

Township Of West Milford

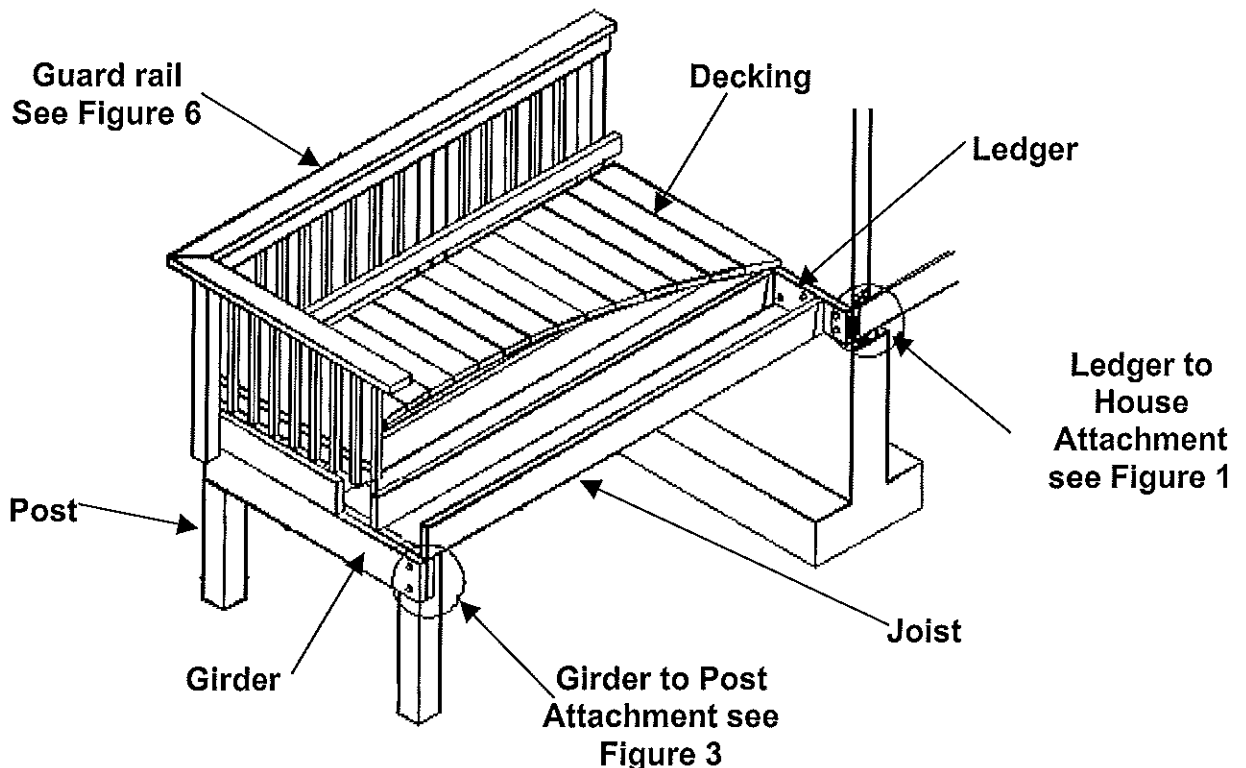
DEPARTMENT
OF BUILDING SAFETY

1480 Union Valley Road • West Milford, NJ 07480 • Tel:(973) 728-2780 • Fax: (973) 728-2843

Deck Construction Guide

1. This handout is based on the **2009 International Residential Building Code NJ**.
2. Drawings are required for decks, they may be drawn by the homeowner or an architect licensed in the State of New Jersey. *(See page 10 for a sample drawing)*
3. A survey of the property indicating the proposed location of the deck is required. The deck may be located anywhere on the property, but decks built extremely close to the property line may require an as-built survey to verify that the deck has not encroached on neighboring properties.
4. Prior to the construction of your deck, you must call for utility locations. The utility dig number is **1-800-272-1000** or **811**. Once you obtain the dig number, write it in the designated area of the construction permit application (inside rear cover of the main folder)
5. Permits are required for new and replacement decks.
6. Decks cannot be put on top of septic systems, see the Health Department for location and information.
7. Lumber to construct decks should be naturally durable or preservative treated.
8. Required Inspection:
 - **Footing**- After hole is dug but before concrete is placed.
 - **Final**- After everything is complete.

Deck Detail



NOTICE

New Rules for Fasteners and Flashing Use With “ACQ” Pressure Treated Wood

As of January 1, 2004, Wood treatment companies are no longer manufacturing CCA pressure treated wood for residential use in projects like decks, fences, sill plates and framing. This change was a voluntary agreement between the wood treatment companies and the U.S. EPA due to the fears about health effects of arsenic and chromium used in CCA treated wood. The majority of new pressure treated wood will contain “ACQ” (Alkaline Copper Quaternary) a copper-based preservative considered less environmentally toxic. Unlike CCA, which relies on toxic amounts of arsenic pumped into lumber to ward away pests and mold, ACQ's primary ingredient is copper, a relatively inert ingredient and an essential nutrient for human health. Quaternary, or Quat, a type of fungicide that attacks decay organisms, provides additional protection against rot and termite attacks, and is used in a wide array of consumer goods, from wood to paints to feminine hygiene products.

The Problem

While ACQ is more environmentally friendly, different techniques for fastening and flashing projects using ACQ are needed. ACQ uses copper as its main ingredient and ammonia as a vehicle to help penetration of the wood. The problem is that the high copper content of the wood when it comes in contact with other metals sets up a galvanic reaction, which causes corrosion. This seems to be aggravated by the ammonia contained in the wood when exposed to moisture.

The Solution

Special attention must be paid to the fasteners and metals used around ACQ wood.

Aluminum should never come in contact with ACQ treated wood. Flashing, which is required on deck ledger boards to prevent water from getting behind and rotting the house framing, must now be **copper, copper clad, stainless steel** or heavy **U.V. resistant plastic**. Aluminum sills of doors should not come in contact with treated wood sill plates or aprons. Aluminum coil trim should not be used to wrap treated posts or trim.

Nails, screws and bolts should be **hot dipped galvanized or stainless steel**, electro-galvanized nails and bolts will not hold up and should not be used. Most manufacturers of nail gun nails are changing to H.D. galvanized or stainless steel, but check that they are approved for use with ACQ. Lag bolts used to attach the ledger board **must be ½” in diameter**. Foundation anchor bolts should be **H.D. Galvanized** if you are using treated sills, aluminum termite shields should not be used.

Hangers and brackets must be approved for use with ACQ. Traditional galvanized joist hangers and brackets have been shown to corrode more quickly with ACQ, so most manufacturers are increasing the thickness of the galvanization of their products. Make sure all hangers and brackets are approved for use with ACQ. Simpson, one of the largest hanger manufacturers, identifies its new products with the name “Z-max”.

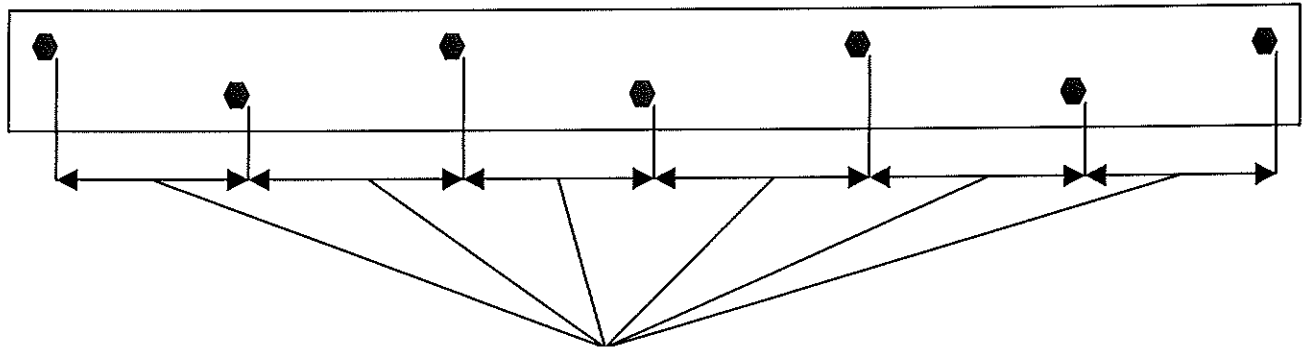
Flashing

Flashing shall be installed to prevent water from getting behind the ledger and damaging house framing. **Aluminum** flashing **can not** be used with ACQ treated lumber, flashing must be **copper** or **stainless steel**.

Ledger Attachment

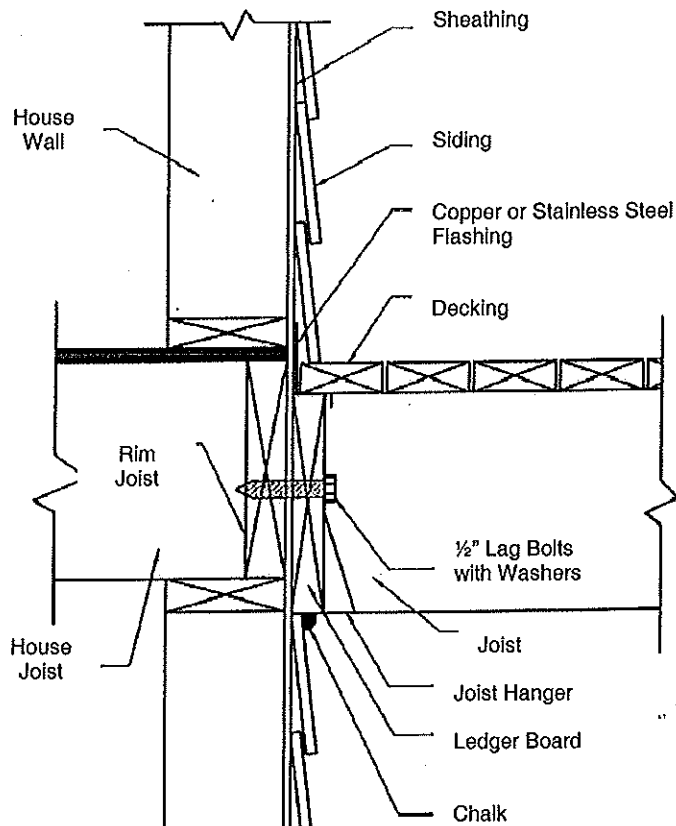
Ledger must be securely bolted to the house. For wood framing 1/2" lag bolts staggered 16" apart are recommended. (Figure 1) Lag bolts should be attached to the house's floor framing or wall studs and should penetrate framing at least 3". If the ledger is attached to the foundation, through bolting is recommended. Lag bolts must be hot dipped galvanized.

Ledger bolting pattern (Figure 1)



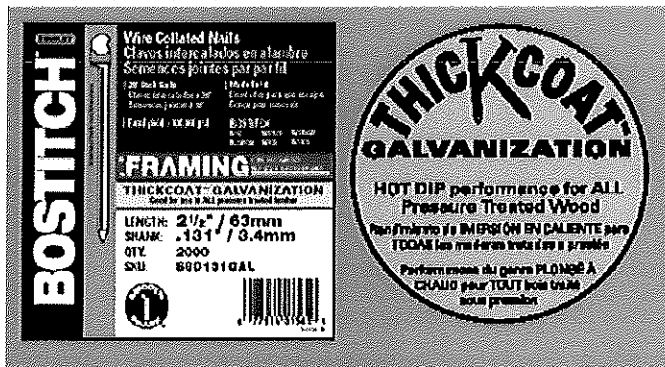
16" Bolt Spacing

Ledger Attachment Detail

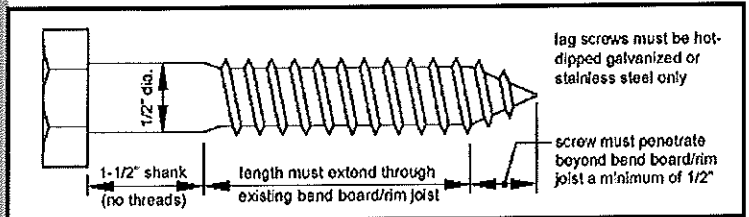


Fasteners

All fasteners must be **hot dipped galvanized**, **stainless steel** or approved for use with ACQ treated lumber. Nail gun nails that are electro-galvanized will not hold up with ACQ lumber and should not be used.



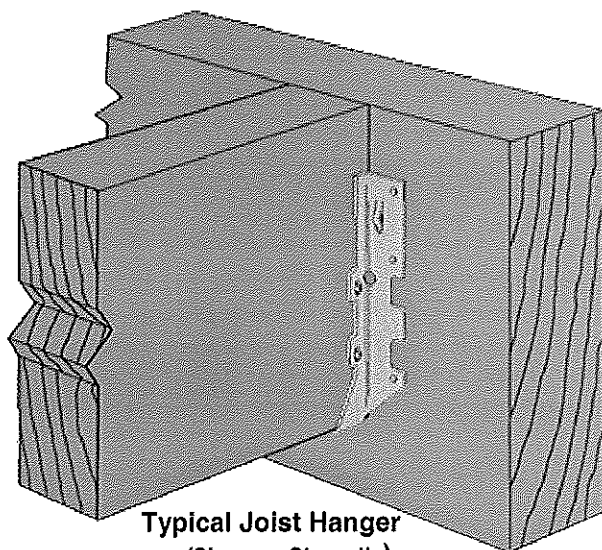
Sample Product Label
(Bostitch)



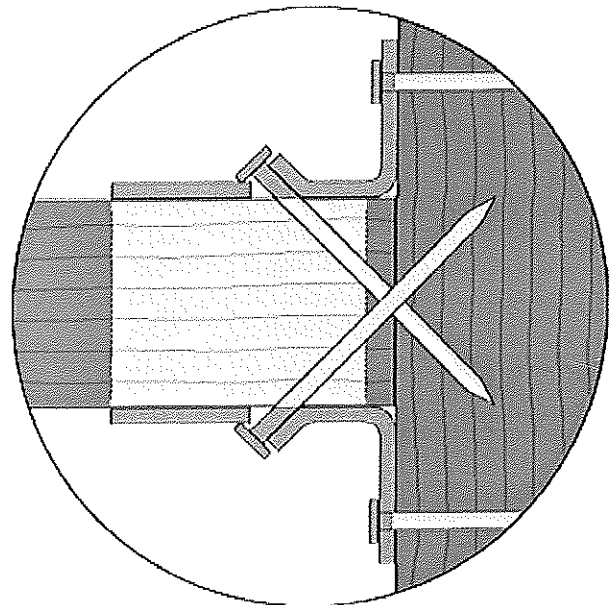
Joist Hangers

Joists should be attached to ledger and flush girders with joist hangers. **The manufacturer must approve joist hangers for use with ACQ treated lumber.** Simpson designates their hangers for use with ACQ with the “Z-max” trade name, USP (United Steel Products) uses the name “Triple Zinc”. Make sure to follow manufactures instructions on nailing hangers. Special nails are made for joist hangers, roofing nails or deck screws are not acceptable. (Figure 2)

(Figure 2)



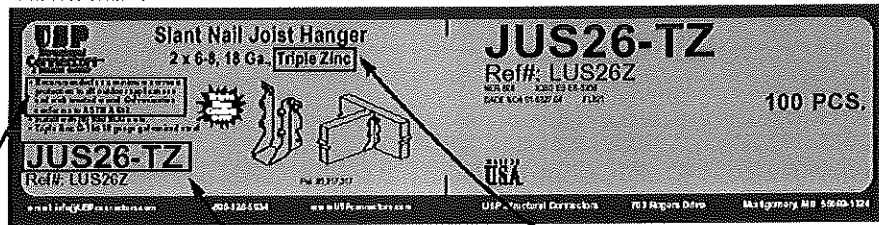
Typical Joist Hanger
(Simpson Strongtie)



Sample Nailing Details
(Simpson Strongtie)



Carton Label



USP recommendation and standards that are met with the Triple Zinc coating.

Part number is referenced with a TZ at the end for Triple Zinc products.

Triple Zinc is called out after product description.

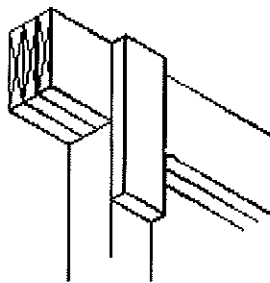
Sample Joist Hanger Product Labels
(Simpson Strongtie & USP)

Posts and Girders

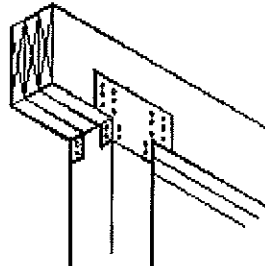
Posts to girder attachment should be braced to prevent girder from "rolling". (Figure 3). Any seams or splices in the girder must be over the posts. (Figure 4)

Post to girder Attachment Detail

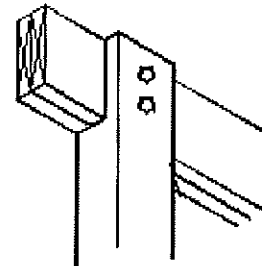
(Figure 3)



2x6 Gusset attached to side of post and girder

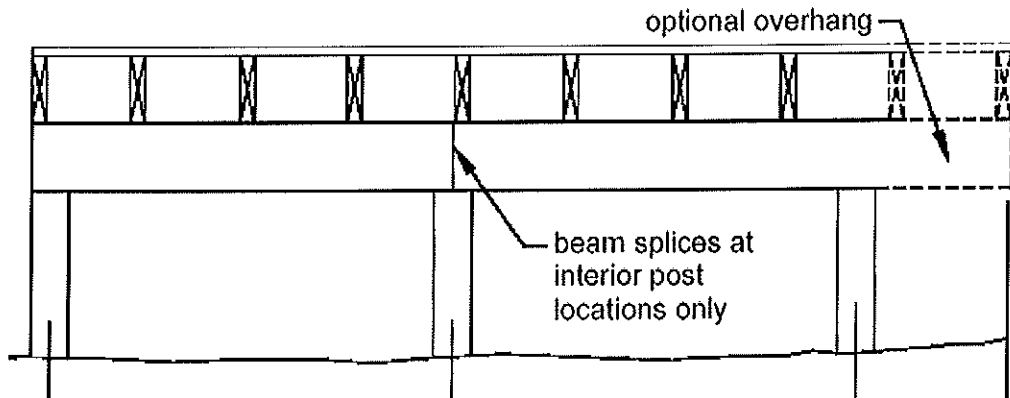


Mechanical fasteners install as per manufactures instructions



Post notched and bolted to girder

(Figure 4)

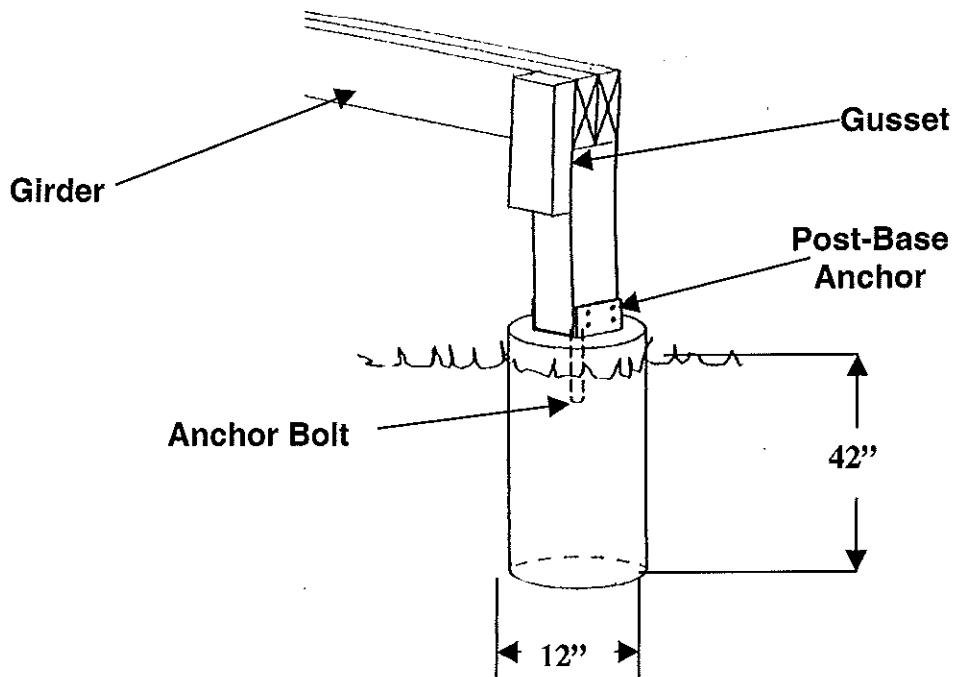


Footings

Footings should be at least 42" below grade and a least 12" in diameter. Larger decks or decks with hot tubs on them may require a larger diameter to distribute the weight over a larger area. Base of post should be attached to the footing with an appropriate anchor. (Figure 5) Note: If while digging your footings you encounter ledge rock, your footings must be "pinned" to the rock, by drilling into the rock 6" and inserting a 12" length of reinforcing rod into the hole to prevent the footing from shifting or being lifted by frost.

Footing and Post Base Detail

(Figure 5)

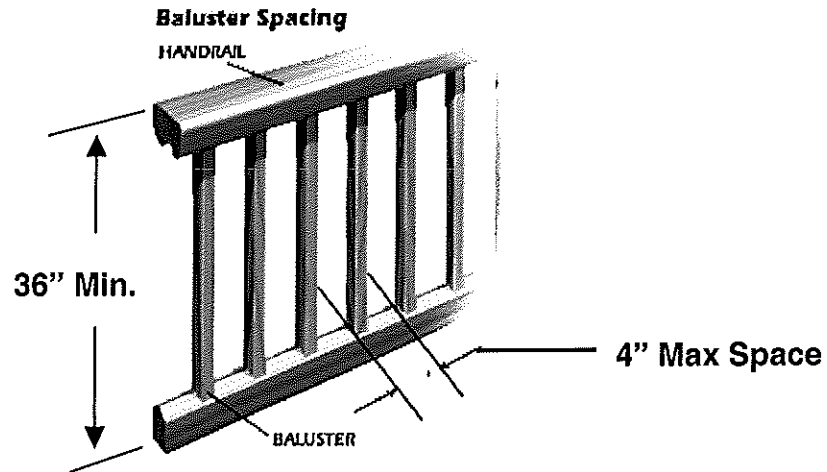


Guardrails (Railings)

Decks that are more than 30" above the adjacent grade must have a guardrail. The guardrails must 36" high (unless the deck is more than 20' above grade then 42" is required) and have no space greater than 4" (Figure 6)

Railing requirements

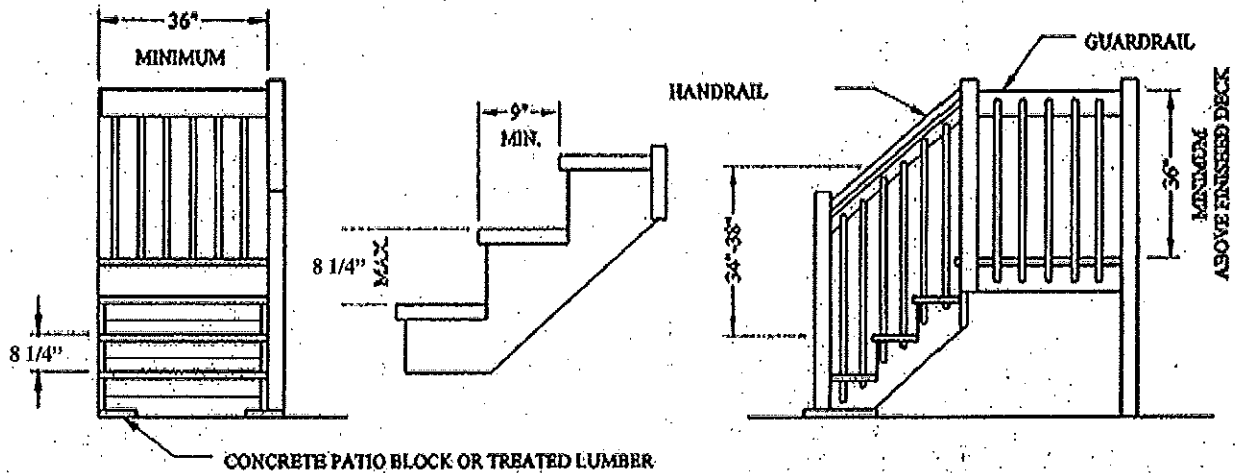
(Figure 6)



Stairs

Stairs must be 36" wide, steps are to have a maximum rise of 8 1/4" and a minimum run of 9". Stairs should not have any opening in the risers greater than 4". (Figure 7). Stairs must be equal in rise and tread depth to within 3/16" between adjacent stairs and no more than 3/8" difference between all stairs. (Figure 8)

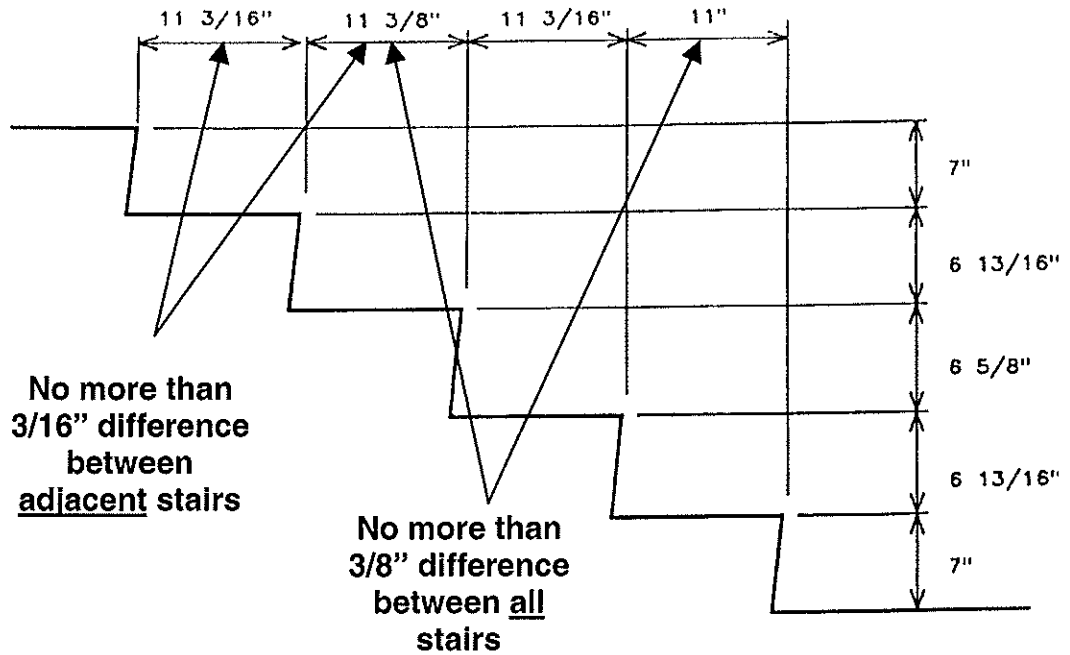
Stair requirements



(Figure 7)

Tolerance for Difference Between Stairs

(Figure 8)

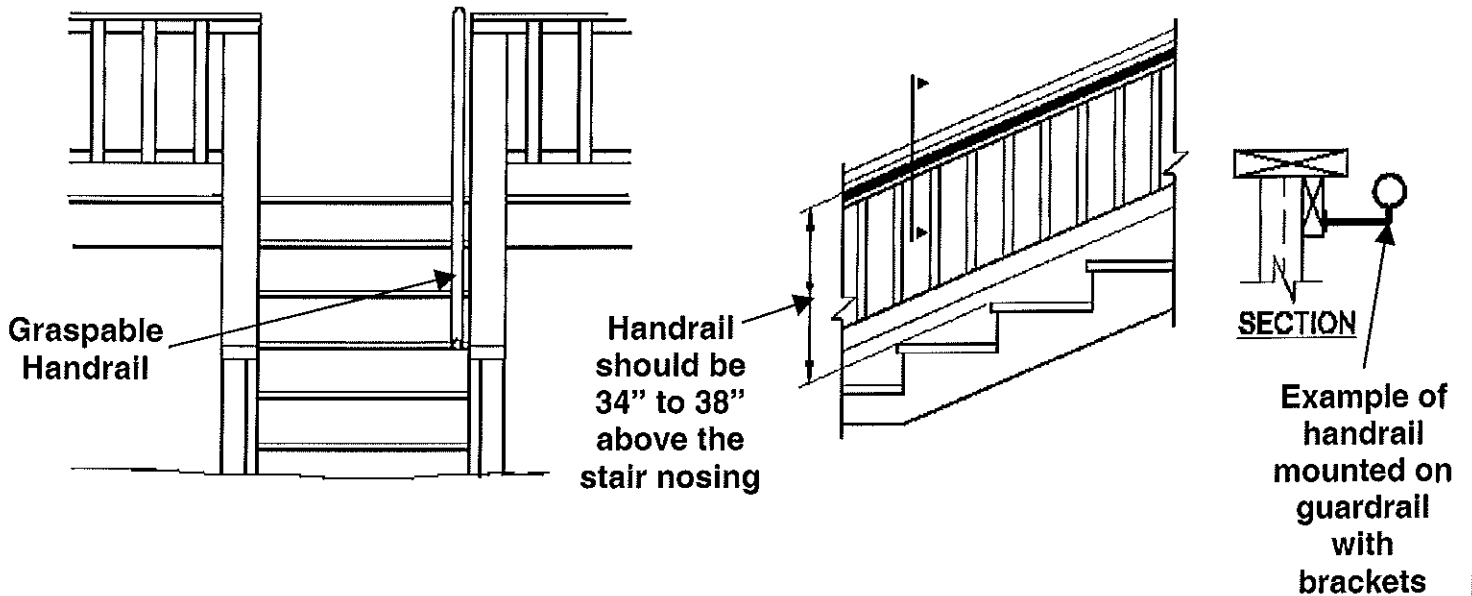


Graspable Handrails

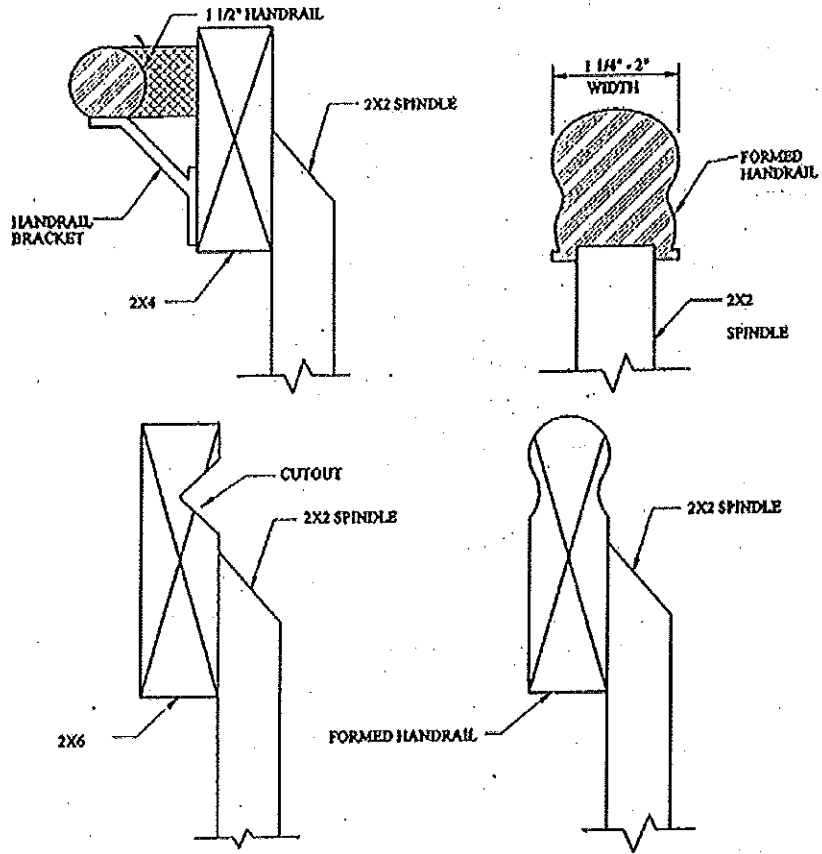
A graspable handrail must be provided on all stairs. The handrail must be mounted 34 " to 38 " above the stair nosing. (Figure 9)

Graspable Handrail

(Figure 9)



OPTIONAL



Note: A 2x4 or 2x6 mounted on top of the guard is not considered graspable.

CHAPTER 5 FLOORS

SECTION R501 GENERAL

R501.1 Application. The provisions of this chapter shall control the design and construction of the floors for all buildings including the floors of *attic* spaces used to house mechanical or plumbing fixtures and *equipment*.

R501.2 Requirements. Floor construction shall be capable of accommodating all loads according to Section R301 and of transmitting the resulting loads to the supporting structural elements.

SECTION R502 WOOD FLOOR FRAMING

R502.1 Identification. Load-bearing dimension lumber for joists, beams and girders shall be identified by a *grade mark* of a lumber grading or inspection agency that has been *approved* by an accreditation body that complies with DOC PS 20. In lieu of a *grade mark*, a certificate of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted.

R502.1.1 Preservative-treated lumber. Preservative treated dimension lumber shall also be identified as required by Section R319.1.

R502.1.2 Blocking and subflooring. Blocking shall be a minimum of utility grade lumber. Subflooring may be a minimum of utility grade lumber or No. 4 common grade boards.

R502.1.3 End-jointed lumber. *Approved* end-jointed lumber identified by a *grade mark* conforming to Section R502.1 may be used interchangeably with solid-sawn members of the same species and grade.

R502.1.4 Prefabricated wood I-joists. Structural capacities and design provisions for prefabricated wood I-joists shall be established and monitored in accordance with ASTM D 5055.

R502.1.5 Structural glued laminated timbers. Glued laminated timbers shall be manufactured and identified as required in ANSI/AITC A190.1 and ASTM D 3737.

R502.1.6 Structural log members. Stress grading of structural log members of nonrectangular shape, as typically used in log buildings, shall be in accordance with ASTM D 3957. Such structural log members shall be identified by the *grade mark* of an *approved* lumber grading or inspection agency. In lieu of a *grade mark* on the material, a certificate of inspection as to species and grade issued by a lumber-grading or inspection agency meeting the requirements of this section shall be permitted to be accepted.

R502.1.7 Exterior wood/plastic composite deck boards. Wood/plastic composites used in exterior deck boards shall comply with the provisions of Section R317.4.

R502.2 Design and construction. Floors shall be designed and constructed in accordance with the provisions of this chap-

ter, Figure R502.2 and Sections R317 and R318 or in accordance with AF&PA/NDS.

R502.2.1 Framing at braced wall lines. A load path for lateral forces shall be provided between floor framing and *braced wall panels* located above or below a floor, as specified in Section R602.10.6.

R502.2.2 Decks. Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads as applicable. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting. For decks with cantilevered framing members, connections to exterior walls or other framing members, shall be designed and constructed to resist uplift resulting from the full live load specified in Table R301.5 acting on the cantilevered portion of the deck.

R502.2.2.1 Deck ledger connection to band joist. For decks supporting a total design load of 50 pounds per square foot (2394 Pa) [40 pounds per square foot (1915 Pa) live load plus 10 pounds per square foot (479 Pa) dead load], the connection between a deck ledger of pressure-preservative-treated Southern Pine, incised pressure-preservative-treated Hem-Fir or *approved* decay-resistant species, and a 2-inch (51 mm) nominal lumber band joist bearing on a sill plate or wall plate shall be constructed with $\frac{1}{2}$ -inch (12.7 mm) lag screws or bolts with washers in accordance with Table R502.2.2.1. Lag screws, bolts and washers shall be hot-dipped galvanized or stainless steel.

R502.2.2.1.1 Placement of lag screws or bolts in deck ledgers. The lag screws or bolts shall be placed 2 inches (51 mm) in from the bottom or top of the deck ledgers and between 2 and 5 inches (51 and 127 mm) in from the ends. The lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger.

R502.2.2.2 Alternate deck ledger connections. Deck ledger connections not conforming to Table R502.2.2.1 shall be designed in accordance with accepted engineering practice. Girders supporting deck joists shall not be supported on deck ledgers or band joists. Deck ledgers shall not be supported on stone or masonry veneer.

R502.2.2.3 Deck lateral load connection. The lateral load connection required by Section R502.2.2 shall be permitted to be in accordance with Figure R502.2.2.3. Hold-down tension devices shall be installed in not less than two locations per deck, and each device shall have an allowable stress design capacity of not less than 1500 pounds (6672 N).

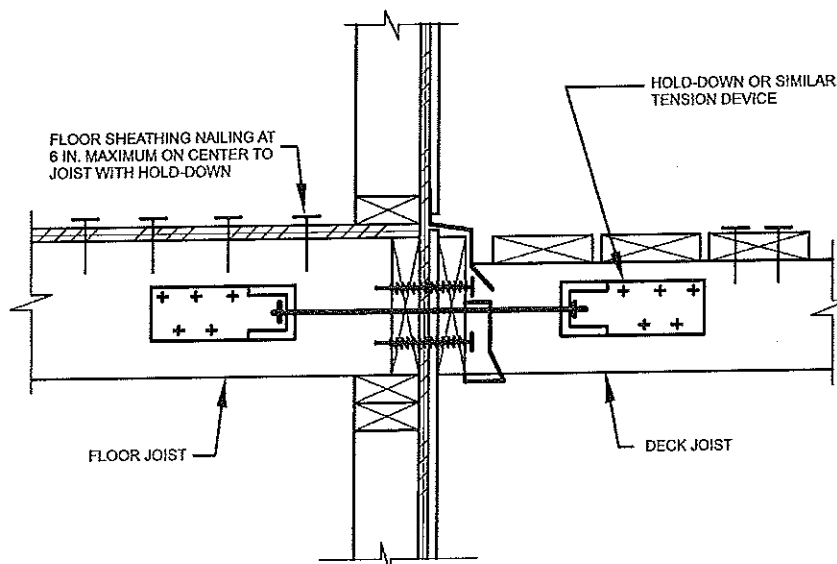
R502.2.2.4 Exterior wood/plastic composite deck boards. Wood/plastic composite deck boards shall be installed in accordance with the manufacturer's instructions.

TABLE R502.2.2.1
FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGER
AND A 2-INCH NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST^{c, f, g}
 (Deck live load = 40 psf, deck dead load = 10 psf)

JOIST SPAN	6' and less	6'1" to 8'	8'1" to 10'	10'1" to 12'	12'1" to 14'	14'1" to 16'	16'1" to 18'
Connection details	On-center spacing of fasteners ^{d, e}						
1/2 inch diameter lag screw with 15/32 inch maximum sheathing ^a	30	23	18	15	13	11	10
1/2 inch diameter bolt with 15/32 inch maximum sheathing	36	36	34	29	24	21	19
1/2 inch diameter bolt with 15/32 inch maximum sheathing and 1/2 inch stacked washers ^{b, h}	36	36	29	24	21	18	16

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

- a. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- b. The maximum gap between the face of the ledger board and face of the wall sheathing shall be 1/2".
- c. Ledgers shall be flashed to prevent water from contacting the house band joist.
- d. Lag screws and bolts shall be staggered in accordance with Section R502.2.2.1.1.
- e. Deck ledger shall be minimum 2 x 8 pressure-preservative-treated No.2 grade lumber, or other approved materials as established by standard engineering practice.
- f. When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1 inch thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel band joist), the ledger attachment shall be designed in accordance with accepted engineering practice.
- g. A minimum 1 x 9 1/2 Douglas Fir laminated veneer lumber rimboard shall be permitted in lieu of the 2-inch nominal band joist.
- h. Wood structural panel sheathing, gypsum board sheathing or foam sheathing not exceeding 1 inch in thickness shall be permitted. The maximum distance between the face of the ledger board and the face of the band joist shall be 1 inch.



For SI: 1 inch = 25.4 mm.

FIGURE 502.2.2.3
DECK ATTACHMENT FOR LATERAL LOADS

R502.3 Allowable joist spans. Spans for floor joists shall be in accordance with Tables R502.3.1(1) and R502.3.1(2). For other grades and species and for other loading conditions, refer to the AF&PA Span Tables for Joists and Rafters.

R502.3.1 Sleeping areas and attic joists. Table R502.3.1(1) shall be used to determine the maximum allowable span of floor joists that support sleeping areas and

attics that are accessed by means of a fixed stairway in accordance with Section R311.7 provided that the design live load does not exceed 30 pounds per square foot (1.44 kPa) and the design dead load does not exceed 20 pounds per square foot (0.96 kPa). The allowable span of ceiling joists that support *attics* used for limited storage or no storage shall be determined in accordance with Section R802.4.