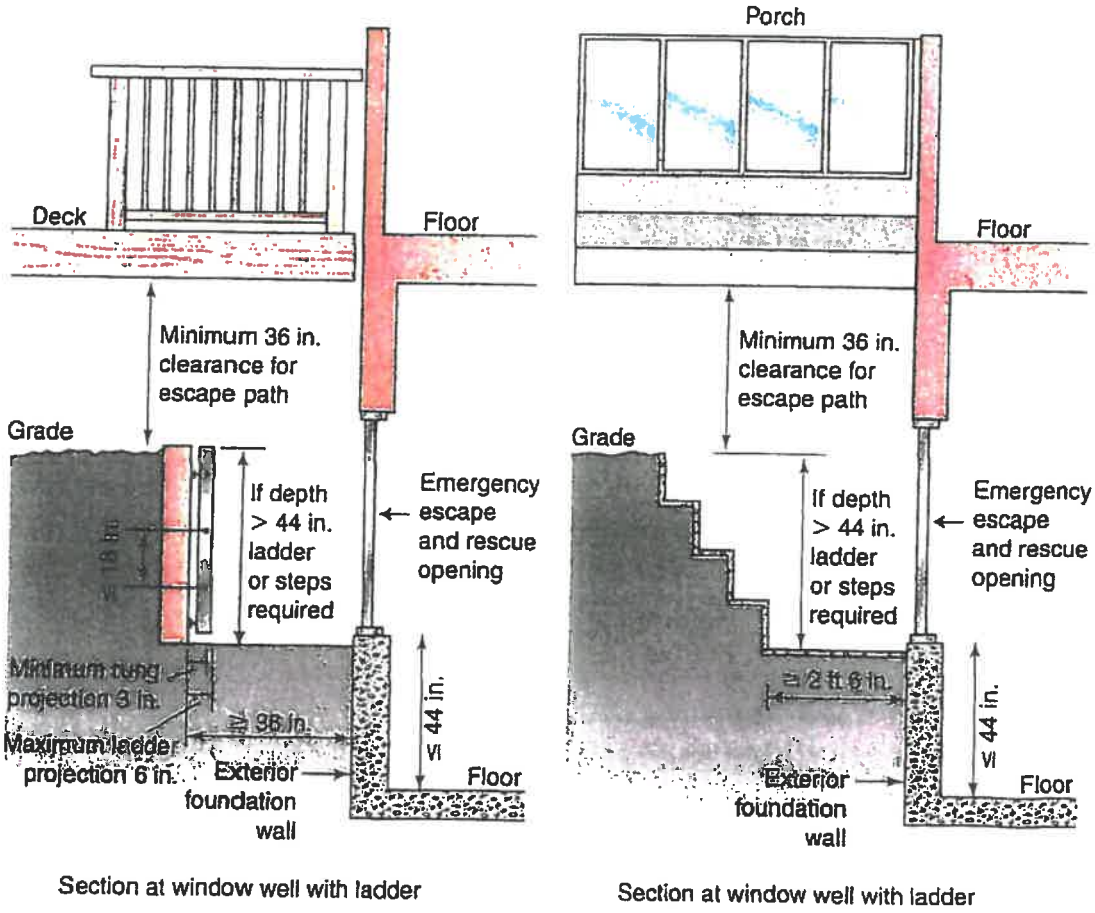


FIGURE 8-22 Window well section views

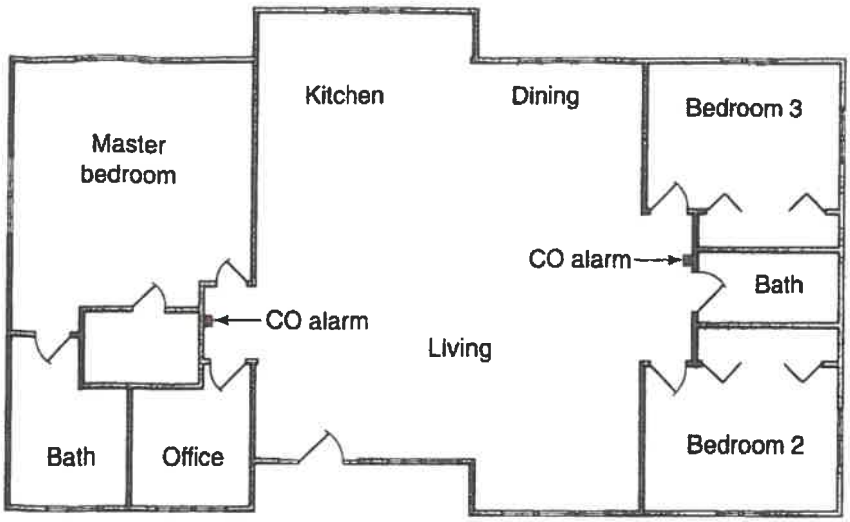


FIGURE 10-4 Carbon monoxide (CO) alarm installed in the immediate vicinity of each sleeping area

and 2 feet from exterior walls. The code does not require the installation of an air conditioning or comfort cooling system. When mechanical equipment for heating or cooling is installed, it must comply with the mechanical and fuel-gas provisions of the IRC (see Chapter 12 of this publication). **[Ref. R303.8]**

SANITATION

In the building planning chapter of the code, the IRC establishes basic requirements for bathroom and kitchen fixtures, clearance dimensions, hot and cold water, and sewer connection. Installation must also comply with the specific requirements of the IRC plumbing provisions (see Chapter 13 of this publication).

Toilet and bathing facilities

In order to maintain a healthy and sanitary living environment, a residence must provide facilities for toilet, bathing, and handwashing purposes. The IRC requires at least one water closet, one lavatory, and a bathtub or shower in every dwelling unit. Each fixture must be connected to an approved water supply and sewer. Lavatories, bathtubs, showers, and bidets require connection to both hot and cold water supply. **[Ref. R306]**

The IRC prescribes minimum clearance dimensions around bathroom fixtures so that occupants can reasonably access and use the fixtures. The minimum size of a shower is also set at 30 inches by 30 inches, though the IRC plumbing provisions provide an alternative for a narrower shower compartment with a greater area. In this case, the minimum inside width of the shower compartment is 25 inches, and the minimum inside area is 1300 square inches, which correlates to the approximate inside dimensions

TABLE R802.4(2)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable attics with limited storage, live load = 20 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf			
			2 × 4	2 × 6	2 × 8	2 × 10
			Maximum ceiling joist spans			
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Douglas fir-larch	SS	10-5	16-4	21-7	Note a
	Douglas fir-larch	#1	10-0	15-9	20-1	24-6
	Douglas fir-larch	#2	9-10	15-0	19-1	23-3
	Douglas fir-larch	#3	7-10	11-6	14-7	17-9
	Hem-fir	SS	9-10	15-6	20-5	Note a
	Hem-fir	#1	9-8	15-2	19-10	24-3
	Hem-fir	#2	9-2	14-5	18-6	22-7
	Hem-fir	#3	7-8	11-2	14-2	17-4
	Southern pine	SS	10-3	16-1	21-2	Note a
	Southern pine	#1	9-10	15-6	20-5	24-0
	Southern pine	#2	9-3	13-11	17-7	20-11
	Southern pine	#3	7-2	10-6	13-3	16-1
	Spruce-pine-fir	SS	9-8	15-2	19-11	25-5
	Spruce-pine-fir	#1	9-5	14-9	18-9	22-11
	Spruce-pine-fir	#2	9-5	14-9	18-9	22-11
	Spruce-pine-fir	#3	7-8	11-2	14-2	17-4
16	Douglas fir-larch	SS	9-6	14-11	19-7	25-0
	Douglas fir-larch	#1	9-1	13-9	17-5	21-3
	Douglas fir-larch	#2	8-11	13-0	16-6	20-2
	Douglas fir-larch	#3	6-10	9-11	12-7	15-5
	Hem-fir	SS	8-11	14-1	18-6	23-8
	Hem-fir	#1	8-9	13-7	17-2	21-0
	Hem-fir	#2	8-4	12-8	16-0	19-7
	Hem-fir	#3	6-8	9-8	12-4	15-0
	Southern pine	SS	9-4	14-7	19-3	24-7
	Southern pine	#1	8-11	14-0	17-9	20-9
	Southern pine	#2	8-0	12-0	15-3	18-1
	Southern pine	#3	6-2	9-2	11-6	14-0
	Spruce-pine-fir	SS	8-9	13-9	18-1	23-1
	Spruce-pine-fir	#1	8-7	12-10	16-3	19-10
	Spruce-pine-fir	#2	8-7	12-10	16-3	19-10
	Spruce-pine-fir	#3	6-8	9-8	12-4	15-0

(continued)

TABLE R802.4(2)—continued
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable attics with limited storage, live load = 20 psf, L/Δ = 240)

CEILING JOIST SPACING (Inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf			
			2 × 4	2 × 6	2 × 8	2 × 10
			Maximum ceiling joist spans			
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
19.2	Douglas fir-larch	SS	8-11	14-0	18-5	23-7
	Douglas fir-larch	#1	8-7	12-6	15-10	19-5
	Douglas fir-larch	#2	8-2	11-11	15-1	18-5
	Douglas fir-larch	#3	6-2	9-1	11-6	14-1
	Hem-fir	SS	8-5	13-3	17-5	22-3
	Hem-fir	#1	8-3	12-4	15-8	19-2
	Hem-fir	#2	7-10	11-7	14-8	17-10
	Hem-fir	#3	6-1	8-10	11-3	13-8
	Southern pine	SS	8-9	13-9	18-2	23-1
	Southern pine	#1	8-5	12-9	16-2	18-11
	Southern pine	#2	7-4	11-0	13-11	16-6
	Southern pine	#3	5-8	8-4	10-6	12-9
	Spruce-pine-fir	SS	8-3	12-11	17-1	21-8
	Spruce-pine-fir	#1	8-0	11-9	14-10	18-2
	Spruce-pine-fir	#2	8-0	11-9	14-10	18-2
	Spruce-pine-fir	#3	6-1	8-10	11-3	13-8
24	Douglas fir-larch	SS	8-3	13-0	17-2	21-3
	Douglas fir-larch	#1	7-8	11-2	14-2	17-4
	Douglas fir-larch	#2	7-3	10-8	13-6	16-5
	Douglas fir-larch	#3	5-7	8-1	10-3	12-7
	Hem-fir	SS	7-10	12-3	16-2	20-6
	Hem-fir	#1	7-7	11-1	14-0	17-1
	Hem-fir	#2	7-1	10-4	13-1	16-0
	Hem-fir	#3	5-5	7-11	10-0	12-3
	Southern pine	SS	8-1	12-9	16-10	21-6
	Southern pine	#1	7-8	11-5	14-6	16-11
	Southern pine	#2	6-7	9-10	12-6	14-9
	Southern pine	#3	5-1	7-5	9-5	11-5
	Spruce-pine-fir	SS	7-8	12-0	15-10	19-5
	Spruce-pine-fir	#1	7-2	10-6	13-3	16-3
	Spruce-pine-fir	#2	7-2	10-6	13-3	16-3
	Spruce-pine-fir	#3	5-5	7-11	10-0	12-3

Check sources for availability of lumber in lengths greater than 20 feet.
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.
a. Span exceeds 26 feet in length.

TABLE R602.7(1)
GIRDER SPANS[a] AND HEADER SPANS[a] FOR EXTERIOR BEARING WALLS
(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir[b] and required number of jack studs)

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD (psf)[e]																	
		30						50						70					
		Building width[c] (feet)																	
		20		28		36		20		28		36		20		28		36	
		Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]	Span	NJ[d]
Roof and ceiling	1-2 × 8	4-6	1	3-10	1	3-5	1	3-9	1	3-2	1	2-10	2	—	—	—	—	—	—
	1-2 × 10	5-8	1	4-11	1	4-4	1	4-9	1	4-1	1	3-7	2	—	—	—	—	—	—
	1-2 × 12	6-11	1	5-11	2	5-3	2	5-9	2	4-8	2	3-8	2	—	—	—	—	—	—
	2-2 × 4	3-6	1	3-2	1	2-10	1	3-2	1	2-9	1	2-6	1	2-10	1	2-6	1	2-3	1
	2-2 × 6	5-5	1	4-8	1	4-2	1	4-8	1	4-1	1	3-8	2	4-2	1	3-8	2	3-3	2
	2-2 × 8	6-10	1	5-11	2	5-4	2	5-11	2	5-2	2	4-7	2	5-4	2	4-7	2	4-1	2
	2-2 × 10	8-5	2	7-3	2	6-6	2	7-3	2	6-3	2	5-7	2	6-6	2	5-7	2	5-0	2
	2-2 × 12	9-9	2	8-5	2	7-6	2	8-5	2	7-3	2	6-6	2	7-6	2	6-6	2	5-10	3
	3-2 × 8	8-4	1	7-5	1	6-8	1	7-5	1	6-5	2	5-9	2	6-8	1	5-9	2	5-2	2
	3-2 × 10	10-6	1	9-1	2	8-2	2	9-1	2	7-10	2	7-0	2	8-2	2	7-0	2	6-4	2
	3-2 × 12	12-2	2	10-7	2	9-5	2	10-7	2	9-2	2	8-2	2	9-5	2	8-2	2	7-4	2
	4-2 × 8	9-2	1	8-4	1	7-8	1	8-4	1	7-5	1	6-8	1	7-8	1	6-8	1	5-11	2
	4-2 × 10	11-8	1	10-6	1	9-5	2	10-6	1	9-1	2	8-2	2	9-5	2	8-2	2	7-3	2
	4-2 × 12	14-1	1	12-2	2	10-11	2	12-2	2	10-7	2	9-5	2	10-11	2	9-5	2	8-5	2
Roof, ceiling and one center-bearing floor	1-2 × 8	3-11	1	3-5	1	3-0	1	3-7	1	3-0	2	2-8	2	—	—	—	—	—	—
	1-2 × 10	5-0	2	4-4	2	3-10	2	4-6	2	3-11	2	3-4	2	—	—	—	—	—	—
	1-2 × 12	5-10	2	4-9	2	4-2	2	5-5	2	4-2	2	3-4	2	—	—	—	—	—	—
	2-2 × 4	3-1	1	2-9	1	2-5	1	2-9	1	2-5	1	2-2	1	2-7	1	2-3	1	2-0	1
	2-2 × 6	4-6	1	4-0	1	3-7	2	4-1	1	3-7	2	3-3	2	3-9	2	3-3	2	2-11	2
	2-2 × 8	5-9	2	5-0	2	4-6	2	5-2	2	4-6	2	4-1	2	4-9	2	4-2	2	3-9	2
	2-2 × 10	7-0	2	6-2	2	5-6	2	6-4	2	5-6	2	5-0	2	5-9	2	5-1	2	4-7	3
	2-2 × 12	8-1	2	7-1	2	6-5	2	7-4	2	6-5	2	5-9	3	6-8	2	5-10	3	5-3	3
	3-2 × 8	7-2	1	6-3	2	5-8	2	6-5	2	5-8	2	5-1	2	5-11	2	5-2	2	4-8	2
	3-2 × 10	8-9	2	7-8	2	6-11	2	7-11	2	6-11	2	6-3	2	7-3	2	6-4	2	5-8	2
	3-2 × 12	10-2	2	8-11	2	8-0	2	9-2	2	8-0	2	7-3	2	8-5	2	7-4	2	6-7	2
	4-2 × 8	8-1	1	7-3	1	6-7	1	7-5	1	6-6	1	5-11	2	6-10	1	6-0	2	5-5	2
	4-2 × 10	10-1	1	8-10	2	8-0	2	9-1	2	8-0	2	7-2	2	8-4	2	7-4	2	6-7	2
	4-2 × 12	11-9	2	10-3	2	9-3	2	10-7	2	9-3	2	8-4	2	9-8	2	8-6	2	7-7	2
Roof, ceiling and one clear span floor	1-2 × 8	3-6	1	3-0	1	2-8	1	3-5	1	2-11	1	2-7	2	—	—	—	—	—	—
	1-2 × 10	4-6	1	3-10	1	3-3	1	4-4	1	3-9	1	3-1	2	—	—	—	—	—	—
	1-2 × 12	5-6	1	4-2	2	3-3	2	5-4	2	3-11	2	3-1	2	—	—	—	—	—	—
	2-2 × 4	2-8	1	2-4	1	2-1	1	2-7	1	2-3	1	2-0	1	2-5	1	2-1	1	1-10	1
	2-2 × 6	3-11	1	3-5	2	3-0	2	3-10	2	3-4	2	3-0	2	3-6	2	3-1	2	2-9	2
	2-2 × 8	5-0	2	4-4	2	3-10	2	4-10	2	4-2	2	3-9	2	4-6	2	3-11	2	3-6	2
	2-2 × 10	6-1	2	5-3	2	4-8	2	5-11	2	5-1	2	4-7	3	5-6	2	4-9	2	4-3	3
	2-2 × 12	7-1	2	6-1	3	5-5	3	6-10	2	5-11	3	5-4	3	6-4	2	5-6	3	5-0	3
	3-2 × 8	6-3	2	5-5	2	4-10	2	6-1	2	5-3	2	4-8	2	5-7	2	4-11	2	4-5	2
	3-2 × 10	7-7	2	6-7	2	5-11	2	7-5	2	6-5	2	5-9	2	6-10	2	6-0	2	5-4	2
	3-2 × 12	8-10	2	7-8	2	6-10	2	8-7	2	7-5	2	6-8	2	7-11	2	6-11	2	6-3	2
	4-2 × 8	7-2	1	6-3	2	5-7	2	7-0	1	6-1	2	5-5	2	6-6	1	5-8	2	5-1	2
	4-2 × 10	8-9	2	7-7	2	6-10	2	8-7	2	7-5	2	6-7	2	7-11	2	6-11	2	6-2	2
	4-2 × 12	10-2	2	8-10	2	7-11	2	9-11	2	8-7	2	7-8	2	9-2	2	8-0	2	7-2	2

(continued)

TABLE R802.5.1(7)
RAFTER SPANS FOR 70 PSF GROUND SNOW LOAD
(Ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum Rafter Spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	SS	7-7	11-10	15-8	19-9	22-10	7-7	11-10	15-3	18-7	21-7
	Douglas fir-larch	#1	7-1	10-5	13-2	16-1	18-8	6-8	9-10	12-5	15-2	17-7
	Douglas fir-larch	#2	6-9	9-10	12-6	15-3	17-9	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-10	7-1	9-0	11-0	12-9
	Hem-fir	SS	7-2	11-3	14-9	18-10	22-1	7-2	11-3	14-8	18-0	20-10
	Hem-fir	#1	7-0	10-3	13-0	15-11	18-5	6-7	9-8	12-3	15-0	17-5
	Hem-fir	#2	6-7	9-7	12-2	14-10	17-3	6-2	9-1	11-5	14-0	16-3
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
	Southern pine	SS	7-5	11-8	15-4	19-7	23-7	7-5	11-8	15-4	18-10	22-3
	Southern pine	#1	7-1	10-7	13-5	15-9	18-8	6-9	10-0	12-8	14-10	17-7
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-9	8-7	10-11	12-11	15-3
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-5	6-6	8-3	10-0	11-10
	Spruce-pine-fir	SS	7-0	11-0	14-6	18-0	20-11	7-0	11-0	13-11	17-0	19-8
	Spruce-pine-fir	#1	6-8	9-9	12-4	15-1	17-6	6-3	9-2	11-8	14-2	16-6
	Spruce-pine-fir	#2	6-8	9-9	12-4	15-1	17-6	6-3	9-2	11-8	14-2	16-6
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
16	Douglas fir-larch	SS	6-10	10-9	14-0	17-1	19-10	6-10	10-5	13-2	16-1	18-8
	Douglas fir-larch	#1	6-2	9-0	11-5	13-11	16-2	5-10	8-6	10-9	13-2	15-3
	Douglas fir-larch	#2	5-10	8-7	10-10	13-3	15-4	5-6	8-1	10-3	12-6	14-6
	Douglas fir-larch	#3	4-6	6-6	8-3	10-1	11-9	4-3	6-2	7-10	9-6	11-1
	Hem-fir	SS	6-6	10-2	13-5	16-6	19-2	6-6	10-1	12-9	15-7	18-0
	Hem-fir	#1	6-1	8-11	11-3	13-9	16-0	5-9	8-5	10-8	13-0	15-1
	Hem-fir	#2	5-8	8-4	10-6	12-10	14-11	5-4	7-10	9-11	12-1	14-1
	Hem-fir	#3	4-4	6-4	8-1	9-10	11-5	4-1	6-0	7-7	9-4	10-9
	Southern pine	SS	6-9	10-7	14-0	17-4	20-5	6-9	10-7	13-9	16-4	19-3
	Southern pine	#1	6-2	9-2	11-8	13-8	16-2	5-10	8-8	11-0	12-10	15-3
	Southern pine	#2	5-3	7-11	10-0	11-11	14-0	5-0	7-5	9-5	11-3	13-2
	Southern pine	#3	4-1	6-0	7-7	9-2	10-10	3-10	5-8	7-1	8-8	10-3
	Spruce-pine-fir	SS	6-4	10-0	12-9	15-7	18-1	6-4	9-6	12-0	14-8	17-1
	Spruce-pine-fir	#1	5-9	8-5	10-8	13-1	15-2	5-5	7-11	10-1	12-4	14-3
	Spruce-pine-fir	#2	5-9	8-5	10-8	13-1	15-2	5-5	7-11	10-1	12-4	14-3
	Spruce-pine-fir	#3	4-4	6-4	8-1	9-10	11-5	4-1	6-0	7-7	9-4	10-9
19.2	Douglas fir-larch	SS	6-6	10-1	12-9	15-7	18-1	6-6	9-6	12-0	14-8	17-1
	Douglas fir-larch	#1	5-7	8-3	10-5	12-9	14-9	5-4	7-9	9-10	12-0	13-11
	Douglas fir-larch	#2	5-4	7-10	9-11	12-1	14-0	5-0	7-4	9-4	11-5	13-2
	Douglas fir-larch	#3	4-1	6-0	7-7	9-3	10-8	3-10	5-7	7-1	8-8	10-1
	Hem-fir	SS	6-1	9-7	12-4	15-1	17-4	6-1	9-2	11-8	14-2	15-5
	Hem-fir	#1	5-7	8-2	10-3	12-7	14-7	5-3	7-8	9-8	11-10	13-9
	Hem-fir	#2	5-2	7-7	9-7	11-9	13-7	4-11	7-2	9-1	11-1	12-10
	Hem-fir	#3	4-0	5-10	7-4	9-0	10-5	3-9	5-6	6-11	8-6	9-10

(continued)

TABLE R802.5.1(7)—continued
RAFTER SPANS FOR 70 PSF GROUND SNOW LOAD
(Ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum Rafter Spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
19.2	Southern pine	SS	6-4	10-0	13-2	15-10	18-8	6-4	9-10	12-6	14-11	17-7
	Southern pine	#1	5-8	8-5	10-8	12-5	14-9	5-4	7-11	10-0	11-9	13-11
	Southern pine	#2	4-10	7-3	9-2	10-10	12-9	4-6	6-10	8-8	10-3	12-1
	Southern pine	#3	3-8	5-6	6-11	8-4	9-11	3-6	5-2	6-6	7-11	9-4
	Spruce-pine-fir	SS	6-0	9-2	11-8	14-3	16-6	5-11	8-8	11-0	13-5	15-7
	Spruce-pine-fir	#1	5-3	7-8	9-9	11-11	13-10	5-0	7-3	9-2	11-3	13-0
	Spruce-pine-fir	#2	5-3	7-8	9-9	11-11	13-10	5-0	7-3	9-2	11-3	13-0
	Spruce-pine-fir	#3	4-0	5-10	7-4	9-0	10-5	3-9	5-6	6-11	8-6	9-10
24	Douglas fir-larch	SS	6-0	9-0	11-5	13-11	16-2	5-10	8-6	10-9	13-2	15-3
	Douglas fir-larch	#1	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
	Douglas fir-larch	#2	4-9	7-0	8-10	10-10	12-6	4-6	6-7	8-4	10-2	11-10
	Douglas fir-larch	#3	3-8	5-4	6-9	8-3	9-7	3-5	5-0	6-4	7-9	9-10
	Hem-fir	SS	5-8	8-8	11-0	13-6	13-11	5-7	8-3	10-5	12-4	12-4
	Hem-fir	#1	5-0	7-3	9-2	11-3	13-0	4-8	6-10	8-8	10-7	12-4
	Hem-fir	#2	4-8	6-9	8-7	10-6	12-2	4-4	6-5	8-1	9-11	11-6
	Hem-fir	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10
	Southern pine	SS	5-11	9-3	11-11	14-2	16-8	5-11	8-10	11-2	13-4	15-9
	Southern pine	#1	5-0	7-6	9-6	11-1	13-2	4-9	7-1	9-0	10-6	12-5
	Southern pine	#2	4-4	6-5	8-2	9-9	11-5	4-1	6-1	7-9	9-2	10-9
	Southern pine	#3	3-4	4-11	6-2	7-6	8-10	3-1	4-7	5-10	7-1	8-4
	Spruce-pine-fir	SS	5-6	8-3	10-5	12-9	14-9	5-4	7-9	9-10	12-0	12-11
	Spruce-pine-fir	#1	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	10-0	11-8
	Spruce-pine-fir	#2	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	10-0	11-8
	Spruce-pine-fir	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm. 1 foot = 304.8 mm. 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the following factors:

H_C/H_R	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 or less	1.00

where:

H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

H_R = Height of roof ridge measured vertically above the top of the rafter support walls.