

 **MECKLENBURG COUNTY**  
**Code Enforcement**  
*www.meckpermit.com*



**RESIDENTIAL CONSTRUCTION  
HANDBOOK  
2009**

Revised 4.1.09

RE:NC RESIDENTIAL BUILDING CODE '09

## PREFACE

This Booklet was published to answer some of the most asked questions about the new International Residential Code, which became effective on January 1, 2009. This handbook is only to be used as a guide and is not intended to be a substitute for the North Carolina Residential Building Code. If a conflict is found between these two publications, the State Code will prevail. The proper section number found in the North Carolina Residential Building Code will follow each question. The correct answer will follow the section number.

To better serve our customers, a form has been added for your convenience at the end of this booklet. If you have any questions, tables, or illustrations, that would be beneficial in the future edition of this handbook, please fill out the form and fax or mail to the address provided.



### Residential Plan Submittal Process

**Effective April 1, 2009**, the Residential Plans Submittal Process will implement new requirements for project submittals. Residential projects that meet the following conditions will require building plan review:

- A. Full building review on all townhouse projects, including footprint additions or structural modifications. A per unit Master Plan Program is available; only individual units are eligible.
- B. All new one and two family residences.
- C. Any enclosed addition to the primary residence, which increases the original footprint. This excludes decks and screen porches.
- D. Interior renovation projects valued equal to or greater than \$175,000
- E. Projects of unconventional building methods (approved alternate methods or methods outside of the NC Residential Code).
- F. Adding a second or third level
- G. Any accessory building ( garage ,storage shed) exceeding 400 square feet or more than one level.

Basic requirements for plan submittal are:

- A. Plans drawn to scale.
- B. Designer, engineer, or architect name, telephone and address.
- C. Property owner name/ address/ pin of job.
- D. Plan size : a minimum 8 1/2 x11 for projects 500 square foot and under.
- E. Plan size : a minimum 11 x 17 for projects over 500 square foot.

**Plans should show all dimensions of footings/foundation, framing details (floor/wall/roof) and elevations. Provide all construction material types including roof/wall coverings and energy requirements**

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## **PERMITS**

### **1. *When is a permit required?***

**NCACP Section 204.3.1** No person may commence or proceed with the construction, reconstruction, alteration, repair, movement to another site, removal or demolition of any building without first securing from the Inspection Department with jurisdiction over the site of the work any and all permits required by the State Building Code.

**EXCEPTION:** Permits shall not be required for any work costing five thousand dollars or less, UNLESS THE WORK INVOLVES:

- (1) the addition, repair or replacement of load bearing members or structures;
- (2) The installation, extension or general repair of any plumbing system;
- (3) the installation, extension, alteration or general repair of any heating or cooling system;
- (4) the installation, extension, alteration of an electrical wire system;
- (5) the use of materials not permitted by this code; or
- (6) the addition of roofing, excluding replacement of like grade of fire resistance roofing.

### **2. *Is labor cost included in the total cost of the permit valuation?***

**NCACP Section 204.6** Yes, permit valuations shall include total cost, such as electrical, gas, mechanical, plumbing equipment, fire protection and other systems, including materials and labor.

### **3. *Do plans need to be on site?***

**NCACP Section 106.2** Yes, a copy of all plans shall be kept at the building site as near as possible to the permit placard for the building official during inspections. (Including roof & floor truss drawings, engineering reports and/or repairs etc...).

**NCACP is the North Carolina Administrative Code and Policies, 2009. All other references are for the North Carolina Residential Code, 2009.**

**PERMITS (con't)**

**4. Does an accessory building need permits?**

**Section R101** No, all accessory buildings do not require a permit. However, if the accessory building is greater than twelve (12) feet in any dimension it will require a building permit and be required to meet the provisions of this code.

Any building not meeting the above would only require a zoning permit.

Accessory buildings requiring a building permit may be constructed without a masonry or concrete foundation provided all of the following conditions are met:

- A. The building shall not exceed 400 sq. ft or one story in height;
- B. The building is supported on a wood foundation of a minimum 2x6 or 3x4 mud sill of approved wood in accordance with Section 323.
- C. The building is anchored to resist overturning and sliding by installing a minimum of one ground anchor at each corner of the building. The total resisting force of all anchors shall be equal to 20 psf times the plan area of the building.

**5. What is an accessory structure?**

**Section R202** It is any structure that is not roofed over or enclosed such as fencing, arbors barbecue pits, etc. They are not required to meet the provisions of this code. **Decks, gazebos and retaining walls over 4 feet high are also accessory structures but they must meet the requirements of this code.**

## **BUILDING PLANNING**

### **1. *When is a one-hour exterior wall required in a single-family residence?***

**Section R302** Exterior walls with a fire separation distance less than 3 feet shall have not less than a one-hour fire-resistive rating with exposure from both sides. Projections beyond the exterior wall shall not extend more than 12 inches. Openings shall not be permitted in exterior walls less than 3 feet from the property line. This distance shall be measured perpendicular to the line used to determine the fire separation distance.

### **2. *What is the minimum ceiling height?***

**Section R305** Habitable rooms, hallways, corridors, bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 7 feet. The required height shall be measured from the finished floor to the lowest projection from the ceiling. Basements can be 6 feet 8 inches.

### **3. *Is a window required for a bathroom?***

**Section R303.3** Bathrooms, water closet compartments and other similar rooms shall be provided with aggregate glazing area in windows of not less than 3 square feet, one-half of which must be operable.

**Exception:** The glazed areas shall not be required where artificial light and a mechanical ventilation system are provided. The minimum ventilation rates shall be 50 cfm for intermittent ventilation or 20 cfm for continuous ventilation. Ventilation air from the space shall be exhausted directly to the outside.

### **4. *What are the minimum clearances for bathroom fixtures?***

**Section R307** (see figure R307.2) or illustration on page 54 in this book.

## **FOOTINGS**

### ***1. When is footing inspection required?***

**NCACP 107.1.1** Footing inspections shall be made after the trenches are excavated, all grade stakes are installed, all reinforcing steel and supports are in place and appropriately tied, all necessary forms are in place and braced and before any concrete is placed.

### ***2. Does a footing have to be level?***

**Section R403.1.5** No, the bottom surface of footings may have a slope not exceeding one unit vertical in ten units horizontal. Footings shall be stepped where it is necessary to change the elevation of the top surface of the footings or where the slope of the bottom surface of the footings will exceed one unit vertical in ten units horizontal.

### ***3. Is 2500 psi concrete the minimum allowable for footings?***

**Section R402.2** Yes but only under moderate weather conditions. See table for other concrete applications.

### ***4. What is the minimum footing size for a masonry fireplace?***

**Section R1003.2** The minimum footing thickness shall be at least 12 inches thick and at 12 inches beyond each side of the exterior dimensions of the chimney.

### ***5. When is a soil test required?***

**Section R401.4** When footings are excavated in areas likely to have expansive, compressible, shifting or other unknown soil characteristics or when the existing soils do not meet the 2000 psf soil bearing capacity.

Table R 403.1(a)

**PIER AND FOOTING SIZES**

<b>1 (One) Story</b>		
<u>Area</u>	<u>Pier</u>	<u>Footing</u>
<u>50</u>	<u>8" x 16"</u>	<u>1' - 4" x 2' - 0" x 8"</u>
<u>100</u>	<u>8" x 16"</u>	<u>1' - 4" x 2' - 0" x 8"</u>
<u>150</u>	<u>8" x 16"</u>	<u>2' - 0" x 2' - 0" x 8"</u>
<u>200</u>	<u>8" x 16"</u>	<u>2' - 4" x 2' - 4" x 10"</u>
<u>250</u>	—	—
<u>300</u>	—	—

<b>2 (Two) Story</b>		
<u>Area</u>	<u>Pier</u>	<u>Footing</u>
<u>50</u>	<u>8" x 16"</u>	<u>1' - 4" x 2' - 6" x 8"</u>
<u>100</u>	<u>8" x 16"</u>	<u>2' - 0" x 2' - 0" x 10"</u>
<u>150</u>	<u>16" x 16"</u>	<u>2' - 8" x 2' x - 8" x 10"</u>
<u>200</u>	<u>16" x 16"</u>	<u>3' - 0" x 3' - 0" x 10"</u>
<u>250</u>	<u>16" x 16"</u>	<u>3' - 4" x 3' - 4" x 1' - 0"</u>
<u>300</u>	<u>16" x 16"</u>	<u>3' - 8" x 3' - 8" x 1' - 0"</u>

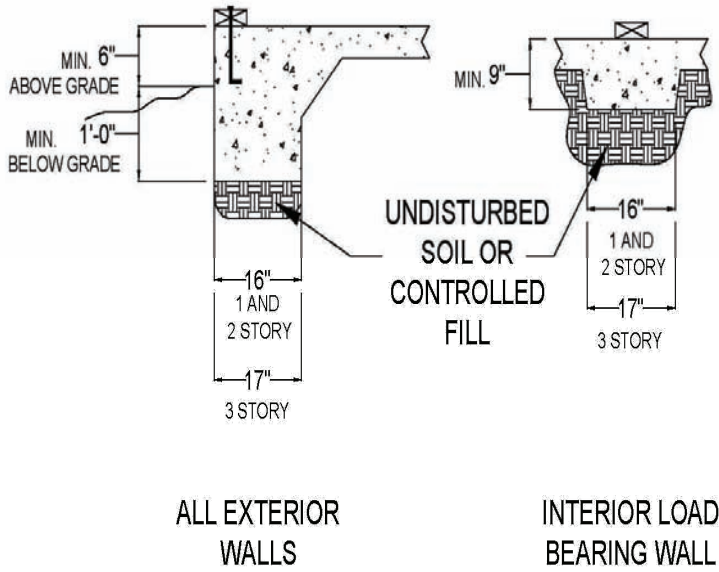
<b>2 1/2 (Two &amp; one half) Story</b>		
<u>Area</u>	<u>Pier</u>	<u>Footing</u>
<u>50</u>	<u>8" x 16"</u>	<u>1' - 4" x 2' - 6" x 8"</u>
<u>100</u>	<u>16" x 16"</u>	<u>2' - 6" x 2' - 6" x 10"</u>
<u>150</u>	<u>16" x 16"</u>	<u>3' - 0" x 3' - 0" x 10"</u>
<u>200</u>	<u>16" x 16"</u>	<u>3' - 11" x 3' - 8" x 1' - 0"</u>
<u>250</u>	<u>16" x 24"</u>	<u>4' - 0" x 4' - 0" x 1' - 0"</u>
<u>300</u>	<u>16" x 24"</u>	<u>4' - 6" x 4' - 6" x 1' - 0"</u>

\* see next page for footnotes

**FOOTNOTES**

1. Pier sizes are based on hollow CMU capped with 4" of solid masonry or concrete for one story and 8" of solid masonry or concrete for two and two and one-half story houses or shall have cavities of the top course filled with concrete or grout or other approved methods Mortar shall be Type S.
2. Footing sizes based on 2000 psf (95 760Pa) allowable soil bearing and 2500psi (17 238 kpa) concrete.
3. Centers of piers shall bear in the middle 1/3 of the footing. Girders must have full bearing on piers. Footings must be full thickness over the entire area of the footing.
4. Piers sizes given are the minimum. For height/thickness limitations, see Section 606.5.
5. Area at first level supported by pier and footing (ft<sup>2</sup>)

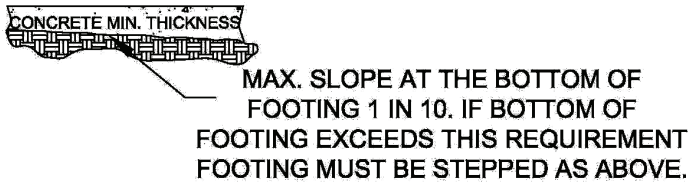
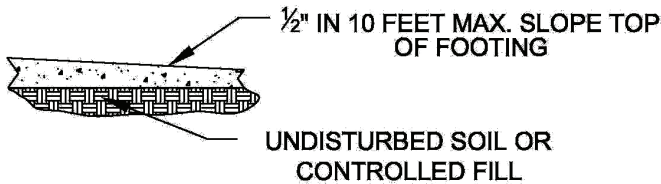
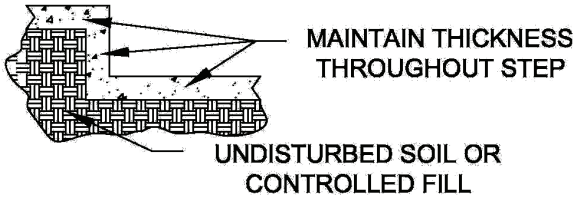
# CONCRETE SLAB FOOTING



A MINIMUM FOOTING WIDTH OF 12 INCHES IS ACCEPTABLE FOR MONOLITHIC SLAB FOUNDATIONS WHERE INDICATED IN TABLE 403.1 AS AN UNDERLINED 16. EXAMPLE: 16

SEE NCRC PG. 57

## STEP FOOTINGS

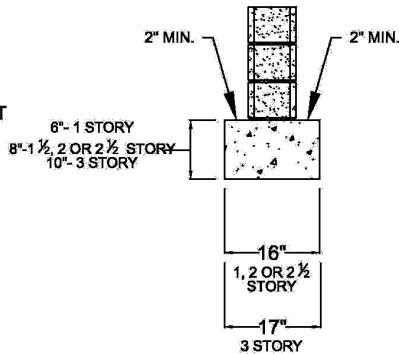


**NOTES:**

1. EXTERIOR FOOTINGS SHALL EXTEND BELOW THE FROST LINE UNLESS OTHERWISE PROTECTED AGAINST FROST HEAVE. IN NO CASE SHALL EXTERIOR FOOTINGS BE LESS THAN 12" BELOW GRADE.

2. FOOTING SIZES ARE BASED ON SOIL WITH ALLOWABLE SOIL PRESSURE OF 2000 POUNDS PER SQUARE FOOT. FOOTINGS ON SOIL WITH LOWER ALLOWABLE SOIL PRESSURE SHALL BE DESIGNED IN ACCORDANCE WITH ACCEPTED ENGINEERING PRACTICE.

3. FOOTING PROJECTIONS SHALL NOT EXCEED THE FOOTING THICKNESS.



## **FOUNDATION**

**1. *When is a foundation Inspection required?***

**NCACP Section 107.1.3** To be made after all foundation supports are installed. This inspection is to check foundation supports, crawl space leveling, ground clearances, and positive drainage when required. Do not backfill footings until after this inspection.

**2. *What is the maximum number of stories allowed to be constructed on a pier and curtain wall?***

**Section R404.1.5.1** Not more than 2 stories in height.

**3. *What is the maximum unsupported height of hollow masonry piers?***

**Section R404.1.5.2 & R606.5** The maximum unsupported height of hollow masonry piers is 4 times the least dimension and 10 times the least dimension for solid masonry piers.

**4. *Are solid masonry units required to have full bed and head joints?***

**Section R607.2.2.1 & R607.2.2.2** All solid or hollow masonry units shall be laid with full head and bed joints

## **SLABS**

### **1. *When is a slab inspection required?***

**NCACP Section 107.1.2** Under slab inspection is to be made after all forms have been placed, all electrical, plumbing and/or heating and air conditioning facilities, all crushed stone, vapor retarder, all reinforcing steel with supports and tied and/or all welded wire fabric is installed, when required, but before any concrete is placed.

### **2. *Are footings required under interior load-bearing walls in slab on grade construction?***

**Section R403** Yes, footings are required under interior load-bearing walls and all other load-bearing conditions. See illustrations on page 12.

### **3. *When is a 4" base required under slabs and what material should be used?***

**Section R506.2.2** A 4-inch-thick base course consisting of clean graded sand, gravel, crushed stone or crushed blast-furnace slag passing a 2-inch sieve shall be placed on the prepared sub grade when the slab is below grade.

**Exception:** A base course is not required when the concrete slab is installed on well-drained or sand-gravel mixture soils classified as Group I according to the United Soil Classification System in accordance with Table R405.1 in the International Residential Code.

### **4. *How much backfill is allowed before a compaction test would be required?***

**Section R506.2.1** A compaction test is required when fill placement exceeds 24" in depth. A compaction test may also be required under certain soil conditions.

## **SLABS (con't)**

### **5. *What is the correct lap of a vapor barrier?***

**Section R506.2.3** A 6 mil polyethylene or an approved vapor retarder with joints lapped not less than 6 Inches shall be placed between the concrete floor slab and the base course or the prepared sub grade where no base course exists.

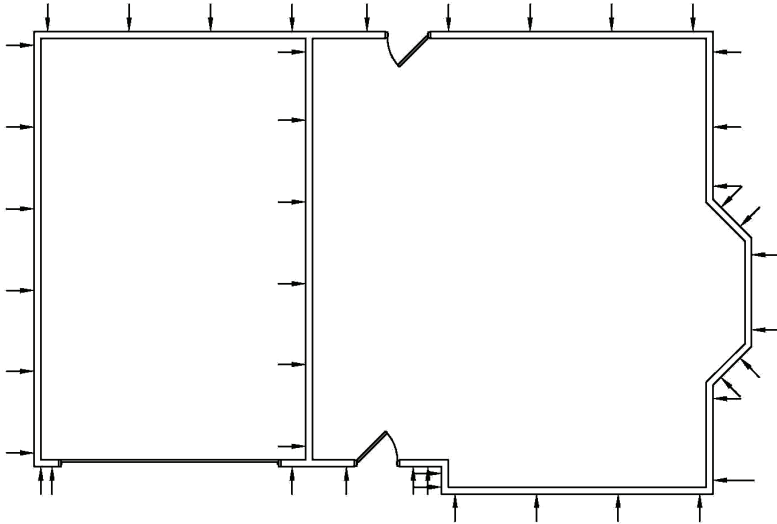
### **6. *What is the minimum specified strength (psi) of concrete for slabs on grade?***

**Table R402.2** Basement slabs and interior slabs on grade require 2500 psi concrete. Porches, carport slabs and steps exposed to weather and garage floors require 3000-psi air entrained concrete.

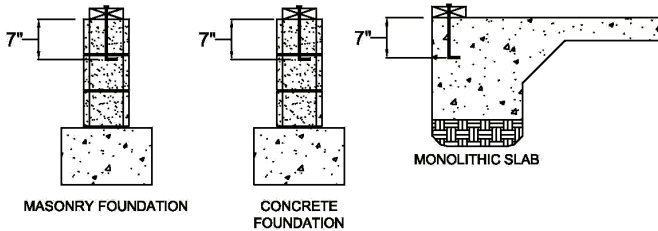
### **7. *What is the required attachment for framed walls on slab on grade?***

**Section R403.1.6** The wood sole plate at exterior walls on monolithic slabs and wood sill plate shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet on center. Anchor bolts shall also be located within 12 inches of the corner. Bolts shall be at least 1/2 inch in diameter and shall extend a minimum of 7 inches into masonry or concrete. Embedment depth of anchor straps shall be per manufacturer instructions. See table on p. 18.

**Bolting Locations and Installations**



EXTERIOR WALLS ON FOUNDATION SYSTEM OR SLAB ON GRADE FLOORS SHALL BE ANCHORED TO THE FOUNDATION SYSTEM OR SLAB WITH AT LEAST ½" DIAMETER BOLT PLACED AT 6'-0" ON CENTER AND NOT MORE THAN 12" FROM EACH CORNER. BOLTS SHALL EXTEND A MINIMUM OF 7" INTO CONCRETE OR MASONRY TO ACCOMMODATE A 1-½" BOTTOM PLATE OR SILL, WITH NUT AND WASHER. MIN. 2 BOLTS REQUIRED PER PLATE SECTION. AS PER SECTION R-403.1.6



SEE TABLE J ON PAGE 32 IN THIS BOOKLET FOR SPACING. WHEN USING STAP ANCHORS WITH A 2x6 BOTTOM PLATE OR LARGER, A HOLE MAY BE DRILLED IN THE CENTER TO ACCOMMODATE THE STRAP AND TO MEET THE NAILING REQUIREMENTS. (SEE ILLUSTRATION BELOW)



**R403.1.6** There shall be a minimum 2 bolts per plate section.

## **BOLTING & STRAPPING FOUNDATIONS'**

<b>TYPES OF BOLTS OR STRAPS</b>	<b>BRAND NAME</b>	<b>LOCATION-SPACING</b>
1/2 anchor bolt w/washer (2)	N/A	Within 12" of each corner & 6' o.c.
22 3/4" anchor strap (3,4)	SIMPSON MAB 23	Within 12" of each corner 3' 3" o.c.
22 3/4" anchor strap (3,4)	HUTCH STA 1622	Within 12" of each corner & 2' 9" o.c.
22 3/4" anchor strap (3,4)	HUTCH STA 1822	within 12" of each plate section & 2' 3" o.c.
14 1/2" anchor strap (3,4)	SIMPSON MAB 15	Within 12" of each corner & 3' 3" o.c.
14 1/2" anchor strap (3,4)	HUTCH STA 1614	Within 12" of each corner & 2' 9" o.c.
14 1/2" anchor strap (3,4)	HUTCH STA 1814	Within 12" of ends of each plate section & 2'3" o.c.
<b>6" x 5/8" expansion bolt NOT APPROVED FOR USE IN CLAY BRICK</b>	HILTI Kwik Bolt	Within 12" of each corner & 6' o.c.
<b>1/2" or 5/8" drill In</b>	Simpson Titen HD	Within 12" of each corner & 6' o.c.

1. See Illustration on page 35 in this booklet for Installation locations for above.
2. There shall be a minimum of 2 bolts per plate section .
3. Bolts shall extend a minimum of 7" into masonry or concrete.
4. Embedment depth of anchor straps shall be per manufacturer Instructions.
5. Fastening schedule are as follows: For Simpson strap anchors, side nailing 2 – 10d x1 1/2 and 4 –10d x 1 1/2 nail In top of plate (total). For Hutch strap anchor STA16 (6)10d on each side (12 total). For anchor STA 18 (4)10d each side (8 total).

**NOTE:** It is the responsibility of the permit holder to Install the anchors In accordance with the manufacturer requirements. The above fasteners are approved alternates In Mecklenburg County. Calculations have been given to show these materials equal and/or exceed the minimum code requirements

## **FRAMING**

### **1. *When is a framing Inspection required?***

**NCACP Section 107.1.5** Framing inspections shall be made after the roof, walls, ceiling and floor framing is complete with appropriate blocking, bracing and fire stopping in place. The following Items must be in place and is visible for inspection:

- a. Pipes; to check for notching, boring or other penetrations.
- b. Chimneys and vents; to check for clearances from combustibles, fire stopping and proper construction.
- c. Windows & doors, Flashing for roofs, chimneys and wall openings.
- d. Insulation baffles; may be required during framing inspection when insulating a cathedral ceiling and the 1" air space required between insulation and the roof deck is questionable.
- e. All lintels required to be bolted to the framing for support shall not be covered by any exterior or interior wall or ceiling finish material before approval. Work may continue without approval for lintels supported on masonry or concrete.
- f. Trade rough-ins complete.
- g. House wrap installed

### **2. *Can a bathroom exhaust fan be vented to the soffit vent?***

**Section R303.3** Bathroom exhausts shall be vented directly to the outside through an approved cap.

### **3. *What is the minimum tread depth on a straight flight of stairs?***

**Section R311.5.3** The minimum tread depth on a flight of stairs is 9 inches .The maximum riser height shall be 8 1/4 inches.

**FRAMING (con't)**

**4. *What are the minimum exit requirements required?***

**Section R311; R310.1 & R310.1.1** The required exit door shall be a side-hinged door not less than 3 ft in width and 6ft, 8" in height. Basements with habitable space and every sleeping room shall have at least one operable emergency escape and rescue window or exterior door opening for emergency escape and *rescue*. The window shall have a sill height of not more than 44" above the floor. All emergency escape and rescue openings shall have a minimum net clear opening of 4.0 sq ft. The minimum net clear opening height shall be 22 inches and the minimum net clear opening width shall be 20 inches. Emergency escape & rescue openings must have a minimum total glass area of not less than 5.0 sq ft in the case of a ground window and not less than 5.7 sq ft in the case of an upper story window.

**5. *Does a wood column supporting a beam in a basement need to be attached?***

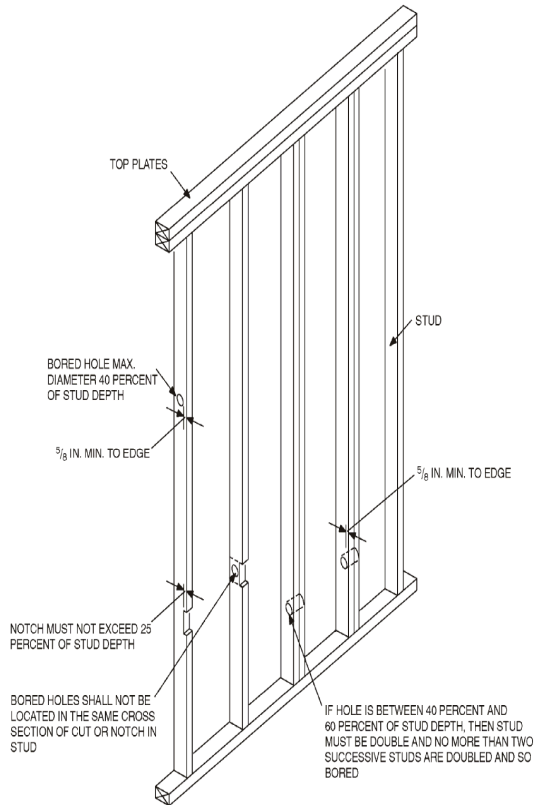
**Section 407.3** Yes. The columns shall be restrained to prevent lateral displacement at the top and bottom ends.

**6. *How much can a stud be notched or drilled?***

**Section R602.6 Notching**-Any stud in an exterior wall or bearing partition may be cut or notched to a depth not exceeding 25 % of its width. Studs in nonbearing partitions may be notched to a depth not to exceed 40% of a single stud width. Notching of bearing studs shall be on one edge only and not to exceed 1/4" the height of the stud. Notching shall not occur in the bottom or top 6" of bearing studs.

**Section R602.6 Drilling**- Any stud may be bored or drilled ,provided that the diameter of the resulting hole is no more than 60% of the stud width ,the edge of the hole is no more than 5/8in (16mm)to the edge of the stud, and the hole shall not be closer than 6" from an adjacent hole or notch. Holes not exceeding 3/4" diameter can be as close as 1-1/2" o.c spacing. Studs located in exterior walls or bearing partitions drilled over 40% and up to 60%shall also be doubled with no more than 2 successive doubled studs board.

**FRAMING (con't)**



For SI: 1 inch = 25.4 mm.

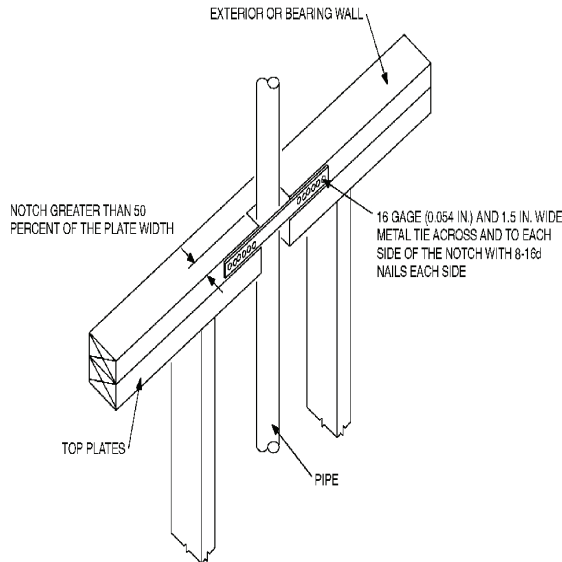
NOTE: Condition for exterior and bearing walls.

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



**8. How do I repair the top plates of an exterior wall when drilled or notched?**

**Section R602.6.1** When piping or ductwork is placed in or partly in an exterior wall or interior, braced or load-bearing wall, necessitating a cutting of the top plate by more than 50 percent of its width, a galvanized metal tie not less than 0.054 inch thick (16 gage) and 1.5 Inches wide shall be fastened to each plate across and to each side of the opening with not less than six 16d nails. See illustration below.



**9. Do electrical penetrations in exterior walls need to be fire-blocked?**

**Section R602.8** Yes. Fire blocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective fire barrier between stories and between a top story and the roof space.

**FRAMING (con't)**

**10. *Are 1x4 let-in braces permitted in a 3-story structure in Mecklenburg County?***

**Table R602.10.3** Yes, 1 x 4 let-in braces can still be used except on the first floor.

**11. *How much lateral bracing is required in exterior walls?***

**Table R602.10.1** Lateral bracing is required at each end and every 25 feet of exterior wall.

**12. *When should the siding be attached to the exterior wall?***

**Section R701.2** Products sensitive to adverse weather shall not be installed until adequate weather protection for the installation is provided. Exterior sheathing shall be dry before applying exterior cover.

**13. *Where is flashing required on brick veneer finishes?***

**Section R703.7.5** Flashing of 6 mil poly or other corrosion-resistive material shall be located beneath the first course of masonry above finished ground level above the foundation wall or slab and at other points of support, including structural floors, shelf angles and lintels

**14. *Is bridging required at mid span of floor joist?***

**Section R502.7.1** Joists exceeding a nominal 2 by 12 shall be supported laterally by solid blocking, diagonal bridging, or a continuous 1-inch-by-3-inch strip nailed across the bottom of joists perpendicular to joists at intervals not exceeding 8 feet.

**FRAMING (con't)**

- 15. *The code requires a double floor joist under load-bearing partitions that run parallel to the joist. Can this double joist be notched or drilled through?***

**Section R502.4** Yes. See question 16 below. Joists under parallel bearing partitions shall be of adequate size to support the load. The code does allow the joists to be spaced apart to accommodate pipes, ducts, vents; however, the joists shall be full depth solid blocked with lumber not less than 2-inches in nominal thickness spaced not more than 4 feet on center.

- 16. *Can a floor joist be drilled in center third of the span?***

**Section R502.8** There are restrictions on the size of the hole and where drilling is permitted. Structural floor members shall not be cut, bored, or notched in excess of the limitations specified. See illustration on page 25.



**FRAMING (con't)**

- 17. *The code requires hangers on the double trimmer joist at floor openings to support the header and/or girder when the member spans more than 6 feet. What is required when those members are less than 6 feet?***

**Section R502.10** 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 with 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.

- 18. *In the design of truss construction, what are the drilling and notching requirements?***

**Section R502.11.3** Truss members and components shall not be cut, notched, spliced or otherwise altered in any way without the approval of a registered design professional.

- 19. *Can a ceiling joist be used a collar tie?***

**Section R802.3.1** It depends on the ceiling Joist. The collar tie must be located in the upper third of the roof.

- 20. *How can a roof be framed for a cathedral ceiling?***

**Section R802.2** When rafters are used to create a cathedral ceiling, one method would be to design a ridge beam with proper support at each end to carry the roof loads. These loads will have direct bearing that carry to footings. Another method would be an engineered truss application for a roof system.

## **FRAMING (con't)**

21. ***Can you explain figure R802.5.1 braced rafter construction in The North Carolina Residential Code?***

**Figure R802.5.1** This application needs to be used when the rafters are over spanned. Use the span tables R802.5.1 (1) and R802.5.1 (2) to check rafter spans. Remember, span is always measured horizontally, not rafter length. The purlin or single ply header must be the same size as the rafter. The 2 x 4 down brace may have an unbraced length of 8 feet. If brace exceeds 8 feet, it must be laterally braced at mid point or may be T-braced. See illustration on p.41.

22. ***What roof pitch would not require an underlayment?***

**Chapter 9** This chapter deals with several types of roof coverings. All roof covering would require an underlayment unless the manufacture's instructions do not require one.

23. ***Can the underlayment be installed running up the pitch of the roof?***

**Section R905.2.7** No, according to this section the underlayment shall be applied shingle fashion, parallel to and starting from the eave.

## **FRAMING (con't)**

**24. Which is the proper way to run the starter course for asphalt shingles?**

**Section R905** According to manufacture's instructions. Most manufactures require you to cut the tabs off the ends of shingles so the cement strip is located at the edge of the eaves.

**25. Can a standard brick lintel be used at the fireplace opening?**

**Section R1003.7** Yes, as long as the lintel is noncombustible and capable of supporting imposed loads.

**26. What are acceptable fire blocking materials?**

**Section R602.8.1** There are several approved types that can be used. They are 2-inch nominal lumber or two thicknesses of 1-inch nominal 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 3/4-inch particleboard with joints backed by 3/4-inch particleboard, 1/2-inch gypsum board, or 1/2 inch cement-based millboard. Batts or blankets of mineral wool or glass fiber shall be permitted as an acceptable alternative.

**R1003.19 Chimney Fire blocking** Wood fire blocking materials or other combustible items cannot be used up against chimneys regardless of the thickness.

TABLE R-602.3(5)  
 SIZE, HEIGHT AND SPACING OF WOOD STUDS<sup>a</sup>

STUD SIZES (inches)	BEARING WALLS					NONBEARING WALLS	
	Laterally unsupported stud height <sup>a</sup> (feet)	Maximum spacing when supporting roof and ceiling only (inches)	Maximum spacing when supporting one floor, roof and ceiling (inches)	Maximum spacing when supporting two floors, roof and ceiling (inches)	Maximum spacing when supporting one floor only (inches)	Laterally unsupported stud height (feet)	Maximum spacing (inches)
2x3 <sup>b</sup>	-	-	-	-	-	10	16
2x4	10	24	16	-	24	14	24
3x4	10	24	24	16	24	14	24
2x5	10	24	24	-	24	18	24
2x6	10	24	24	16	24	20	24

For SI: 1 inch = 25.4mm

a. Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall. Increases in unsupported height are permitted where justified by analysis

b. Shall not be used in exterior walls

**Table R602.3 (1)**  
**FASTENER SCHEDULE FOR STRUCTURAL MEMBERS**

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER a,b,c,d	SPACING OF FASTENERS
Joist to sill or girder, toe nail	3-8d (2-1/2"x0.113")	—
1" x 6" sub floor or less to each joist, face nail	2-8d (2-1/2"x0.113") 2 staples, 1 3/4'	
2" sub floor to joist or girder, blind and face nail	(3-1/2"x0.135") 2-16d	
Sole plate to joist or blocking, face nail	16d (3-1/2"x0.135")	16" o.c.
Top or sole plate to stud, end nail	2(3-1/2"x0.135") -16d	
Stud to sole plate, toe nail	3-8d (2-1/2"x0.113") 2-16d (3-1/2"x0.135")	
Double studs, face nail	10d(3"x0.128")	24" o.c.
Double top plates, face nail	10d(3"x0.128")	24" o.c.
Sole plate to joist or blocking at braced wall panels	3-16d (3-1/2"x0.135")	16" o.c.
Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d (3-1/2"x0.135")	
Blocking between joists or rafters to top plate, toe nail	3-8d (2-1/2"x0.113")	
Rim joist to top plate, toe nail	8d(2-1/2"x0.113")	6" o.c.
Top plates, laps at corners and intersections, face nail	2-10d(3"x0.128")	
Built-up header, two pieces with 1/2" spacer	16d (3-1/2"x0.135")	16" o.c. along each edge
Continued header, two pieces	16d (3-1/2"x0.135")	16" o.c. along each edge
Ceiling joists to plate, toe nail	3-8d (3-1/2"x0.113")	
Continuous header to stud, toe nail	4-8d (2-1/2"x0.113")	
Ceiling joist, laps over partitions, face nail	3-10d(3"x0.113")	—

**FASTENER SCHEDULE FOR STRUCTURAL MEMBERS**

<b>DESCRIPTON OF BUILDING ELEMENTS</b>	<b>NUMBER AND TYPE OF FASTENER a,b,c,d</b>	<b>SPACING OF FASTENER</b>
Ceiling joist to parallel rafters, face nail	3-10d(3"x0.128")	
Rafter to plate, toe nail	2-16d (3-1/2"x0.135")	—
1" brace to each stud and plate, face nail	2-8d (2-1/2"x0.113") 2 staples, 1-1/4"	—
1" x 6" sheathing to each bearing, face nail	2-8d (2-1/2"x0.113") 2 staples, 1-3/4"	—
1 x 8 bearing, face sheathing to each bearing, face nail	2-8d (2-1/2"x0.113") 3 staples, 1-3/4"	—
Wider than 1" x 8" sheathing to each bearing, face nail	3-8d (2-1/2"x0.113") 4 staples, 1-3/4"	
Built-up corner studs	10d(3"x0.128")	24"o.c.
Built-up girders and beams, 2-inch lumber layers	10d (3"x0.128")	Nail each layer as follows: 32" o.c. at top and bottom and staggered. Two nails at ends and at each splice.
2" planks	2-16d	At each bearing
Roof rafters to ridge, valley or hip rafters: toe nail face nail	4-16d (3-1/2"x0.135")  3-16d(3-1/2"x0.135")	—

**FASTENER SCHEDULE FOR STRUCTURAL MEMBERS**

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER a,b,c,d	SPACING OF FASTENER
Rafter ties to rafters, face	3-8d (2-1/2"x0.113")	
<u>Ledger Strip</u>	3-16d common 4-3" x 0.031" nail, 4-3" x 14-gage staple	Face nail at 4" on center under each joist

- a. All nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections shall have minimum average bending yield strengths as shown: 80 ksi (551 MPa) for shank diameter of 0.192 inch (20d common nail), 90 ksi (620 MPa) for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi (689 MPa) for shank diameters of 0.142 inch or less.
- b. Staples are 16 gage wire and have a minimum 7/16-inch on diameter crown width.
- c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater
- d. Four-foot-by-8-foot or 4-foot-by-9-foot panels shall be applied vertically.
- e. Spacing of fasteners not included in this table shall be based on Table R602 3(9).
- f. For regions having basic wind speed of 110 mph or greater, 8d deformed nails shall be used for attaching plywood and wood structural panel roof sheathing to framing within minimum 48-inch distance from gable end walls, if mean roof height is more than 25 feet, up to 35 feet maximum.
- g. For regions having basic wind speed of 100 mph or less, nails for attaching wood structural panel roof sheathing to gable end wall framing shall be spaced 6 inches on center. When basic wind speed is greater than 100 mph, nails for attaching panel roof sheathing to intermediate supports shall be spaced 6 inches on center for minimum 48-inch distance from ridges, eaves and gable end walls; and 4 inches on center to gable end wall framing.
- h. Gypsum sheathing shall conform to ASTM C 79 and shall be installed in accordance with GA 253. Fiberboard sheathing shall conform to either AHA 194.1 or ASTM C 208.
- i. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and at all floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and at all roof plane perimeters. Blocking of roof or floor sheathing panel edges perpendicular to the framing members shall not be required except at intersection of adjacent roof planes. Floor and roof perimeter shall be supported by framing members or solid blocking. Roof sheathing 7/16" or greater in thickness does not require perimeter blocking

**Table 602.3(2)**  
**ALTERNATE ATTACHMENTS**

NOMINAL MATERIAL THICKNESS (inches)	DESCRIPTION (a,b) OF FASTENER AND LENGTH (inches)	SPACING` OF FASTENERS	
		Edges (Inches)	Intermediate supports (inches)
Wood structural panels subfloor, roof and wall sheathing to framing and particle-board wall sheathing to framing (f)			
5/16	0.097 - 0.099 Nail 1 1/2 Staple 15 ga. 13/8 Staple 16 ga. 13/4	6	12
3/8	Staple 15 ga. 13/8	6	12
	0.097 - 0.099 Nail 1 1/2	4	10
	Staple 16 ga. 134	6	12
15/32 and 1/2	Staple 15 ga. 1 1/2	6	12
	0.097 - 0.099 Nail 15/8	3	6
	Staple 16 ga. 13/4	6	12
19/32 and 5/8	0.113 Nail 134 Staple 15 and 16 ga. 15/8	6	12
	0.097 - 0.099 Nail 134	3	6
23/32 And 3/4	Staple 14 ga. 134	6	12
	Staple 15 ga. 13/4	5	10
	0.097 - 0.099 Nail 17/8	3	6
	Staple 16 ga. 2	4	8
1	Staple 14 ga. 2	5	10
	0.113 Nail 2 1/4, Staple 15 ga. 2	4	8
	0.097 - 0.099 Nail 2 7/8	3	6
NOMINAL MATERIAL THICKNESS (inches)	DESCRIPTION (a,b) OF FATENER & LENGTH (inches)	SPACING( c ) OF FASTENERS	
		Edges (inches)	Body of panels(d) (Inches)

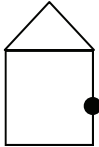
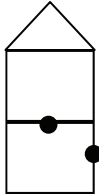
continued

**ALTERNATE ATTACHMENTS**

<b>Floor underlayment; plywood-hardboard-particleboard</b>			
<b>Plywood</b>			
1/4 and 5/16	1 1/4 ring or screw shank nail—minimum 12 1/2 ga. (0.099") shank diameter	3	6
	Staple 18 ga., 7/s, 3/16 crown width	2	5
11/32, 3/8, 15/32 and 1/2	1 1/4 ring or screw shank nail—minimum 12 1/2 ga. (0.099) shank diameter	6	8'
19/32, 5/8, 23/32 and 3/4	1 1/2 ring or screw shank nail—minimum 12 1/2 ga. (0.099) shank diameter	6	12
	Staple 16 ga. 11/4	6	8
<b>Hardboard</b>			
0.200	1 1/2 long ring-grooved underlayment nail	6	6
	4d cement-coated sinker nail	6	6
	Staple 18 ga., 7/8 long (plastic coated)	3	6
<b>Particleboard</b>			
1/4	4d ring-grooved underlayment nail	3	6
	Staple 18 ga., 7/8 long, 3/16 crown	3	6
3/8	6d ring-grooved underlayment nail	6	10
	Staple 16 ga., 1 1/8 long, 3/8 crown	3	6
1/2, 5/8	6d ring-grooved underlayment nail	6	10
	Staple 16 ga., 1 5/8 long, 3/8 crown	3	6

- a. Nail is a general description and may be T-head, or round head.
- b. Staples shall have a minimum crown width of 7/16-inch on diameter except as noted.
- c. Nails or staples shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater. Nails or staples shall be spaced at not more than 12 inches on center at intermediate supports for floors.
- d. Fasteners shall be placed in a grid pattern throughout the body of the panel.
- e. For 5-ply panels, intermediate nails shall be spaced not more than 12 inches on center each way.
- f. Hardboard underlayment shall conform to ANSI/AHA A135.4.

**GIRDER SPANS° AND HEADER SPANS° FOR EXTERIOR BEARING WALLS**  
 (Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir<sup>b</sup> and required number of jack studs)

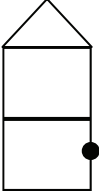
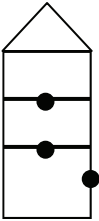
<b>GIRDER AND HEADER SUPPORTS</b>	<b>SIZE</b>	<b>GROUND SNOW LOAD (psf)<sup>e</sup></b>					
		<b>30</b>					
		<b>Building Width(c) Feet</b>					
		<b>20</b>		<b>28</b>		<b>36</b>	
		<b>Span</b>	<b>NJ (d)</b>	<b>Span</b>	<b>NJ (d)</b>	<b>Span</b>	<b>NJ (d)</b>
Roof and ceiling 	2-2x4	3-6	1	3-2	1	2-10	1
	2-2x6	5-5	1	4-8	1	4-2	1
	2-2x8	6-10	1	5-11	2	5-4	2
	2-2x10	8-5	2	7-3	2	6-6	2
	2-2x12	9-9	2	8-5	2	7-6	2
	3-2x8	8-4	1	7-5	1	6-8	1
	3-2x10	10-6	1	9-1	2	8-2	2
	3-2x12	12-2	2	10-7	2	9-5	2
	4-2x8	7-0	1	6-1	2	5-5	2
	4-2x10	11-8	1	10-6	1	9-5	2
4-2x12	14-1	1	12-2	2	10-11	2	
Roof, ceiling and one center-bearing floor 	2-2x4	3-1	1	2-9	1	2-5	1
	2-2x6	4-6	1	4-0	1	3-7	2
	2-2x8	5-9	2	5-0	2	4-6	2
	2-2x10	7-0	2	6-2	2	5-6	2
	2-2x12	8-1	2	7-1	2	6-5	2
	3-2x8	7-2	1	6-3	2	5-8	2
	3-2x10	8-9	2	7-8	2	6-11	2
	3-2x12	10-2	2	8-11	2	8-0	2
	4-2x8	5-10	2	5-2	2	4-8	2
	4-2x10	10-1	1	8-10	2	8-0	2
4-2x12	11-9	2	10-3	2	9-3	2	

continued

Table R502.5(1)

**GIRDER SPANS° AND HEADER SPANS° FOR EXTERIOR BEARING WALLS**

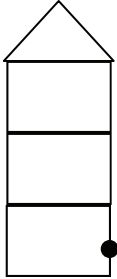
(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir<sup>b</sup> and required number of jack studs)

<b>GIRDER AND HEADER SUPPORTS</b>	<b>SIZE</b>	<b>GROUND SNOW LOAD (psf)<sup>e</sup></b>					
		<b>30</b>					
		<b>Building Width(c) Feet</b>					
		<b>20</b>		<b>28</b>		<b>36</b>	
		<b>Span</b>	<b>NJ (d)</b>	<b>Span</b>	<b>NJ (d)</b>	<b>Span</b>	<b>NJ (d)</b>
Roof, ceiling and one clear span floor  	2-2x4	2-8	1	2-4	1	2-1	1
	2-2x6	3-11	1	3-5	2	3-0	2
	2-2x8	5-0	2	4-4	2	3-10	2
	2-2x10	6-1	2	5-3	2	4-8	2
	2-2x12	7-1	2	6-1	3	5-5	3
	3-2x8	6-3	2	5-5	2	4-10	2
	3-2x10	7-7	2	6-7	2	5-11	2
	3-2x12	8-10	2	7-8	2	6-10	2
	4-2x8	5-1	2	4-5	2	3-11	2
	4-2x10	8-9	2	7-7	2	6-10	2
4-2x12	10-2	2	8-10	2	7-11	2	
Roof, ceiling and two center-bearing floors  	2-2x4	2-7	1	2-3	1	2-0	1
	2-2x6	3-9	2	3-3	2	2-11	2
	2-2x8	4-9	2	4-2	2	3-9	2
	2-2x10	5-9	2	5-1	2	4-7	3
	2-2x12	6-8	2	5-10	3	5-3	3
	3-2x8	5-11	2	5-2	2	4-8	2
	3-2x10	7-3	2	6-4	2	5-8	2
	3-2x12	8-5	2	7-4	2	6-7	2
	4-2x8	4-10	2	4-3	2	3-10	2
	4-2x10	8-4	2	7-4	2	6-7	2
4-2x12	9-8	2	8-6	2	7-8	2	

continued

**GIRDER SPANS° AND HEADER SPANS° FOR  
EXTERIOR BEARING WALLS**

(Maximum spans for Douglas fir-larch, hem-fir, southern pine  
and spruce-pine-fir and required number of jack studs)

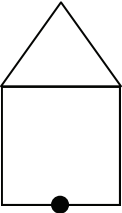
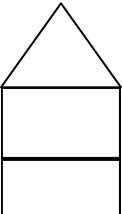
<b>GIRDERS AND HEADER SUPPORTS</b>	<b>SIZE</b>	<b>GROUND SNOW LOAD (psf)e</b>					
		<b>30</b>					
		<b>Building width (c) feet</b>					
		<b>20</b>		<b>28</b>		<b>36</b>	
		<b>Span</b>	<b>NJ (d)</b>	<b>Span</b>	<b>NJ (d)</b>	<b>Span</b>	<b>NJ (d)</b>
Roof, ceiling and two clear span floor  	2-2x4	2-1	1	1-8	1	1-6	2
	2-2x6	3-1	2	2-8	2	2-4	2
	2-2x8	3-10	2	3-4	3	3-0	3
	2-2x10	4-9	2	4-1	3	3-8	3
	2-2x12	5-6	3	4-9	3	4-3	3
	3-2x8	4-10	2	4-2	2	3-9	2
	3-2x10	5-11	2	5-1	2	4-7	3
	3-2x12	6-10	2	5-11	3	5-4	3
	4-2x8	5-7	2	4-10	2	4-4	2
	4-2x10	6-10	2	5-11	2	5-3	2
4-2x12	7-11	2	6-10	2	6-2	3	

- Spans are given in feet and inches.
- Tabulated values assume #2 grade lumber.
- Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.
- NJ - Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.
- Use 30 psf ground snow load for cases in which ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf

Table R502.5(2)

**GIRDER SPANS° AND HEADER SPANS° FOR  
INTERIOR BEARING WALLS**

(Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir and required number of jack studs )

HEADER AND GIRDERS SUPPORTS	SIZE	BUILDING WIDTH( c) FEET					
		20		28		36	
		Span	NJ (d)	Span	NJ (d)	Span	NJ (d)
	2-2x4	3-1	1	2-8	1	2-5	1
	2-2x6	4-6	1	3-11	1	3-6	1
	2-2x8	5-9	1	5-0	2	4-5	2
	2-2x10	7-0	2	6-1	2	5-5	2
	2-2x12	8-1	2	7-0	2	6-3	2
	3-2x8	7-2	1	6-3	1	5-7	2
	3-2x10	8-9	1	7-7	2	6-9	2
	3-2x12	10-2	2	8-10	2	7-10	2
	4-2x8	9-0	1	7-8	1	6-9	1
	4-2x10	10-1	1	8-9	1	7-10	2
	2-2x4	2-2	1	1-10	1	1-7	1
	2-2x6	3-2	2	2-9	2	2-5	2
	2-2x8	4-1	2	3-6	2	3-2	2
	2-2x10	4-11	2	4-3	2	3-10	3
	2-2x12	5-9	2	5-0	3	4-5	3
	3-2x8	5-1	2	4-5	2	3-11	2
	3-2x10	6-2	2	5-4	2	4-10	2
	3-2x12	7-2	2	6-3	2	5-7	3
	4-2x8	6-1	1	5-3	2	4-8	2
	4-2x10	7-2	2	6-2	2	5-6	2
4-2x12	8-4	2	7-2	2	6-5	2	

- Spans are given in feet and inches.
- Tabulated values assume #2 grade lumber.
- Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.
- NJ - Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header

**FLOOR JOIST****(Residential sleeping areas, live load = 30 psf, I/<sup>4</sup> =360)**

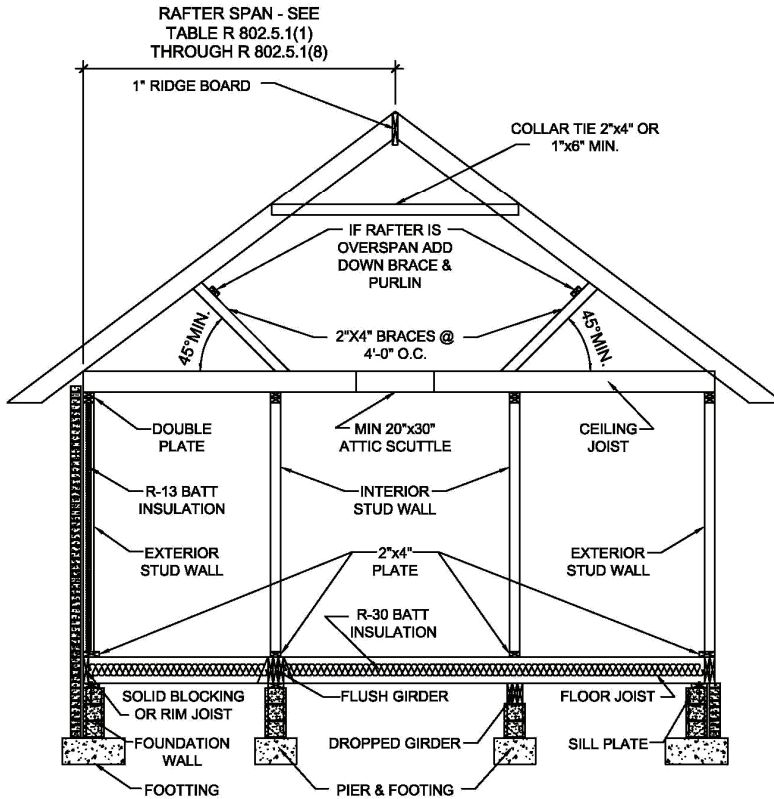
JOIST SPACING (inches)	SPECIES AND GRADE	DEAD LOAD =10 psf			
		2x6	2X 8	2x10	2x12
		Maximum floor Joist spans			
		(ft.- in.)	(ft.- in.)	(ft.- In.)	(ft.- in.)
12	Southern pine #2	11-10	15- 7	19-10	24- 2
	Southern pine #3	10- 5	13- 3	15- 8	18- 8
	Spruce-pine-fir #2	11- 3	14-11	19- 0	23- 0
	Spruce-pine-fir #3	9- 8	12- 4	15- 0	17- 5
16	Southern pine #2	10- 9	14- 2	18- 0	21- 1
	Southern pine #3	9- 0	11- 6	13- 7	16- 2
	Spruce-pine-fir #2	10- 3	13- 6	17- 2	19-11
	Spruce-pine-fir #3	8- 5	10- 8	13- 0	15- 1
19.2	Southern pine #2	10- 1	13- 4	16- 5	19- 3
	Southern pine #3	8- 3	10- 6	12- 5	14- 9
	Spruce-pine-fir #2	9- 8	12- 9	15- 8	18- 3
	Spruce-pine-fir #3	7- 8	9- 9	11-10	13- 9
24	Southern pine #2	9- 4	12- 4	14- 8	17- 2
	Southern pine #3	7- 4	9- 5	11- 1	13- 2
	Spruce-pine-fir #2	8-11	11- 6	14- 1	16- 3
	Spruce-pine-fir #3	6-10	8- 8	10- 7	12- 4

**FLOOR JOIST**

(Residential living areas, live load = 40 psf, L/A = 360)

JOIST SPACING (inches)	SPECIES AND GRADE	DEAD LOAD =10 psf			
		2x6	2 X 8	2 X 10	2 X 12
		Maximum floor joist spans			
		(ft.- in.)	(ft.- in.)	(ft.- in.)	(ft.- in.)
12	Southern pine #2	10- 9	14- 2	18- 0	21- 9
	Southern pine #3	9- 4	11-11	14- 0	16- 8
	Spruce-pine-fir #2	10- 3	13- 6	17- 3	20- 7
	Spruce-pine-fir #3	8- 8	11- 0	13- 5	15- 7
16	Southern pine #2	9- 9	12-10	16- 1	18-10
	Southern pine #3	8- 1	10- 3	12- 2	14- 6
	Spruce-pine-fir #2	9- 4	12- 3	15- 5	17-10
	Spruce-pine-fir #3	7- 6	9- 6	11- 8	13- 6
19	Southern pine #2	9- 2	12- 1	14- 8	17- 2
	Southern pine #3	7- 4	9- 5	11- 1	13- 2
	Spruce-pine-fir #2	8- 9	11- 6	14- 1	16- 3
	Spruce-pine-fir #3	6-10	8- 8	10- 7	12- 4
24	Southern pine #2	8- 6	11- 0	13- 1	15- 5
	Southern pine #3	6- 7	8- 5	9-11	11-10
	Spruce-pine-fir #2	8- 1	10- 3	12- 7	14- 7
	Spruce-pine-fir #3	6- 2	7- 9	9- 6	11- 0

## ROOF DOWN BRACING



**NOTES:**

PURLINS MAY BE INSTALLED TO REDUCE THE SPAN OF RAFTERS. PURLINS SHALL BE SIZED NO LESS THAN THE REQUIRED SIZE OF RAFTERS THEY SUPPORT. PURLINS SHALL BE SUPPORTED BY 2x4 STRUTS INSTALLED TO BEARING WALLS AT A SLOPED NOT LESS THAN 45 DEGREES FROM THE HORIZONTAL. THE STRUTS SHALL BE SPACED NOT MORE THAN 4'-0" O.C., AND THE UNBRACED LENGTH OF STRUTS SHALL NOT EXCEED 5'-0". COLLAR TIES SHALL BE NAILED IN THE UPPER THIRD OF THE ROOF TO EVERY THIRD PAIR OF RAFTERS NOT TO EXCEED 4'-0" O.C.

**CEILING JOIST SPANS FOR COMMON LUMBER SPECIES**

(Uninhabitable attics without storage, live load = 10 psf,  $L_j = 240$ )

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

a. Span exceeds 26 feet in length.

**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 x 4	2 x 6	2 x 8	2 x 10
		Maximum ceiling joist spans			
		(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine #2	9-10	15-6	20-1	23-11
	Southern pine #3	8-2	12-0	15-4	18-1
	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	Southern pine #2	8-11	13-6	17-5	20-9
	Southern pine #3	7-1	10-5	13-3	15-8
	Spruce-pine-fir #2	8-7	12-10	16-3	19-10
	Spruce-pine-fir #3	6-8	9-8	12-4	15-0
19.2	Southern pine #2	8-5	12-3	15-10	18-11
	Southern pine #3	6-5	9-6	12-1	14-4
	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	Southern pine #2	7-8	11-0	14-2	16-11
	Southern pine #3	5-9	8-6	10-10	12-10
	Spruce-pine-fir #2	7-2	10-6	13-3	16-3
	Spruce-pine-fir #3	5-5	7-11	10-0	12-3

Table R802.5.1(1)

**RAFTER SPANS FOR COMMON LUMBER SPECIES**

(Roof live load=20 psf, ceiling not attached to rafters, Lie = 180)

RAFTER-SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				
			2 X 4	2 X 6	2 X 8	2 X 10	2 X 12
			Maximum Ceiling Joist Spans				
			(feet - Inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Southern pine	#2	10-10	17-0	22-5	Note b	Note b
	Southern pine	#3	9-1	13-6	17-2	20-3	24-1
	Spruce-pine-fir	#2	10-4	16-3	21-0	25-8	Note b
	Spruce-pine-fir	#3	8-7	12-6	15-10	19-5	22-6
16	Southern pine	#2	9-10	15-1	19-5	23-2	Note b
	Southern pine	#3	7-11	11-8	14-10	17-6	20-11
	Spruce-pine-fir	#2	9-5	14-4	18-2	22-3	25-9
	Spruce-pine-fir	#3	7-5	10-10	13-9	16-9	19-6
19.2	Southern pine	#2	9-3	13-9	17-9	21-2	24-10
	Southern pine	#3	7-3	10-8	13-7	16-0	19-1
	Spruce-pine-fir	#2	8-10	13-1	16-7	20-3	23-6
	Spruce-pine-fir	#3	6-9	9-11	12-7	15-4	17-9
24	Southern-pine	#2	8-7	12-3	15-10	18-11	22-2
	Southern pine	#3	6-5	9-6	12-1	14-4	17-1
	Spruce-pine-fir	#2	8-0	11-9	14-10	18-2	21-0
	Spruce-pine-fir	#3	6-1	8-10	11-3	13-8	15-11

- b. 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. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors on page 46.

Table R802.5.1(2)

**RAFTER SPANS FOR COMMON LUMBER SPECIES**

(Roof live load=20 psf, ceiling attached to rafters, Lk, = 240 )

RAFTER-SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf				
		2 X 4	2 X 6	2 X 8	2 X 10	2 X 12
		Maximum Ceiling Joist Spans				
		(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Southern pine #2	9-10	15-6	20-5	Note b	Note b
	Southern pine #3	9-1	13-6	17-2	20-3	24-1
	Spruce-pine-fir #2	9-5	14-9	19-6	24-10	Note b
	Spruce-pine-fir #3	8-7	12-6	15-10	19-5	22-6
16	Southern pine #2	8-11	14-1	18-6	23-2	Note b
	Southern pine #3	7-11	11-8	14-10	17-6	20-11
	Spruce-pine-fir #2	8-7	13-5	17-9	22-3	25-9
	Spruce-pine-fir #3	7-5	10-10	13-9	16-9	19-6
19.2	Southern pine #2	8-5	13-3	17-5	21-2	24-10
	Southern pine #3	7-3	10-8	13-7	16-0	19-1
	Spruce-pine-fir #2	8-1	12-8	16-7	20-3	23-6
	Spruce-pine-fir #3	6-9	9-11	12-7	15-4	17-9
24	Southern pine #2	7-10	12-3	15-10	18-11	22-2
	Southern pine #3	6-5	9-6	12-1	14-4	17-1
	Spruce-pine-fir #2	7-6	11-9	14-10	18-2	21-0
	Spruce-pine-fir #3	6-1	8-10	11-3	13-8	15-11

- b. 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. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors on page 46.

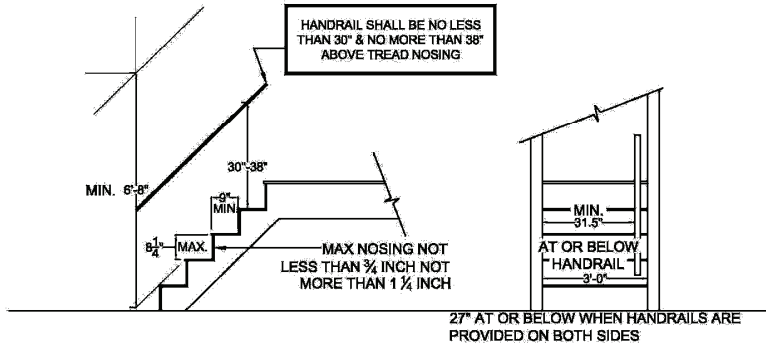
**RAFTER SPANS ADJUSTMENT CHART**

<b>H<sub>c</sub>/H<sub>r</sub></b>	<b>Rafter Span Adjustment Factor</b>
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 and less	1.00

H<sub>c</sub> - Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

H<sub>r</sub> = Height of roof ridge measured vertically above the top of the rafter support walls.

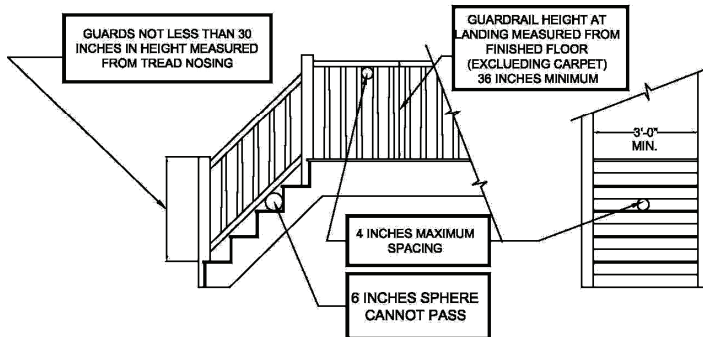
## STAIRWAYS



**NOTES:**

1. THE GREATEST TREAD DEPTH OR THE GREATEST RISER HEIGHT SHALL NOT EXCEED THE SMALLEST BY MORE THAN 3/8 OF AN INCH
2. THE TOP AND BOTTOM RISER OF INTERIOR STAIRS SHALL NOT EXCEED THE SMALLEST RISER WITHIN THAT STAIR RUN BY MORE THAN 3/4 OF AN INCH.
3. THE HEIGHT OF THE TOP AND BOTTOM RISER OF THE INTERIOR STAIRS SHALL BE MEASURED FROM PERMANENT FINISHED SURFACE TO PERMANENT FINISHED SURFACE. (CARPET EXCLUDED)
4. WHERE THE BOTTOM RISER OF AN EXTERIOR STAIR ADJOINS AN EXTERIOR WALK, PORCH, DRIVEWAY, PATIO, OR FINISH GRADE, THE HEIGHT OF THE RISER MAY BE LESS THAN THE HEIGHT OF THE ADJACENT RISER.

## HANDRAILS & GUARDRAILS



### STAIRS WITH FOUR (4) OR MORE RISERS REQUIRE A HANDRAIL

**GUARDRAILS / HANDRAILS:** REQUIRED ON ALL PORCHES, BALCONIES OR RAISED FLOOR SURFACES LOCATED MORE THAN 30 INCHES ABOVE THE FLOOR OR GRADE BELOW. GUARDRAILS SHALL NOT BE LESS THAN 36 INCHES IN HEIGHT. OPEN SIDES OF STAIRS WITH A TOTAL RISE OF MORE THAN 30 INCHES ABOVE THE FLOOR OR GRADE BELOW SHALL HAVE GAURDRAILS NOT LESS THAN 34 INCHES NOR MORE THAN 38 INCHES IN HEIGHT MEASURED FROM NOSING OF THE TREADS.

**HANDRAIL GRIP SIZE:** THE HANDGRIP PORTION OF THE HANDRAILS SHALL NOT BE MORE THAN 2 INCHES IN IN CROSS-SECTIONAL DEMENSION, OR THE SHAPE SHALL PROVIDE AN EQUIVLANT GRIPPING SURFACE. THE HANDGRIP PORTION SHALL SHALL HAVE A SMOOTH SURFACEWITH NO SHARP CORNERS.

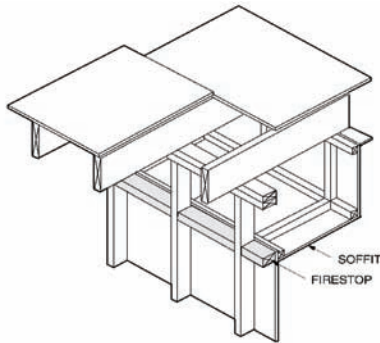
**Picket Spacing:** ON OPEN SIDE OF STAIR TREADS ONLY, PICKETS CAN BE SPACED SUCH THAT A 4 3/8" SPHERE CANNOT PASS THROUGH.

### **Exterior & Garage handrails.**

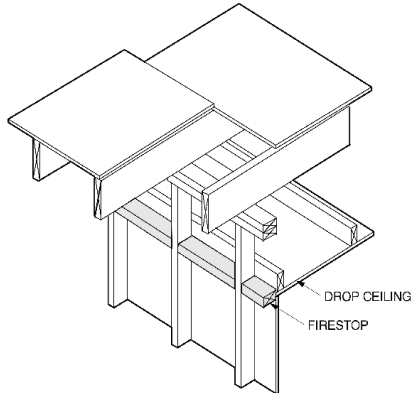
Exterior handrails (decks, screen porches ,garages ,and areas exposed to weather ) shall not be more than 3 1/2" inches in cross section dimension.

## **FIRESTOPPING**

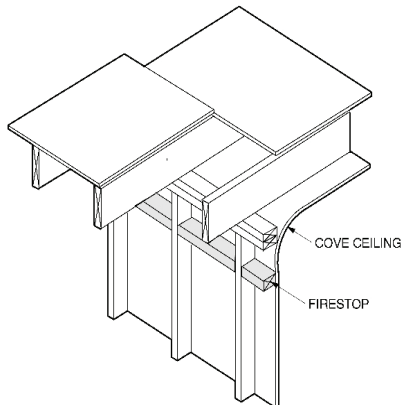
### ***FIRESTOPPING—FURRED SOFFIT***



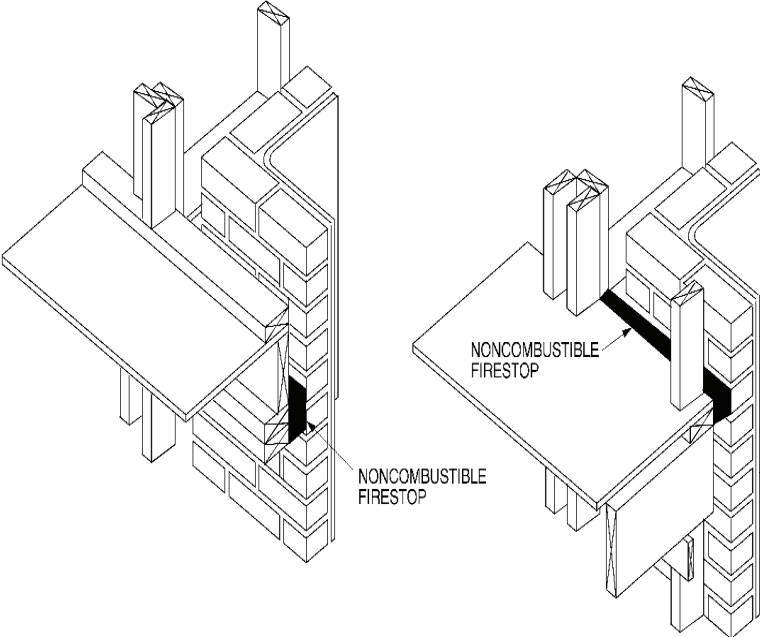
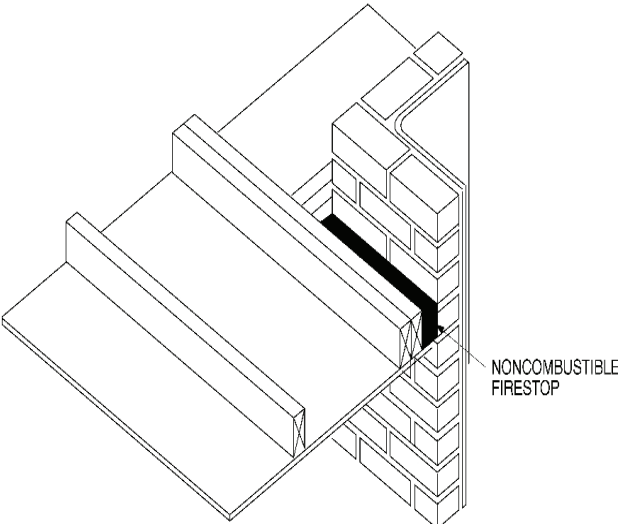
### ***FIRESTOPPING—DROPPED CEILING***



### ***FIRESTOPPING—COVE CEILING***

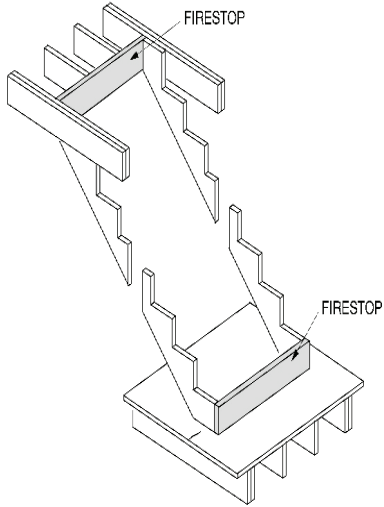


**FIRESTOPPING**

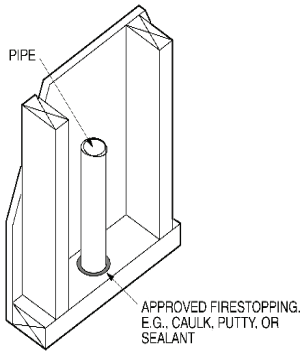


# **FIRESTOPPING**

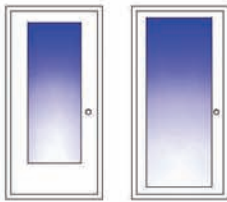
## ***FIRESTOPPING-AT STAIRWAYS***



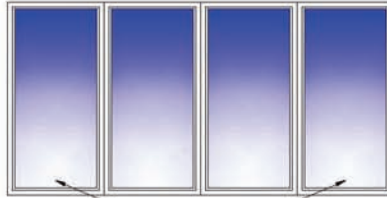
## ***FIRESTOPPING-AROUND PIPING***



## SAFETY GLAZING



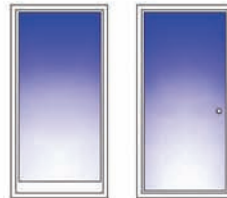
INGRESS AND EGRESS DOORS  
DOORS WITH GLAZING



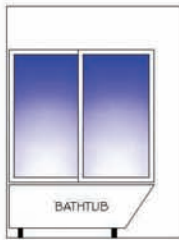
FIXED GLAZING  
SLIDING-TYPE DOORS WITH  
GLAZING



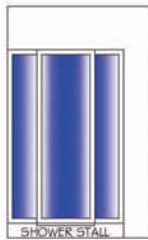
STORM DOORS AND  
DOORS WITH GLAZING



GLASS DOORS FRAMED AND UNFRAMED  
DOORS WITH GLAZING

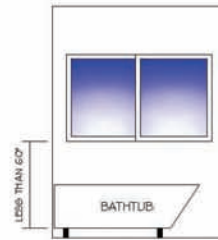


HOT TUB, WHIRLPOOL, SAUNA, STEAM  
ROOM, TUB ENCLOSURE

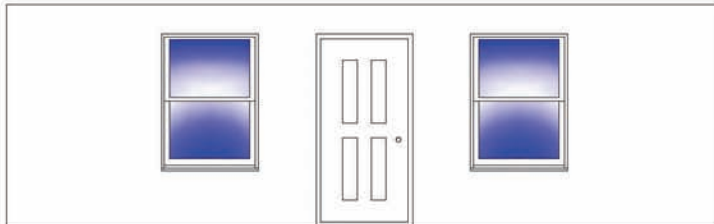


SHOWER  
ENCLOSURE

DOORS  
WITH GLAZING

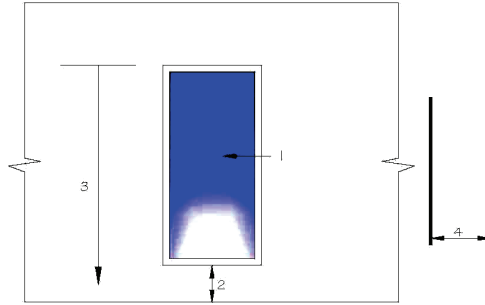


GLAZING IN BUILDING WALL ENCLOSING  
HOT TUB, WHIRLPOOL, SAUNA, STEAM  
ROOM, BATHROOM AND SHOWER



FIXED OR OPERABLE PANELS ADJACENT TO AND WITHIN THE SAME PLANE AS A DOOR WHERE  
THE NEAREST VERTICAL EDGE IS WITHIN 24" AND BOTTOM EDGE IS LESS THAN 60" ABOVE  
THE FLOOR OR WALKING SURFACE.

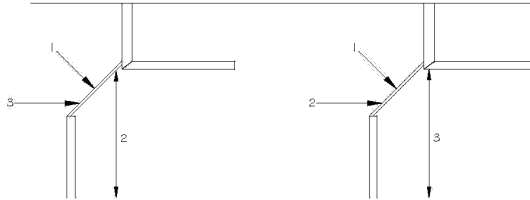
## SAFETAY GLAZING



GLAZING IN AN INDIVIDUAL FIXED OR OPERABLE PANEL THAT MEETS ALL OF THE FOLLOWING CONDITIONS:

1. EXPOSED AREA OF AN INDIVIDUAL PANE GREATER THAN 9 SQ. FT.
2. BOTTOM EDGE IS LESS THAN 18" ABOVE FINISHED FLOOR.
3. TOP EDGE IS GREATER THAN 36" ABOVE FINISHED FLOOR.
4. ONE OR MORE WALKING SURFACES WITHIN 36" HORIZONTALLY OF THE GLAZING

## SKYLIGHTS AND SLOPED GLAZING



- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. GLASS AREA 16 SQ. FT. OR LESS</li> <li>2. HIGHEST POINT OF GLASS NOT MORE THAN 12 FT. ABOVE A WALKING SURFACE OR OTHER ACCESSIBLE AREA.</li> <li>3. NOMINAL GLASS THICKNESS NOT MORE THAN <math>\frac{3}{16}</math>" AND (FOR MULTIPLE GLAZING ONLY) THE OTHER PANE OR PANE FULLY TEMPERED, LAMINATED OR WIRED GLASS</li> </ol> | <ol style="list-style-type: none"> <li>1. GLASS AREA GREATER THAN 16 SQ. FT.</li> <li>2. GLASS SLOPE 30 DEGREES OR LESS FROM VERTICAL.</li> <li>3. THE HIGHEST POINT OF GLASS NOT MORE THAN 10'-0" ABOVE WALKING SURFACE OR OTHER ACCESSIBLE AREA.</li> </ol> |
|---|---|

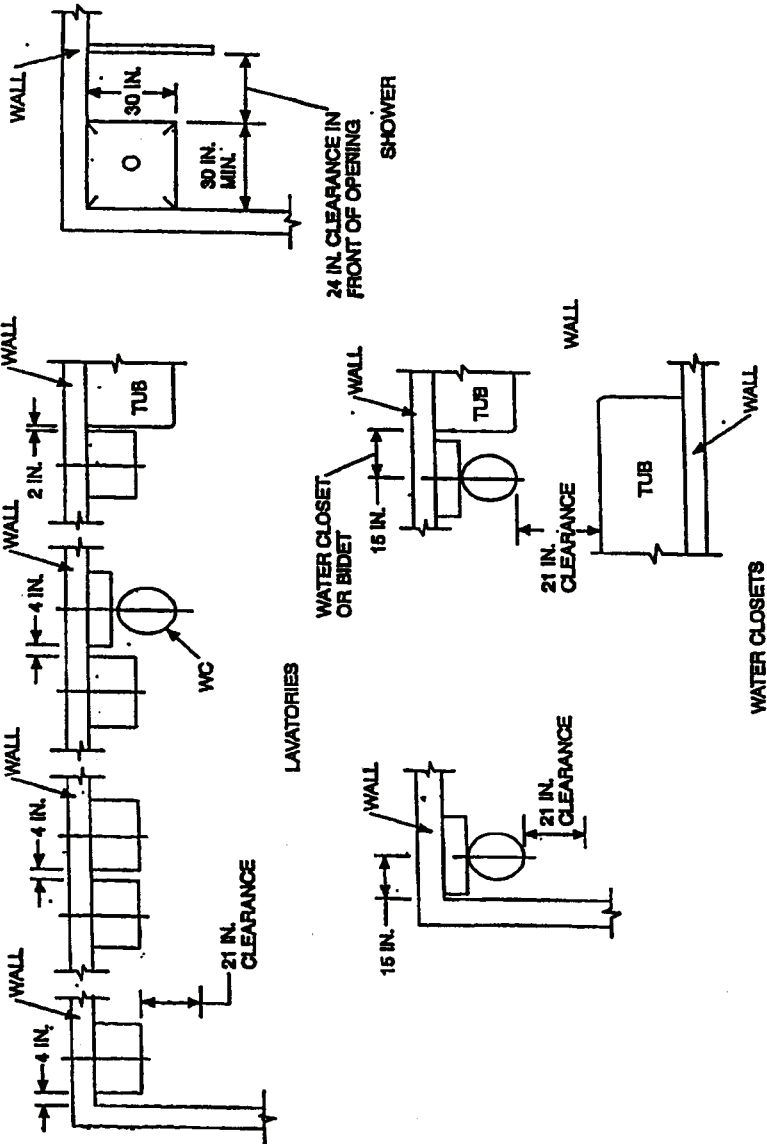
SCREENS NOT REQUIRED WHEN FULLY TEMPERED GLASS IS USED AS A SINGLE GLAZING OR THE BOTTOM PANE IN MULTIPLE GLAZING AND EITHER OF THE ABOVE FOLLOWING CONDITIONS ARE MET.

SCREENS ARE ALSO NOT REQUIRED FOR THE FOLLOWING:

1. LAMINATED GLASS WITH MINIMUM 0.030 INCH POLYVINYL BUTYRAL INTERLAYER
2. WIRE GLASS
3. APPROVED RIGID PLASTIC

ILLUSTRATION I

PLUMBING FIXTURE CLEARANCE



## **INSULATION**

### **1. *When is an insulation inspection required?***

**NCACP Section 107.1.6** Insulation inspections shall be made after an approved building framing and rough-in inspection and after the permanent roof covering is installed, with all insulation and vapor retarders in place, but before any wall or ceiling covering is applied.

### **2. *What are the minimum R-values required for walls, floors and ceilings?***

**Table N1102.1** Insulation shall be a minimum of R-13 in walls, R-30 in ceilings and R-19 in floors. This is for zone 3 which is Mecklenburg County.

### **3. *What is the maximum slope a ceiling can be before blown insulation cannot be used?***

Typically, manufacturer's information discourages using blown insulation for sloped ceilings. Insulation batts must be used. Blown insulation can only be used for flat ceilings unless specified for sloped ceilings by the manufacturer.

### **4. *Are insulation markers necessary when using blown insulation in the attic?***

**Section N1101.3.1** Yes, where blown-in or sprayed insulation is applied in the roof-ceiling assembly, the installer shall provide a certification of the initial installed thickness, settled thickness, coverage area, and number of bags of insulating material installed. Markers shall be provided for every 300 sq. ft. of attic area, attached to the trusses, rafters, or joists and indicate in 1-inch high numbers the installed thickness of the insulation. The depth markers shall be installed to the roof-ceiling assembly at time of wall insulation and be viewable at the insulation inspection along with the baffles.

## **FINAL**

### **1. *When is a final inspection required?***

**NCACP Section 107.1.8** Final inspections shall be made for each trade after completion of the work authorized under the technical codes.

### **2. *Is a separation required between the garage and the living area?***

**Section R309.2** Yes. The garage shall be separated from the residence and its attic area by not less than 1/2 Inch gypsum board applied to the garage side. Also, openings from a private garage directly into a room used for sleeping purposes **shall not be permitted**. Other openings between the garage and residence shall be equipped with solid wood doors not less than 1 3/8 inches in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches thick, or 20-minute fire-rated doors.

### **3. *How much can a handrail project into the stairway?***

**Section R314.1** Stairways shall not be less than 36 inches in clear width at all points above the permitted handrail height and below the required headroom height. Handrails shall not project more than 4.5 inches on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 31.5 inches where a handrail is installed on one side and 27 inches where handrails are provided on both sides.

### **4. *How many risers are needed before a handrail is required?***

**Section R315.1** A handrail shall be provided on at least one side of stairways if it is more than 30in above grade or has (4) four or more risers

**Section R311.5.6.3** Exterior handrails (Decks, garages, and areas exposed to weather) shall not be more than 3 1/2 inches in cross section dimension.

**FINAL (con't)**

5. ***Are returns at the end of handrails required on all handrails?***

**Section R315.1** All required handrails shall be continuous the full length of the stairs from a point directly above the top riser of a flight to a point directly above the lowest riser of the flight. Ends shall be returned or shall terminate in newel posts or safety terminals.

6. ***Are foundation drains allowed to terminate outside the foundation wall underground?***

**Section R405.2.3** The drainage system shall discharge into an approved sewer system or to daylight.

7. ***Is regular gypsum board acceptable material at shower and bath areas?***

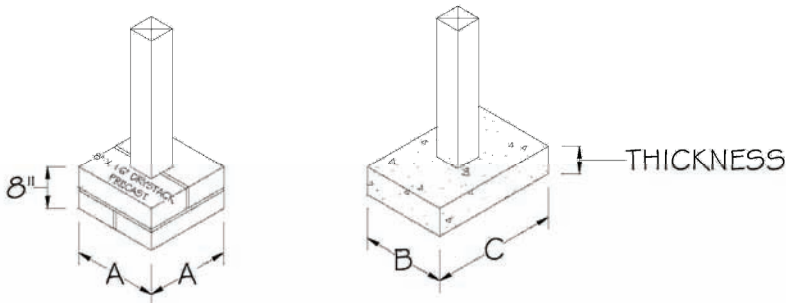
**Section R702.4.2 & R307.2** Gypsum board utilized as the base or backer board for adhesive application of ceramic tile or other nonabsorbent finish material shall conform to ASTM C630 or C1178. Bathtub and shower floors and walls above bathtubs with installed shower heads and in shower compartments shall be finished with a nonabsorbent surface. Such wall surfaces shall extend to a height of not less than 6 feet above the floor.

8. ***What is an acceptable location for the insulation certificate ?***

Section N1101.8 The permanent certificate shall be posted inside the electrical panel box, inside the kitchen cabinets or other approved location . It shall be completed by the builder or reregistered design professional. It shall state the predominate R-values installed in ceilings/roof walls ,foundations (crawl, basement ,wall and or floor) and ducts outside conditioned spaces .U-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration.

## WOOD DECKS

1. A deck is an exposed exterior wood floor structure which may be attached to the structure or freestanding. Roofed porches (open or screened-in) may be constructed using these provisions.
2. Support posts shall be supported by a footing.
3. When attached to a structure, the structure to which attached shall have a treated wood band for the length of the deck, or corrosion-resistant flashing shall be used to prevent moisture from coming in contact with the untreated framing of the structure. Aluminum flashing may not be used in conjunction with deck construction. The deck band and the structure band shall be constructed in contact with each other except on brick veneer structures and where plywood sheathing is required and properly flashed. Siding shall not be installed between the structure and the deck band. If attached to a brick structure, neither flashing nor a treated band for the brick structure is required; in addition, the treated deck band shall be constructed in contact with the brick veneer.



## FOOTING CHART

SIZE (inches)		TRIBUTARY AREA (sq. ft.)	THICKNESS (inches)	
A x A	B x C		Precast	Cast-in-Place
8 x 16	8 x 16	36	4	6
12 x 12	12 x 12	40	4	6
16 x 16	16 x 16	70	8	8
	16 x 24	100		8
	24 x 24	150		8

- 4. When the deck is supported at the structure by attaching the deck to the structure, the following attachment schedules shall apply for attaching the deck band to the structure.**

**A. Structure Except Brick All Veneer Structures:**

<b>Fasteners</b>	<b><u>8' Max Joist Span</u></b>	<b><u>16' Max Joist Span</u></b>
5/8" Hot Dipped Galv. Bolts and Washers • And 12d Common Hot Dipped Galv. Nails ••	1 @ 3'-6" o.c  And 2 @ 8" o.c	1 @ 1' -8"  And 3 @ 6" o.c

- \* Minimum edge distance for bolts is 2 1/2 Inches.
- \* Nails must penetrate the supporting structure band a minimum of 1 1/2 inches.

**B. Brick Veneer Structures**

<b>Fasteners</b>	<b><u>8' Max Joist Span</u></b>	<b><u>16' Max Joist Span</u></b>
5/8" Hot Dipped Gal. bolts	1 @ 2' -4" o.c	1 @ 1' - 4" o.c

Minimum edge distance for bolts is 2 1/2 inches.

**C. Masonry Ledge Support**

If the deck band is supported by a minimum of 1/2 inch masonry ledge along the foundation wall, 5/8 inch hot dipped galvanized bolts with washers spaced at 48 Inches o.c. may be used for support.

D. Other means of support, such as joist hangers, may be connected to a treated house band and properly flashed.

- 5. Girders shall bear directly on posts or be connected to the side of posts with 2 - 5/8 inch hot dipped galvanized bolts.**

**6. Floor decking shall be No. 2 grade treated Southern Pine or equivalent. The minimum floor decking thickness shall be as follows :**

<b>Joist Spacing</b>	<b>Decking (Nominal)</b>
12" - o.c.	1" S4S
16" - o.c.	1" T & G
24" - o.c.	1 1/4" S4S
32" - o.c.	2" S4S

**7. Maximum Height of Deck Support Posts as follows:**

<b>Post Size</b>	<b>Unbraced Max. Post Height</b>
4 x 4	8' — 0"
6 x 6	20' — 0'
•••	Over 20' — 0'

This table is based on No. 2 treated Southern Pine posts. Maximum tributary Area Is based on 128 total square feet which may be located at different levels.

- From top of footing to bottom of girder.
- Decks with post heights over 20' — 0" shall be designed and sealed by a Professional Engineer or Architect.

**8. Decks shall be braced to provide lateral stability. The following are acceptable means to provide lateral stability:**

- A. When the deck floor height is less than 4' — 0" and the deck is attached to the structure in accordance with Section (4) above. lateral bracing is not required.
- B. 4 x 4 wood knee braces may be provided on each column in both directions. The knee braces shall attach to each post a point not less than 1/3 of the post length from the top of the post, and the braces shall be angled between 45 degrees and 60 degrees from the horizontal. Knee braces shall be bolted to the post and the girder with one 5/8 inch hot dipped galvanized bolt at each end of the brace

- C. For freestanding decks without knee braces or diagonal bracing, Lateral stability may be provided by embedding the posts in Accordance with the following:

POST SIZE	Max. Tributary Area	Max. Post Height	Embedment Depth	Concrete Diameter
4 x 4	48 SF	4' - 0'	2' - 6"	1' - 0"
6 x 6	120 SF	6' - 0"	3' - 6"	1' - 8"

- D. 2 x 6 diagonal vertical cross bracing may be provided in two perpendicular directions for freestanding decks or parallel to the structure at the exterior column line for attached decks. The 2 x 6's shall be attached to the posts with one 5/8 inch hot dipped galvanized bolt at each end of each bracing member.

**CAUTION:** The current methods of chemically preserving lumber are much more corrosive to hardware and fasteners than those used in the past. The use of APPROVED corrosion resistant hardware, structural connectors and fasteners is required. ( Example; ACQ treated lumber would require the use of ACQ approved or triple galvanized hardware.)

Table R502.3.3(1)

**CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING LIGHT-FRAME EXTERIOR BEARING WALL AND ROOF ONLY<sup>a, g, h</sup>**  
 (Floor Live Load ≤ 40 psf, Roof Live Load ≤ 20 psf )

Member & Spacing	20 psf		
	Roof Width		
	24 ft.	32 ft.	40 ft.
2 x 8 @ 12"	20" (177)	15" (227)	—
2 x 10 @ 16"	29" (228)	21" (297)	16" (364)
2 x 10 @ 12"	36" (166)	26" (219)	20" (270)
2 x 12 @ 16"	—	32" (287)	25" (356)
2 x 12 @ 12"	—	42" (209)	31" (263)
2 x 12 @ 8"	—	48" (136)	45" (169)

- a. Tabulated values are for clear-span roof supported solely by exterior bearing walls.
- b. Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, southern pine, and spruce-pine-fir for repetitive (3 or more) members.
- c. Ratio of backspan to cantilever span shall be at least 3:1.
- d. Connections capable of resisting the indicated uplift force shall be provided at the backspan support.
- e. Uplift force is for a backspan to cantilever span ratio of 3:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 3 divided by the actual backspan ratio provided (3/ backspan ratio).
- f. See Section R301.2.2.2.2, item 1, for additional limitations on cantilevered floor joists for detached one- and two-family dwellings in Seismic Design Categories
- g. D, and D2 and townhouses in Seismic Design Categories C, D,, and D2.
- h. A full-depth rim joist shall be provided at the cantilevered end of the joists. Solid blocking shall be provided at the cantilever support.

**GIRDER AND FLOOR JOIST SPANS FOR EXTERIOR WOOD DECKS**

**GIRDER SPANS**

Exterior Girder Clear Spans (Nominal Lumber Sizes)

Deck Width            **2x6**                    **2x8**                    **2x10**                    **2x12**

<b>20' (2ply)</b>	<b>3-11</b>	<b>5-0</b>	<b>6-1</b>	<b>7-1</b>
<b>20' (3ply)</b>	<b>—</b>	<b>6-3</b>	<b>7-7</b>	<b>8-10</b>
<b>20' (4ply)</b>	<b>—</b>	<b>—</b>	<b>8-9</b>	<b>10-2</b>

\*Partial reproduction of Table R502.5(1) at 30 ground snow load and roof ceiling and 1 clear span floor. Deck width is 20' or less measured in the direction of joists span. Splices in plys must break over bearing supports.

**FLOOR JOIST SPANS**

**M106.1 Joist Spans**-Joists spans shall be based upon TableR502.3.1(2)with 40lbs per sq. ft live load an 10lbs per sq. ft dead load .This table assumes treated southern yellow pine #2 for use with exterior decks.

<b>Spacing (o.c)</b>	<b>2x6</b>	<b>2x8</b>	<b>2x10</b>	<b>2x12</b>
<b>12"</b>	<b>10-9</b>	<b>14-2</b>	<b>18-0</b>	<b>21-9</b>
<b>16"</b>	<b>9-9</b>	<b>12-10</b>	<b>16-1</b>	<b>18-10</b>
<b>19.2"</b>	<b>9-2</b>	<b>12-1</b>	<b>14-8</b>	<b>17-2</b>
<b>24"</b>	<b>8-6</b>	<b>11-0</b>	<b>13-1</b>	<b>15-5</b>

Partial reproduction of Table R502.3.1(2) (Residential living areas, live load = 40 psf, L/A = 360)

**Requirements for sales centers in residence**  
**single family.**

(Required to meet temporary structure section of Vol. 1-C section 1.2.10.1 NC Accessibility Code)

***Permit requirements (2 ways to permit):***

- Structure can be permitted all at one time at initial permit stage to show total heated square footage of house and garage area (no garage indicated on application form).
- If structure is permitted as having a garage then a second permit will be required to change that garage area to a sales center (Supplemental permit). This would mean that there would be 2 frame, 2 insulation and 2 final inspections on this site. Inspection request on both permits would need to be called for.
- If the garage area is converted back from sales center to a garage then a new permit is required for that conversion to check structure and removal of HVAC registers will be required. Conversion permit back to garage will be the responsibility of the owner (either the builder at that time or the home owner if sold and converted).

***Requirements:***

- Van Accessible access parking space with signage (8' parking, 8' access isle) per section 4.4.1. Space and access isle should be paved and must be marked to clearly define per section 4.2.3.
- Access walkway 4' wide, ramps and any handrails if needed per Chapter 5 of Accessibility Code
- Entrance door and all interior doors inside the sales office area must be 3/0 with lever handles and entrance door must have low profile threshold, door requirements listed in Chapter 7 of NC Accessibility Code.
- 1 accessible bathroom facility either inside the office space or home with accessible route or an accessible porta-jon can be provided for the duration of the sales center usage. Location of the porta-jon and its access should be discussed with inspector. Only the areas being used as the sales office are required to be accessible to customers and staff, kitchens and bedrooms are not required to be accessible unless utilized by the occupants .

Any concerns about meeting these requirements at a specific jobsite should be discussed with area field inspector prior to installation.

## **CUSTOMER SERVICE FORM**

To better serve our customers, this form has been added for your convenience. If you have any questions, tables, or illustrations, that would be beneficial in the future revisions of this handbook, please fill out this form and fax or mail to the address provided below.

Name:

Company:

Address:

Comments:

Mail to: Mecklenburg County Code Enforcement  
700 N. Tryon St.  
CHARLOTTE, NC 28202-2236

Attn: RTAC

FAX: 704-432-6723

Phone-704-432-7822

**NOTES**



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