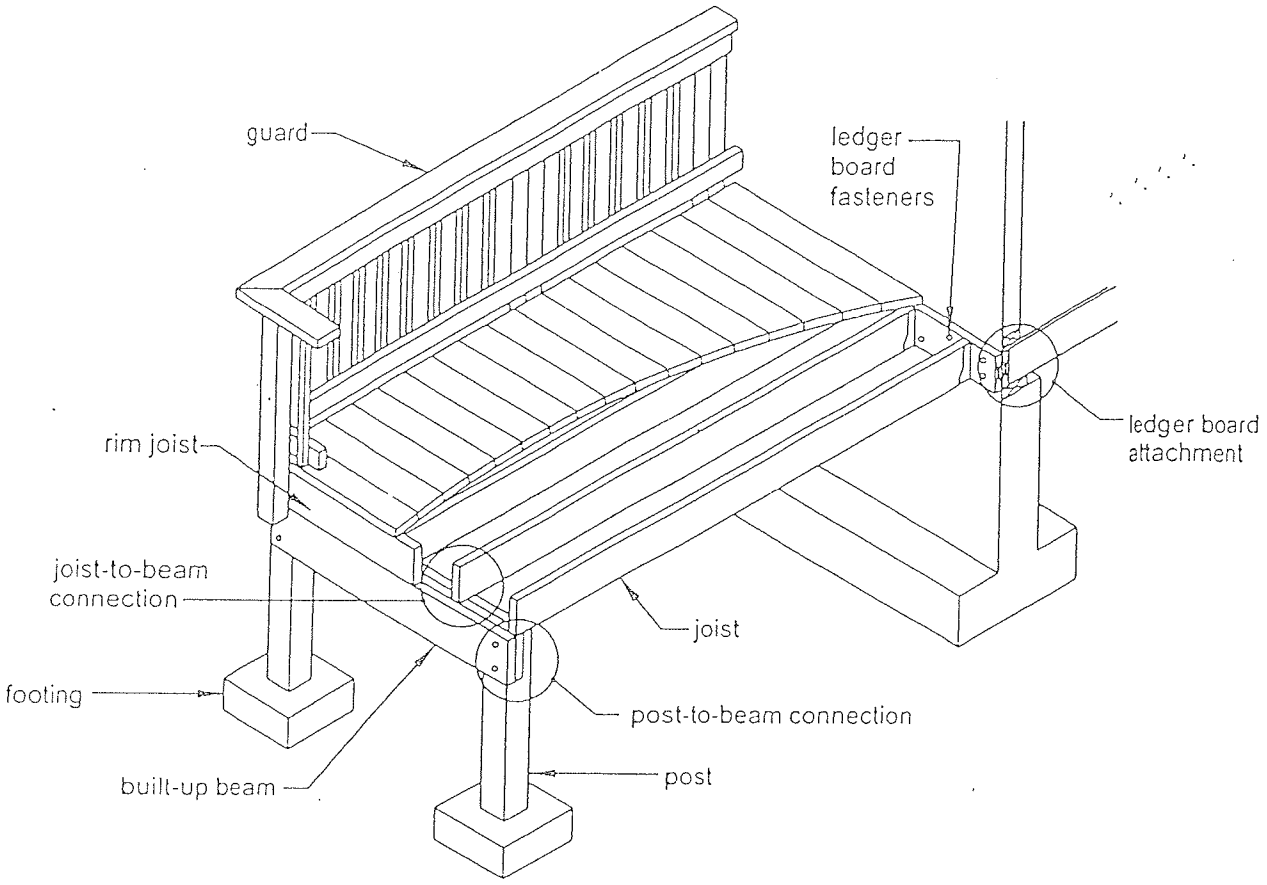
– TOWNSHIP

Typical Deck Details



CONTENTS

PIC - 21

THE USE OF THIS PACKAGE IN LIEU OF SUBMITTED DRAWINGS APPLIES TO SINGLE SPAN, SINGLE LEVEL, RESIDENTIAL DECKS ONLY. DECKS MUST BE CONSTRUCTED IN STRICT CONFORMANCE WITH THE DETAILS CONTAINED HEREIN. A COPY OF THIS DECK DETAIL MUST BE ON THE JOB SITE AND AVAILABLE TO THE INSPECTOR.

GENERAL NOTES

1. All lumber shall be southern pine, grade #2 or better and shall be pressure treated ACQ or CA-B in accordance with American Wood-Preservers' Association standards for **ground contact.**
2. All nails shall be spiral or annular grooved.
3. **New pressure treatment methods use chemicals that will prematurely corrode standard fasteners, hardware, and flashing when in contact with pressure treated lumber, and, as a result, fastener and hardware requirements have changed; see below.**
   - **All screws and nails shall be hot-dipped galvanized or stainless steel.**
   - **All hardware (joist hangers, cast-in-place post anchors, etc.) shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel. Look for products such as "Zmax" from Simpson Strong-Tie or "Triple Zinc" from USP.**
4. Decks constructed according to this handout are not approved for future hot tub installations.
5. Decks shall not be attached to house overhangs, bay windows, brick veneers, or chimneys.
6. Deviations from this handout and conditions which do not meet the details shown herein require a plan submission.
7. Inspections:
   - A footing, framing, and final inspection is required on all decks.
   - Footing inspections are required PRIOR to the placement of concrete.
   - Framing and final inspections may be combined if all portions of the deck framing and mechanical attachments are at least 42" above grade.
   - **Inspections are required by law. Failure to receive any and all inspections can result in the issuance of violations which may lead to legal proceedings.**
8. It is the responsibility of the permit holder or the permit holder's representative to notify the Township when the stages of construction are reached that require an inspection. Inspection requests may be made by calling 540-6080 or 652-4841 for inspection request. All inspections are in the A.M. only. Requires a 24-48 hour notice. Monday thru Friday each week.
9. All decking material shall be composed of 2x6 or 5/4 ("five-quarter") board. Attach decking to each joist with 2-8d nails or 2-#8 screws. Decking may be placed from an angle perpendicular to the joists to an angle of 45 degrees to the joists. Decking must have a span length such that each board bears on a minimum of 4 joists.
10. Plastic or manufactured decking products may be substituted with an approved evaluation report from the International Code Council. The evaluation report must be on the jobsite and available to the inspector during the inspection process. Installation and span lengths of the substituted material must be in strict conformance with the evaluation report and the manufacturer's instructions.
11. Decks shall not be used or occupied until a final inspection approval is obtained.

JOIST SIZE

The span of a joist is measured from the centerline of bearing at one end of the joist to the centerlin bearing at the other and does not include overhangs. Maximum joist span lengths are noted in TABL See FIGURE 1 and FIGURE 2 for joist span types.

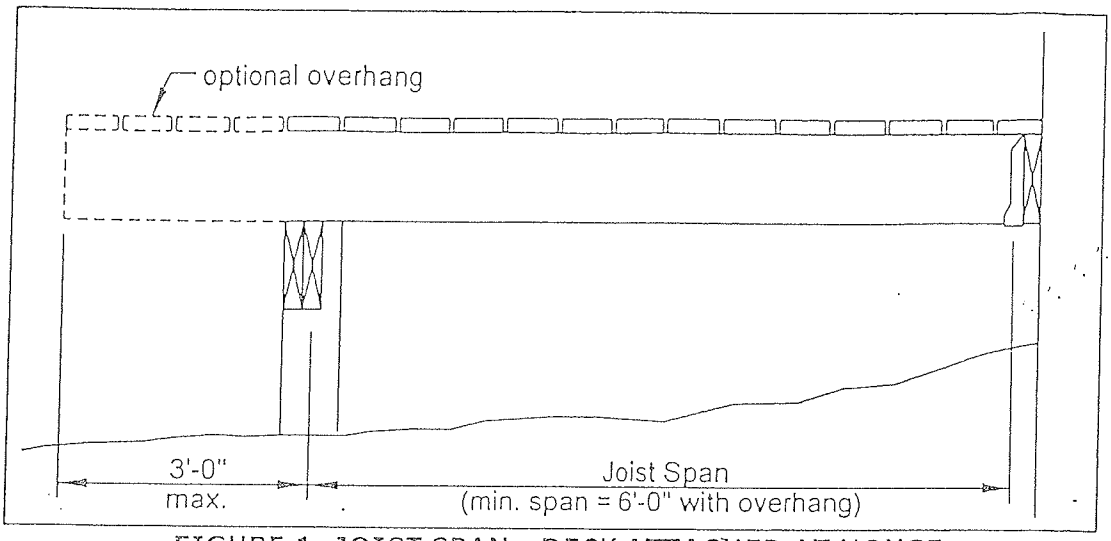


FIGURE 1: JOIST SPAN - DECK ATTACHED AT HOUSE

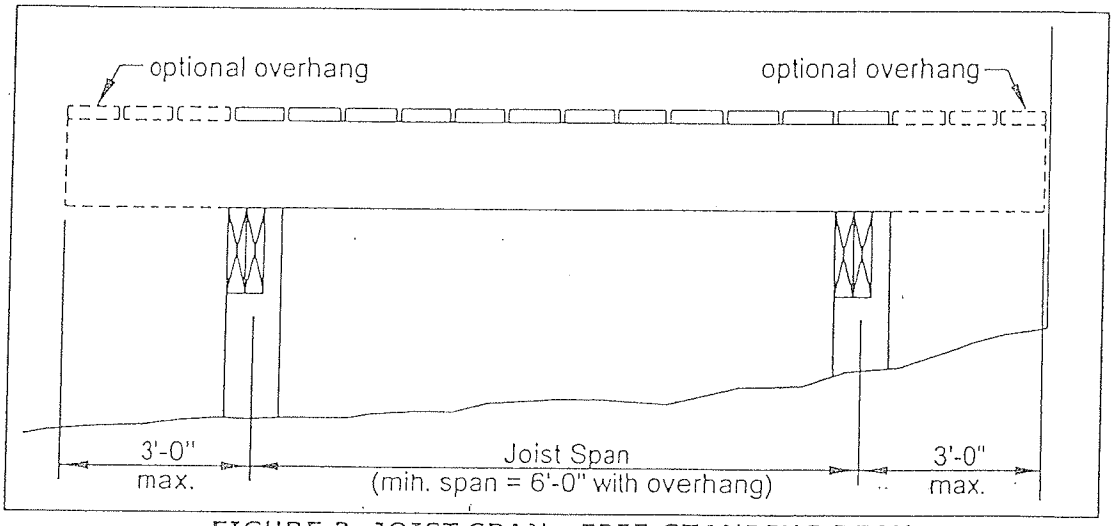


FIGURE 2: JOIST SPAN - FREE-STANDING DECK

TABLE 1: MAXIMUM JOIST SPANS

Joist Size	Joist Spacing, on center	Joist Span[1] (does not include overhang)
2x6	16"	9'-9"
2x6	24"	8'-6"
2x8	16"	12'-10"
2x8	24"	11'-0"
2x10	16"	16'-1"
2x10	24"	13'-1"
2x12	16"	18'-10"
2x12	24"	15'-5"

[1] Spans based on 40 PSF live load, 10 PSF dead load, southern pine#2, normal loading duration, wet service conditions and $\Delta=\ell/360$.

BEAM SIZE

Beam size determination is based on your joist span characteristics. Use TABLE 2 if your joists do not overhang or TABLE 3 if your joist overhangs. See FIGURE 3 for beam span types.

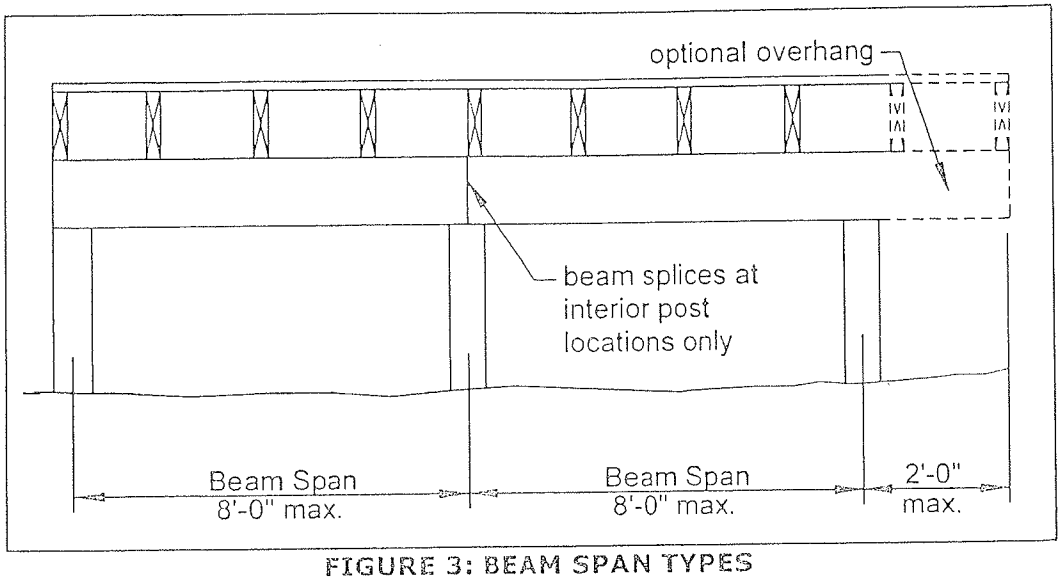


FIGURE 3: BEAM SPAN TYPES

TABLE 2: MINIMUM BEAM SIZE FOR JOISTS WITH NO OVERHANGS

Joist Span	Beam Size
0 - 6'-8"	(2) 2x6*
6'-8" - 11'-2"	(2) 2x8*
11'-2" – 15'-9"	(2) 2x10*
16'-0" – 18'-9"	(2) 2x12

TABLE 3: MINIMUM BEAM SIZE FOR JOISTS WITH OVERHANGS

Joist Span	Beam Size
0 – 6'-0"	(2) 2x8*
6'-0" – 12'-8"	(2) 2x10*
12'-8" – 18'-9"	(2) 2x12

* You may substitute a larger beam size for the one shown in the table. For instance, if the table requires (2) 2x8, you may substitute a (2) 2x10 or (2) 2x12.

LEDGER ATTACHMENT REQUIREMENTS

GENERAL: Ledger board attachments to the existing exterior wall shall be constructed in accordance with FIGURE 5 through FIGURE 7. When attachments are made to the existing house band board, it shall be capable of supporting the new deck. If this cannot be verified or conditions at the existing house differ from the details herein, then a free-standing deck is required. See FREE-STANDING DECKS on sheet 8. YOU MUST VERIFY THE EXISTING CONDITIONS IN THE FIELD PRIOR TO APPLYING FOR A BUILDING PERMIT. COMPLIANCE WITH ALL THE REQUIREMENTS HEREIN IS CRITICAL TO ENSURE THE STRUCTURAL STABILITY OF YOUR DECK.

SIDING AND FLASHING: Siding or the exterior finish system must be removed prior to the installation of the ledger board. Flashing is required at any ledger board connection to a wall of wood framed construction and shall be composed of copper (attached using copper nails), stainless steel, UV resistant plastic or galvanized steel coated with 1.85 oz/sf of zinc (G-185 coating).

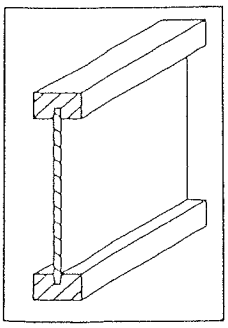


FIGURE 4: MWJ PROFILE

MANUFACTURED WOOD JOIST: The term "MWJ" denotes manufactured wood "I" joists; see FIGURE 4. Examples of manufactured wood joists are TJI, GPI, and LPI.

Many new homes constructed with MWJs include a 1-$^1/_4$" manufactured solid rim joist; see FIGURE 5. However, older homes constructed with MWJs may only include a plywood band board. In these cases a free-standing deck or a full plan submission is required.

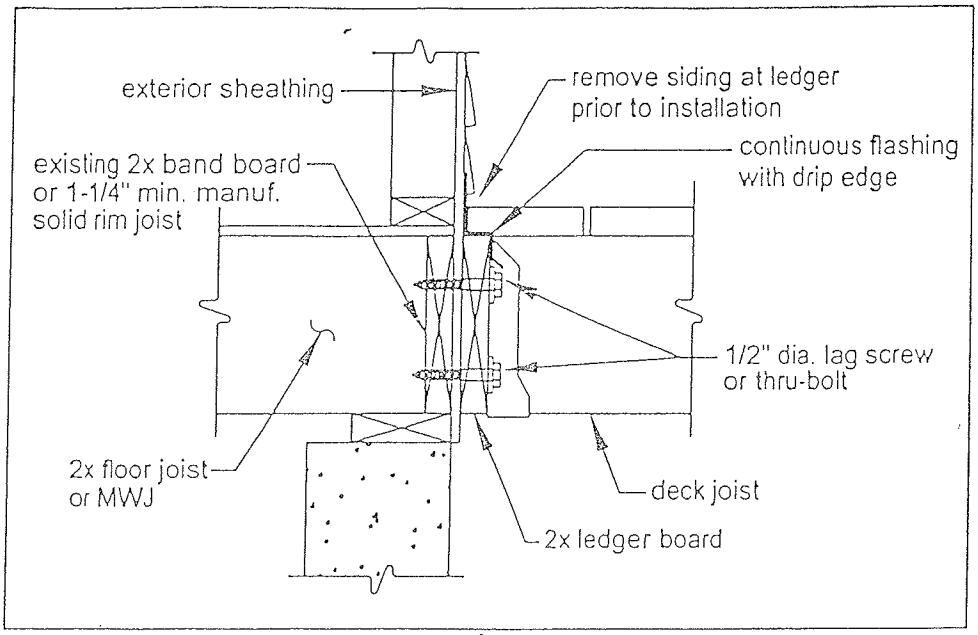


FIGURE 5: ATTACHMENT OF LEDGER BOARD-TO-BAND BOARD

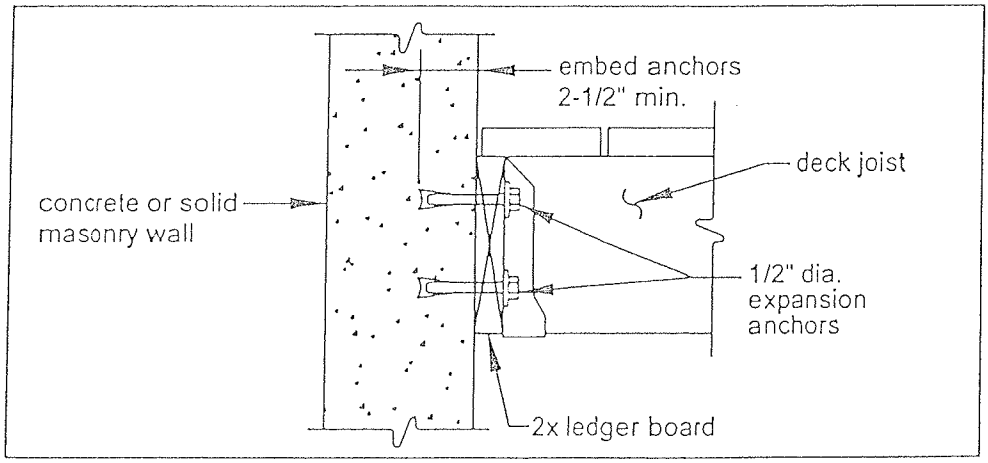


FIGURE 6: ATTACHMENT OF LEDGER BOARD-TO-FOUNDATION WALL (CONCRETE OR SOLID MASONRY)

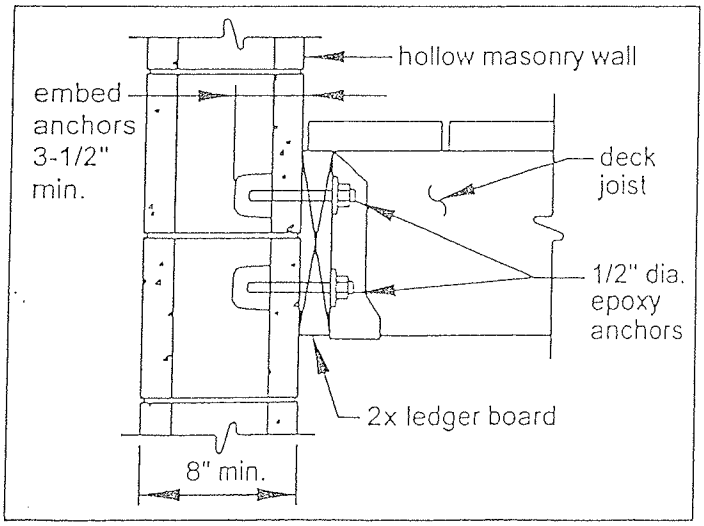
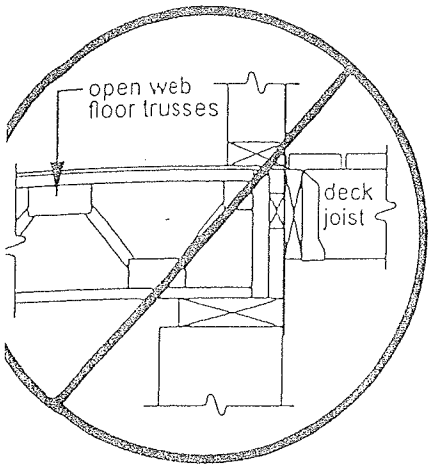


FIGURE 7: ATTACHMENT OF LEDGER BOARD-TO-FOUNDATION WALL (HOLLOW MASONRY)

OHIBITED LEDGER ATTACHMENTS

achments to the ends of pre-manufactured open web joists, to brick veneers, and to house erhangs/bay windows are strictly prohibited; see FIGURE 8 through FIGURE 10. In such cases the deck ill be free-standing. See FREE-STANDING DECKS on sheet 8.



IGURE 8: NO ATTACHMENT TO OPEN WEB TRUSSES

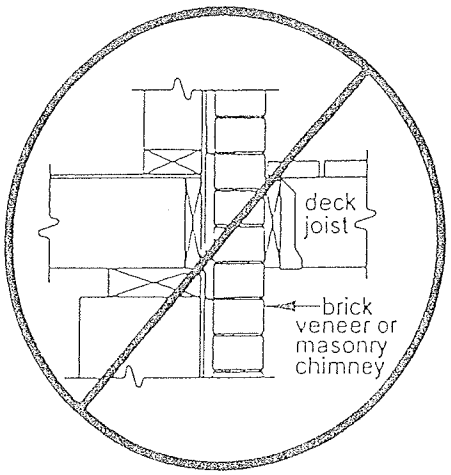


FIGURE 9: NO ATTACHMENT TO BRICK VENEER

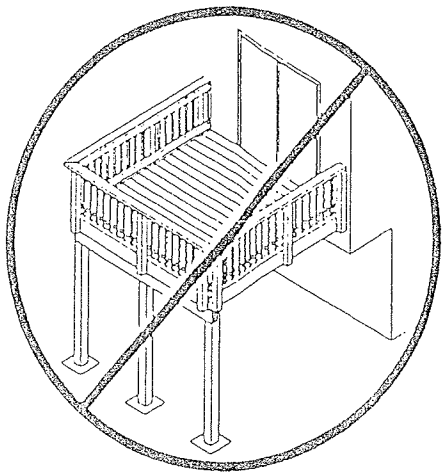


FIGURE 10: NO ATTACHMENT TO HOUSE OVERHANG

DGER BOARD FASTENERS

fastener types shall be spaced per TABLE 4 and installed per FIGURE 11. All fasteners shall be installed h washers and must be thoroughly tightened. **Adequacy of connections will be verified by vnship inspector.** If a ladder is required to access the ledger board, one must be provided by the perty owner, permit holder, or their representative.

INSTALLING THE LEDGER

Wood Frame Construction

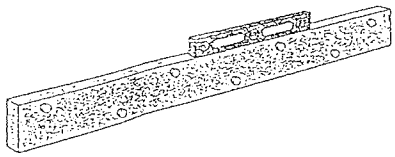
First, brace the ledger against the house wall at the desired height. Temporarily nail once at the board's center, then level the board with a carpenter's level, and temporarily nail both ends. Re-check for levelness.

Using washers and ⅜" lag bolts that are 2" longer than the thickness of the ledger, secure the ledger to the existing interior floor framing box joist. Be sure to space the bolts no more than 2' apart.

Stucco, Masonry or Concrete Construction

Brace the ledger against the house wall at the desired height and level the board with a carpenter's level, using makeshift braces for support. For stucco, drill lag screw holes through the ledger into house floor frame header. For masonry or concrete, mark expansion shield holes on the wall and then drill using a masonry bit. Bolt or lag screw the ledger in place. Remove braces, if any, and re-check for levelness.

Using washers and ⅜" lag bolts that are 2" longer than the thickness of the ledger, secure the ledger into expansion shields. Be sure to space bolts no more than 2' apart.



Thru-Bolts

Thru-bolts shall have a minimum diameter of $^1/_2$". Lead (pilot) holes for thru-bolts shall be $^{17}/_{32}$" to $^9/_{16}$" in diameter. Thru-bolts must be equipped with washers at the bolt head as well as the nut.

Expansion Anchors

Use expansion anchors when attaching a ledger board to a concrete or solid masonry wall as shown in FIGURE 6. Bolt diameters of the anchors shall be a minimum of $^1/_2$"; in some cases, this may require an anchor size of $^5/_8$". Minimum embedment length shall be 2-$^1/_2$". Expansion anchors must have washers.

Epoxy Anchors

When attaching to hollow masonry, fill the cells with grout and use expansion anchors, or use one of the approved epoxy anchors listed in TABLE 5 and install as shown in FIGURE 7. Epoxy anchors shall have a minimum diameter of $^1/_2$" and minimum embedment length of 3-$^1/_2$". Installation shall be in strict conformance to the manufacturers' instructions. Epoxy anchors must have washers.

TABLE 5: APPROVED EPOXY ANCHORS

Manufacturer	Product
ITW Ramset/Red Head	Epcon Acrylic 7
Hilti	HY-20

Lag Screws

Lag screws shall have a minimum diameter of $^1/_2$" and shall be hot-dipped galvanized or stainless steel. Lag screws may be used only when the field conditions match those shown in FIGURE 5. **You must verify the existing conditions in the field prior to applying for a building permit and installing lag screws. Compliance with all the requirements herein is critical to ensure the structural stability of your deck.** See FIGURE 12 for lag screw length and shank requirements. All lag screws shall be installed with washers.

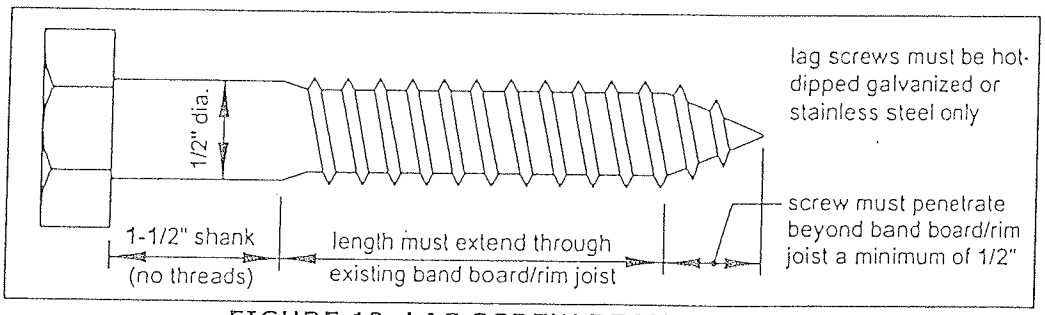


FIGURE 12: LAG SCREW REQUIREMENTS

Lag screw installation requirements: each lag screw shall have lead (pilot) holes drilled as follows: 1) drill a $^1/_2$" diameter hole in the ledger board, 2) drill a $^5/_{16}$" diameter hole into the solid connection material of the existing house. DO NOT DRILL A $^1/_2$" DIAMETER HOLE INTO THE SOLID CONNECTION MATERIAL.

The threaded portion of the lag screw shall be inserted into the lead hole by turning. DO NOT DRIVE WITH A HAMMER. Use soap or a wood-compatible lubricant as required to facilitate tightening. Each lag screw shall be thoroughly tightened.

FREE-STANDING DECKS

Decks which are free-standing do not utilize the exterior wall of the existing house to support vertical loads. Support at or near the house is provided by an additional beam and posts. See FIGURE 13. Beam size is determined by TABLE 2 and TABLE 3.

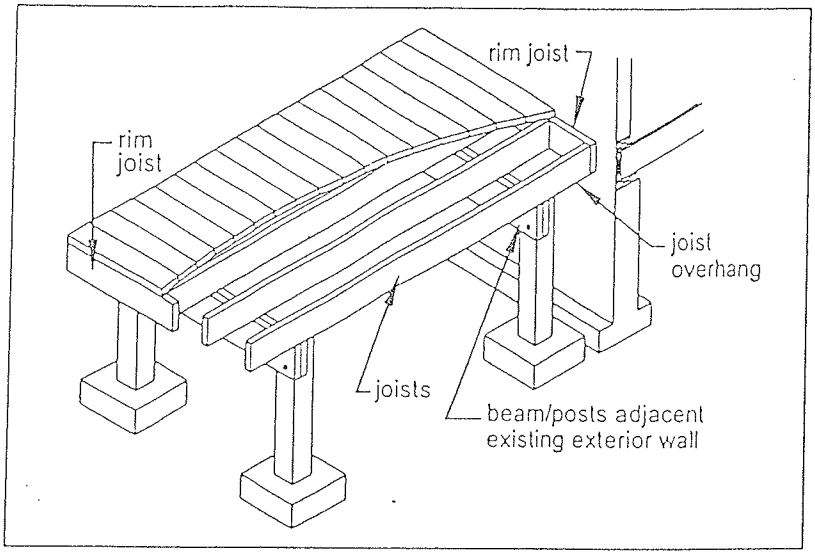


FIGURE 13: FREE-STANDING DECK

LATERAL SUPPORT OF FREE STANDING DECKS

Free standing decks greater than 2 feet above grade shall resist lateral loading and movement by one of the following methods.

1. **Diagonal Bracing:** provide diagonal bracing as shown in FIGURE 14. Bracing shall be located between posts parallel to beams and bolted to the beam and post as shown. Diagonal bracing shall also be located perpendicular to beams and, in such cases, bracing shall be bolted to the post and joist above the post location.

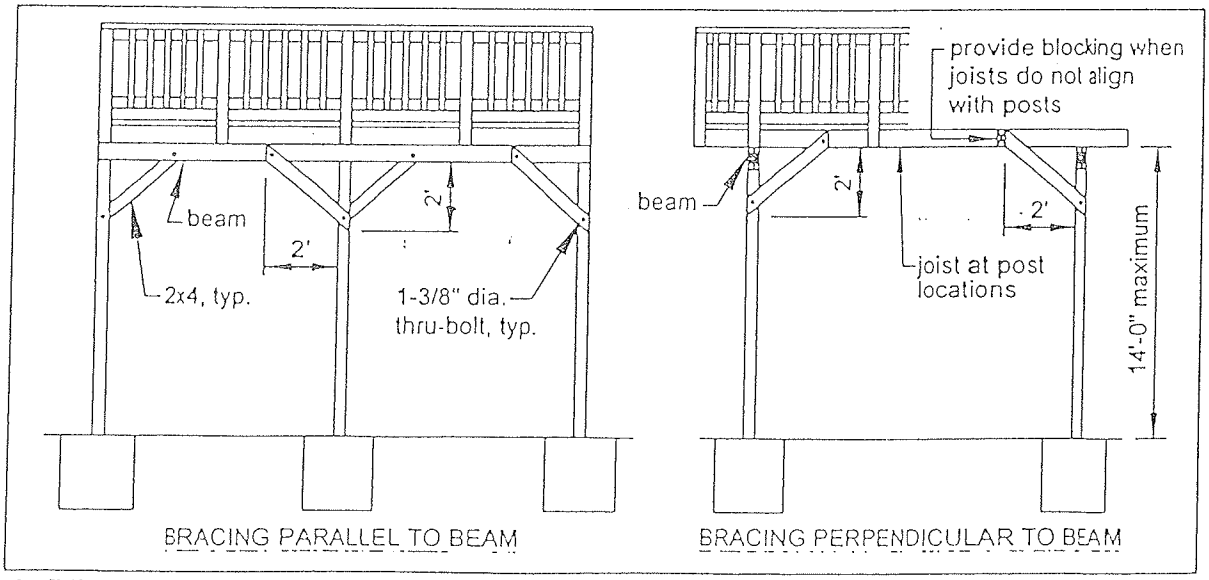


FIGURE 14: DIAGONAL BRACING REQUIREMENTS – use 6" x 6" support posts.

2. **Attachment To House:** lateral support is provided by the attachment of the deck rim joist to existing house as shown in FIGURE-15. The existing exterior wall must have sheathing consis of structural wood panels with a minimum thickness of $^3/_8$", and the fasteners shall attach to a existing band board or wall stud. The deck rim joist may also attach to a masonry or concrete but not to a brick veneer. YOU MUST VERIFY THIS CONDITION IN THE FIELD PRIOR TO UTILI THIS METHOD. Fasteners shall be 16" on center and must penetrate existing wall studs. See the provisions noted on sheet 6. Flashing over the rim joist is required and must be installed i accordance with the flashing provisions noted on sheet 4. For rim joist size and requirements, sheet 10.

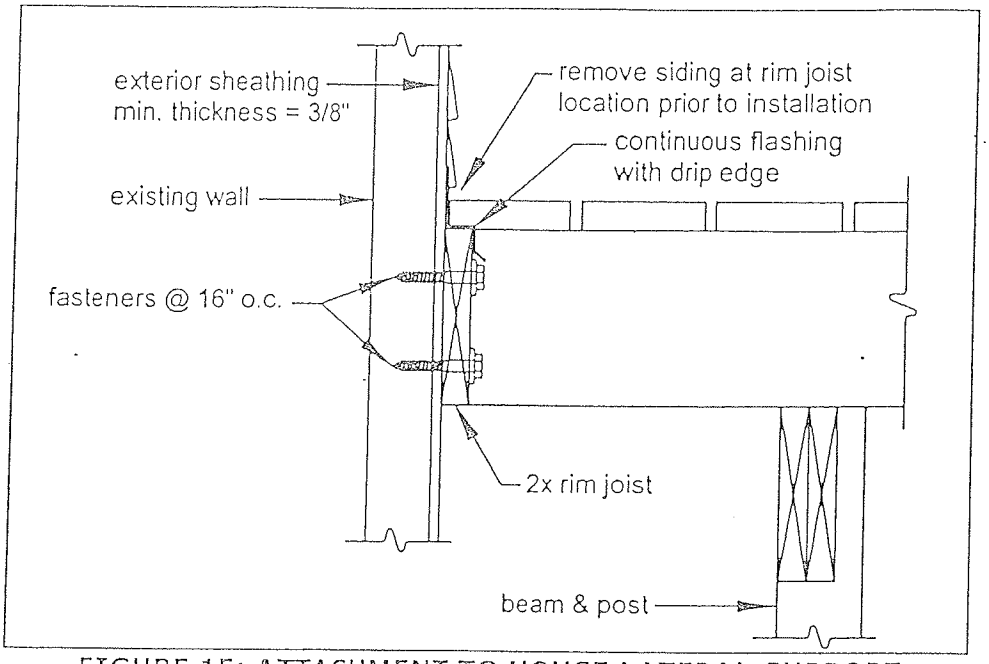


FIGURE 15: ATTACHMENT TO HOUSE LATERAL SUPPORT

JOIST HANGERS

Joist hangers, as shown in FIGURE 16, shall have a minimum capacity of 1000 lbs. Joist hangers used shall be manufactured for their intended lumber size. Joist hangers shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel.

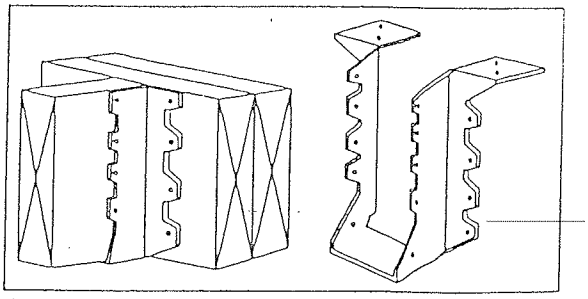


FIGURE 16: TYPICAL JOIST HANGERS

JOIST-TO-BEAM CONNECTION

Each joist shall be attached to the beam as shown in FIGURE 17. Mechanical fasteners shall be galvani with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel.

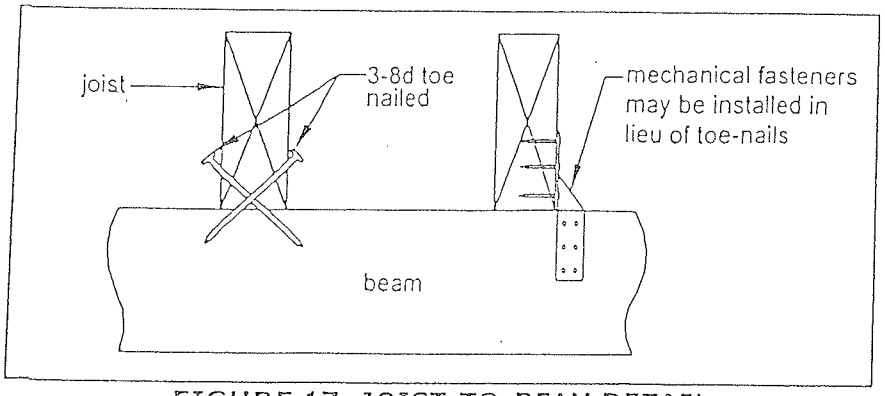


FIGURE 17: JOIST-TO-BEAM DETAIL

RIM JOIST REQUIREMENTS

Attach a continuous rim joist to the ends of joists as shown in FIGURE 18. Please note: rim joists are required at both ends of joists associated with free-standing decks. Minimum rim joist dimensions shall equal to the dimensions of the joist.

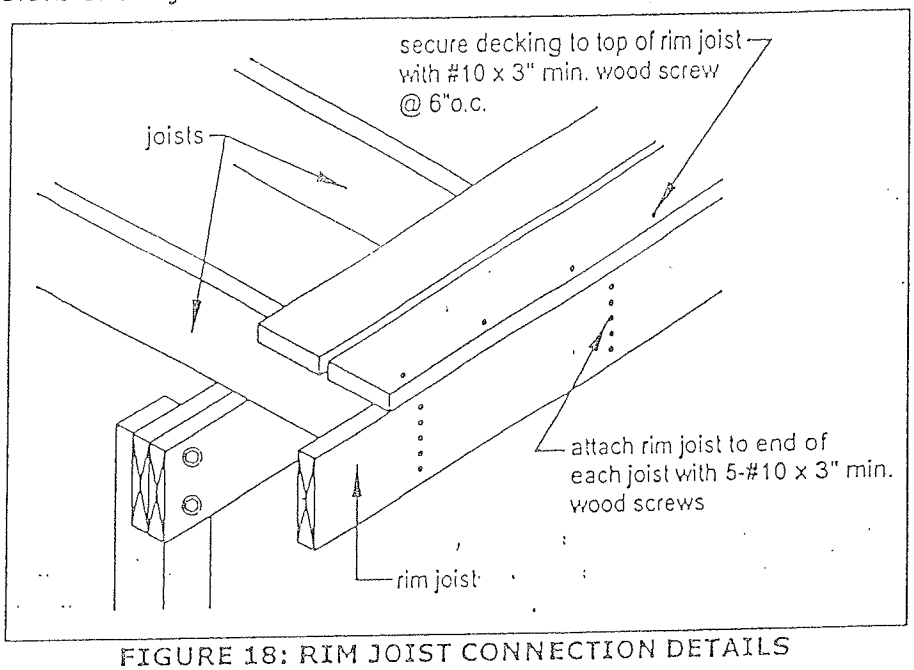


FIGURE 18: RIM JOIST CONNECTION DETAILS

BUILT-UP BEAM REQUIREMENTS

Built-up beams shall be assembled in accordance with FIGURE 19. The nailing pattern shall be staggered as shown.

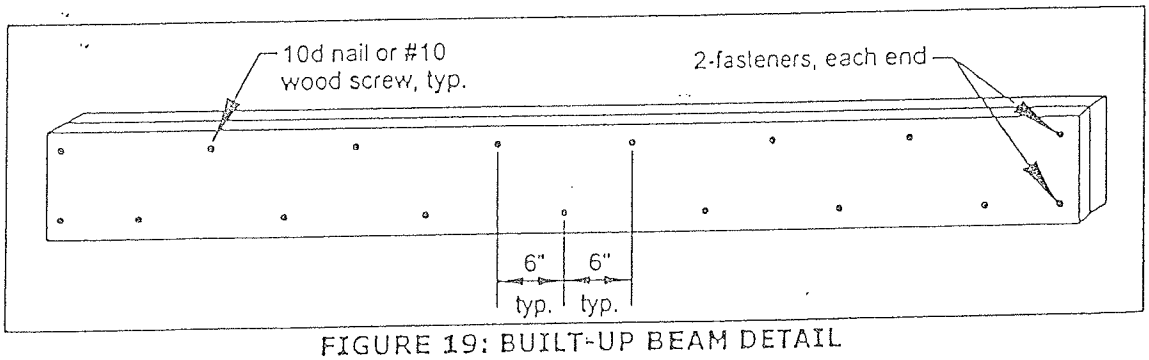


FIGURE 19: BUILT-UP BEAM DETAIL

POST-TO-BEAM REQUIREMENTS

The post-to-beam connection may be accomplished by notching the 6x6 post as shown in FIGURE 20. thru-bolts shall have washers at the bolt head and nut. All post sizes shall be 6x6, and the maximum height shall be 14'-0".

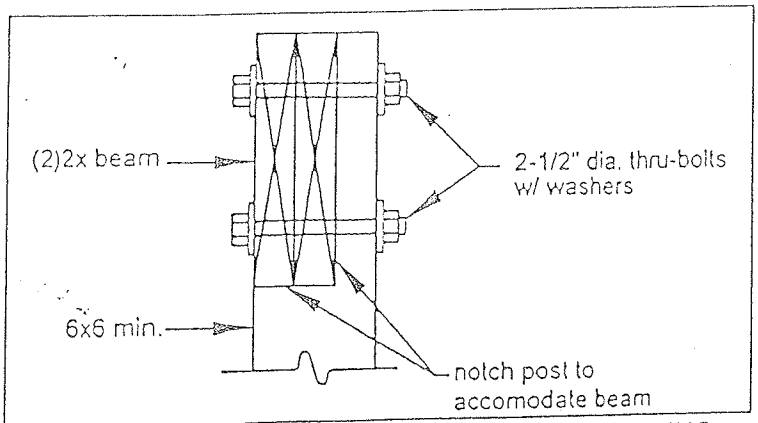


FIGURE 20: POST-TO-BEAM REQUIREMENTS

FOOTINGS

See FIGURE 21 for footing size, footing thickness and post attachment options and requirements. All footings shall bear on solid ground; bearing conditions shall be verified in the field by County inspectors prior to placement of concrete. Footings closer than 5'-0" to the existing exterior house wall must bear at the same elevation as the existing wall footing. Call PA ONE @ 1-800-242-1776 before digging over utility lines or enclosed meters.

Pre-manufactured post anchors shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel.

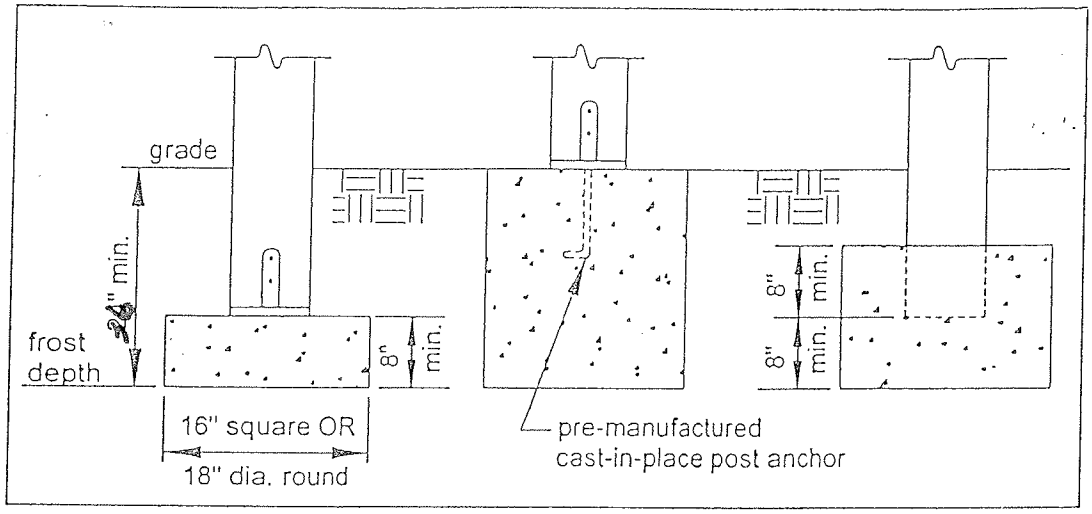


FIGURE 21: TYPICAL FOOTING DETAILS

GUARD REQUIREMENTS

Decks less than 30" above grade are not required to have a guard; however, if one is installed, it must meet these requirements. All guards shall be constructed in strict conformance with figures herein; any deviations require a plan submission.

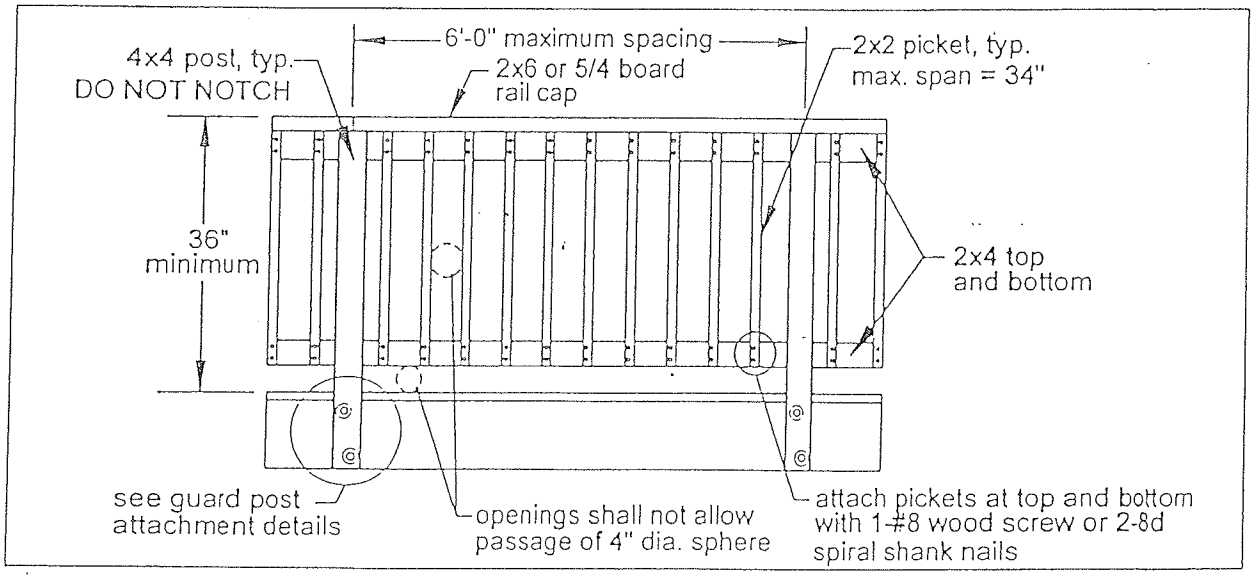


FIGURE 22: TYPICAL GUARD DETAIL

An pre-fabricated wood, plastic or manufactured guard system purchased from a home center store, lumber company or similar will also require a plan submission. **The rail cap is designed to withstand a concentrated load of 200 LBS anywhere along its length; the infill area is designed to withstand a horizontal load of 50 LBS on a square foot area.**

GUARD POST ATTACHMENT: Guard posts shall be spaced per FIGURE 22 and attached per FIGURE 23 through FIGURE 26.

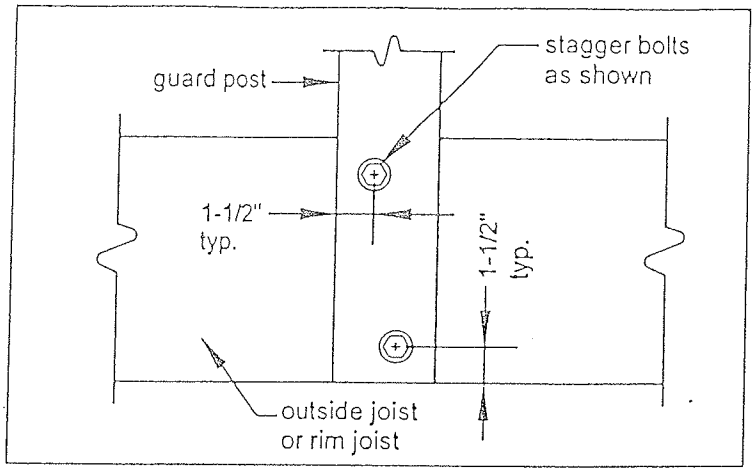


FIGURE 23: GUARD POST ATTACHMENT DETAIL

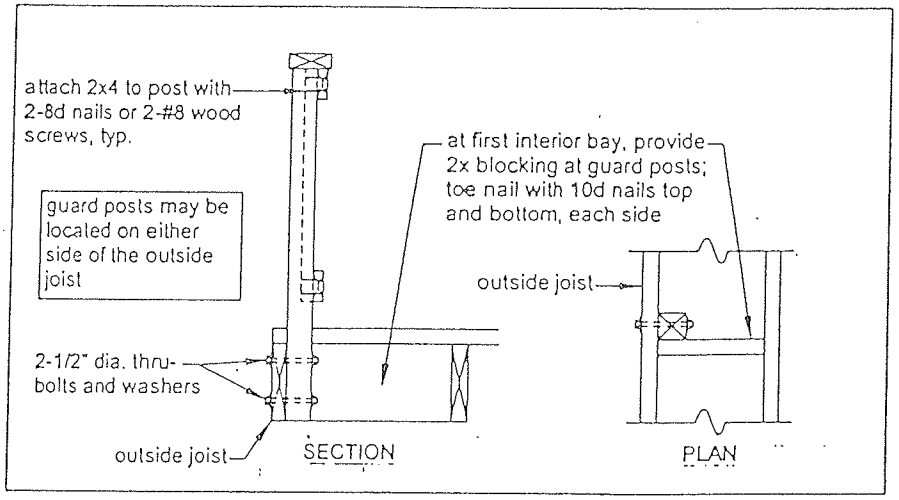


FIGURE 24: GUARD POST TO OUTSIDE JOIST DETAIL

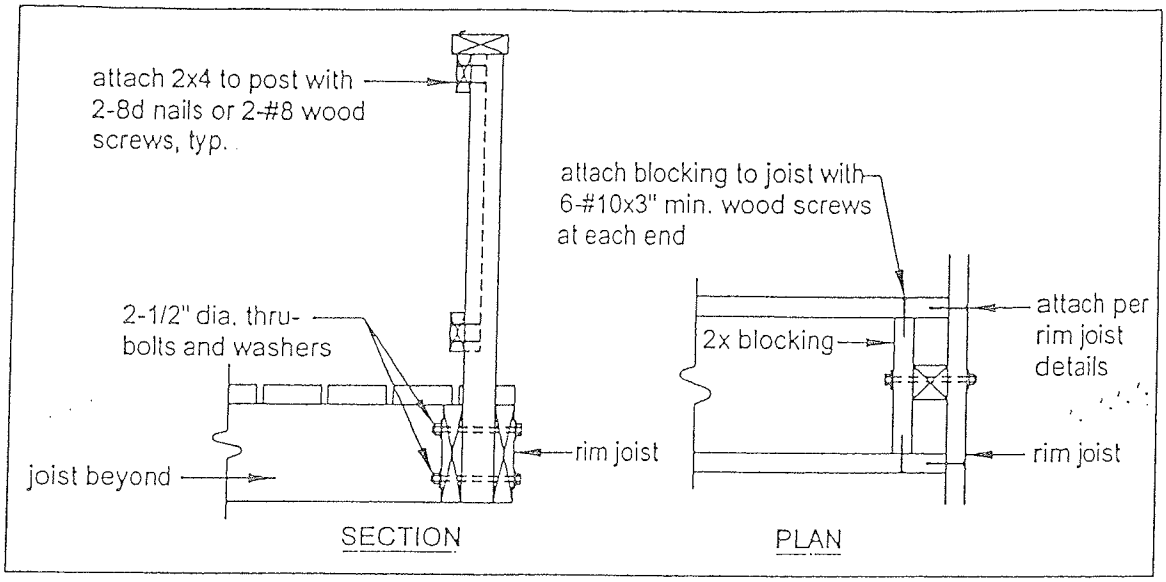


FIGURE 25: GUARD POST TO RIM JOIST DETAIL, OPTION 1

As shown in FIGURE 26, guard posts may be attached to the outside face of the rim joist. However, in this condition, and in addition to the attachment requirements shown in FIGURE 18, the rim joist must be fastened to the next adjacent joists with 20 gage. *stud tie plates* attached per the manufacturer's instructions with hot-dipped galvanized or stainless steel fasteners. Stud tie plates must be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel. Look for model number SP1 in a Zmax coating from Simpson Strong-Tie or model number SPT22 in a Triple Zinc coating from USP. **If you are unable to use *stud tie plates* in this condition, you must follow the requirements of FIGURE 25.**

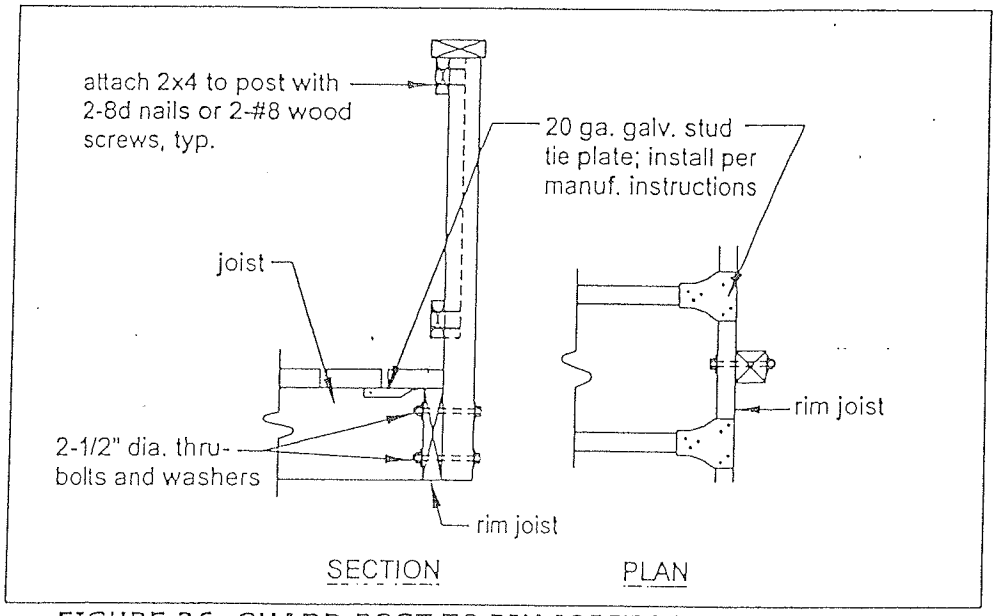


FIGURE 26: GUARD POST TO RIM JOIST DETAIL, OPTION 2

STAIR REQUIREMENTS

Stairs, stair stringers, and stair guard shall meet the requirements shown in FIGURE 27 through FIGURE 33. All stringers shall be 2x12.

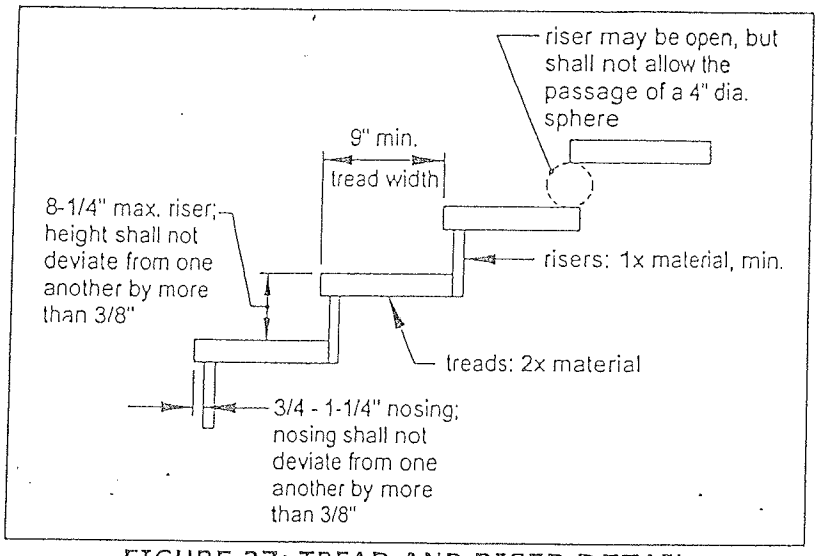


FIGURE 27: TREAD AND RISER DETAIL

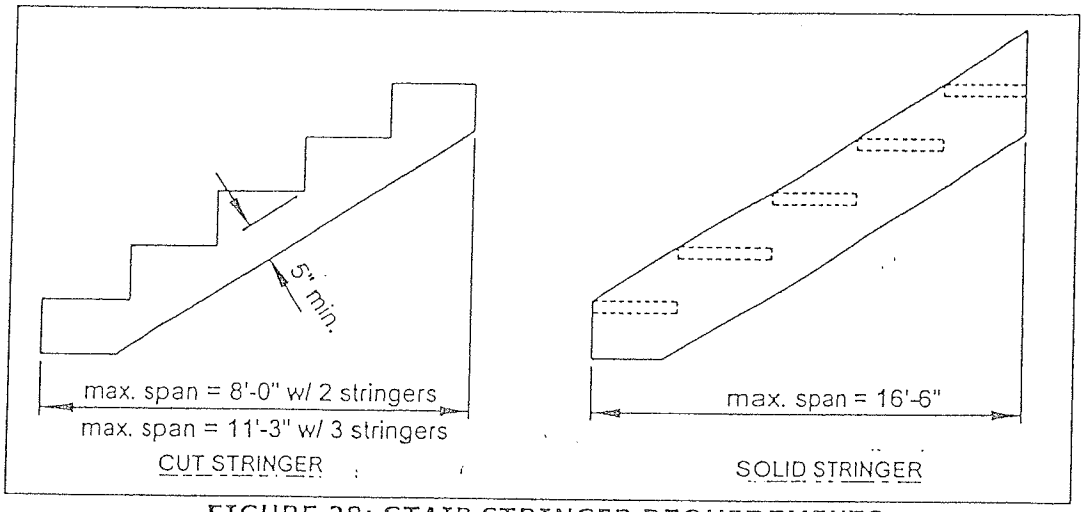


FIGURE 28: STAIR STRINGER REQUIREMENTS

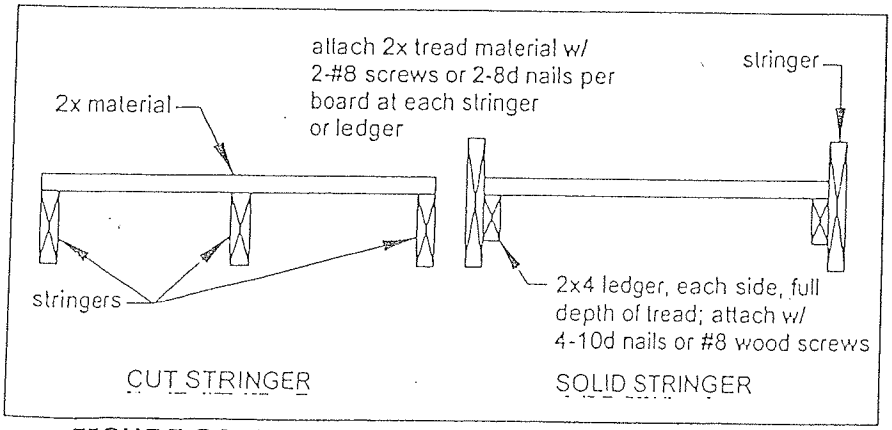


FIGURE 29: TREAD CONNECTION REQUIREMENTS

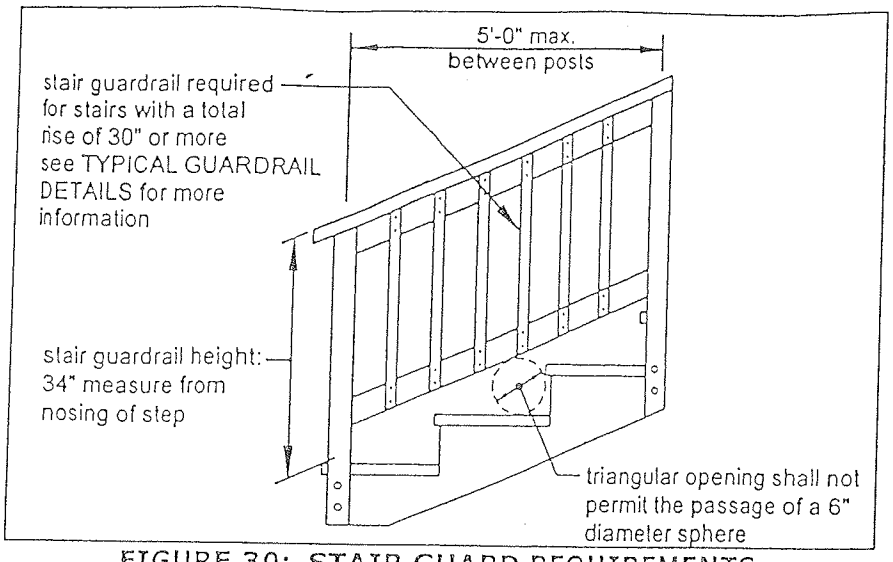


FIGURE 30: STAIR GUARD REQUIREMENTS

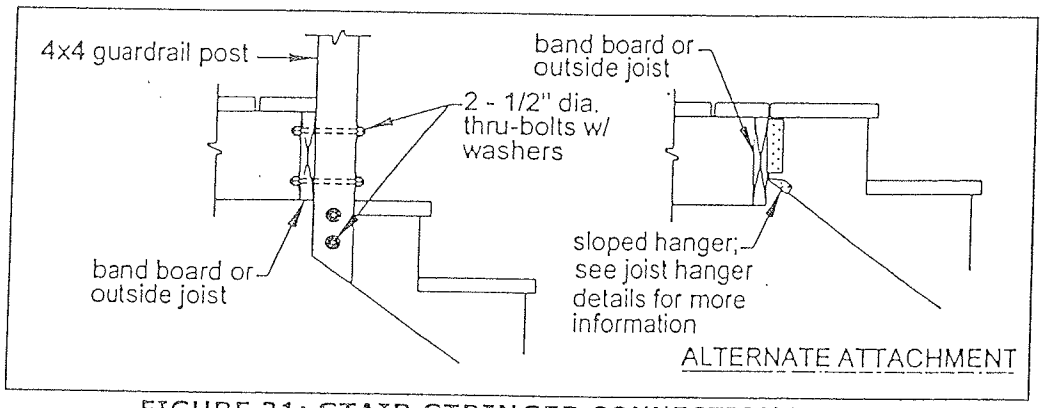


FIGURE 31: STAIR STRINGER CONNECTION DETAIL

STAIR HANDRAIL REQUIREMENTS

All stairs with 2 or more risers shall have a handrail on one side. Handrails shall be graspable and shall be composed of decay-resistant and/or corrosion resistant material. The hand grip portion, if circular, shall be between 1-$^1/_4$" and 2-$^1/_4$" in cross section. Shapes other than circular shall have a perimeter dimension between 4" and 6-$^1/_4$" with a maximum cross sectional dimension of 2-$^1/_4$". All shapes shall have a smooth surface with no sharp corners. Handrails shall run continuously from a point directly over the lowest riser to a point directly over the highest riser and shall return to the guard at each end; see FIGURE 33. Handrails my be interrupted at guards posts only at a turn in the stair. See FIGURE 32.

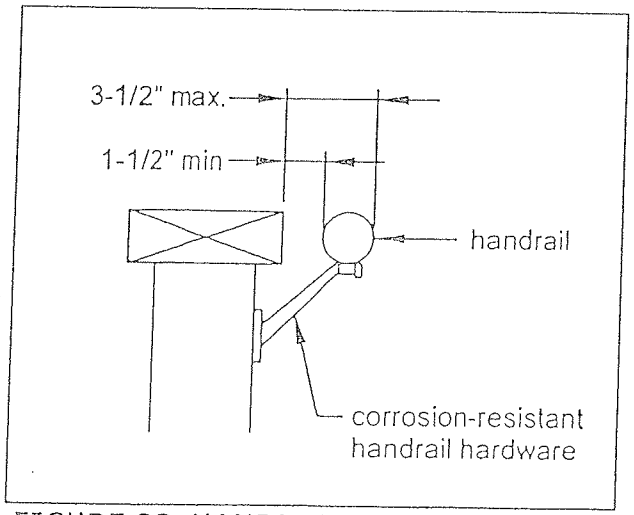


FIGURE 32: HANDRAIL REQUIREMENTS

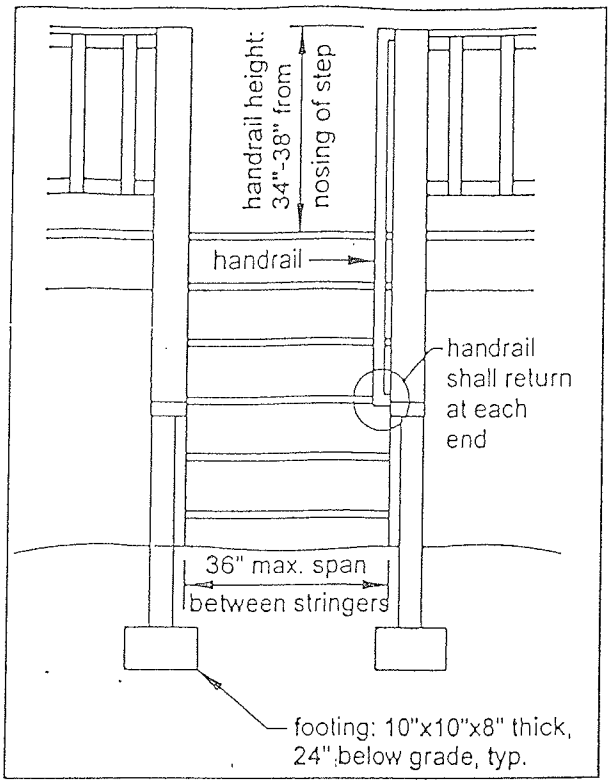


FIGURE 33: MISCELLANEOUS STAIR REQUIREMENTS

STAIR ILLUMINATION REQUIREMENTS

Stairways shall have a light source located at the top landing such that all stairs and landings are illuminated. The light switch shall be operated from inside the house.

FRAMING AT CHIMNEY OR BAY WINDOW

All members at a chimney or bay window shall be framed in accordance with FIGURE 34. Headers with a span length greater than 6'-0" require a plan submission.

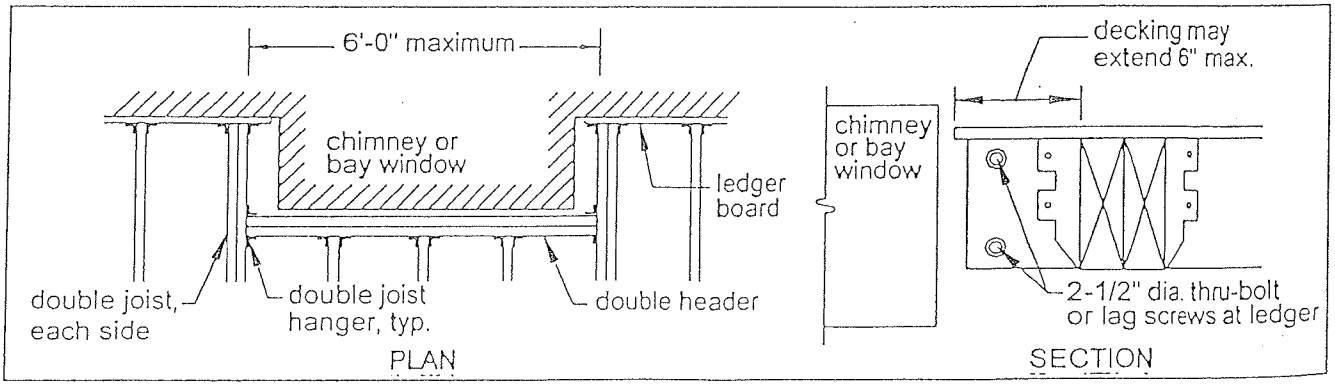


FIGURE 34: REQUIREMENTS FOR FRAMING AT CHIMNEY OR BAY WINDOW

R311.5.6.3 Handrail grip size. All required handrails shall be of one of the following types or provide equivalent graspability.

1. Type I. Handrails with a circular cross section shall have an outside diameter of at least $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). If the handrail is not circular it shall have a perimeter dimension of at least 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) with a maximum cross section of dimension of $2^1/_4$ inches(57 mm).
2. Type II. Handrails with a perimeter greater than $6^1/_4$ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $^3/_4$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of at least $^5/_{16}$ inch (8 mm) within $^7/_8$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for at least $^3/_8$ inch (10 mm) to a level that is not less than $1^3/_4$ inches (45 mm) below the tallest portion of the profile. The minimum width of the handrail above the recess shall be $1^1/_4$ inches (32 mm) to a maximum of $2^3/_4$ inches (70 mm). Edges shall have a minimum radius of 0.01 inches (0.25 mm).

R311.5.7 Illumination. All stairs shall be provided with illumination in accordance with Section R303.6.

R311.5.8 Special stairways. Circular stairways, spiral stairways, winders and bulkhead enclosure stairways shall comply with all requirements of Section R311.5 except as specified below.

R311.5.8.1 Spiral stairways. Spiral stairways are permitted, provided the minimum width shall be 26 inches (660 mm) with each tread having a $7^1/_2$-inches (190 mm) minimum tread depth at 12 inches from the narrower edge. All treads shall be identical, and the rise shall be no more than $9^1/_2$ inches (241 mm). A minimum headroom of 6 feet 6 inches (1982 mm) shall be provided.

R311.5.8.2 Bulkhead enclosure stairways. Stairways serving bulkhead enclosures, not part of the required building egress, providing access from the outside grade level to the basement shall be exempt from the requirements of Sections R311.4.3 and R311.5 where the maximum height from the basement finished floor level to grade adjacent to the stairway does not exceed 8 feet (2438 mm), and the grade level opening to the stairway is covered by a bulkhead enclosure with hinged doors or other approved means.

R311.6 Ramps.

R311.6.1 Maximum slope. Ramps shall have a maximum slope of one unit vertical in eight units horizontal (12.5-percent slope).

R311.6.2 Landings required. A minimum 3-foot-by-3-foot (914 mm by 914 mm) landing shall be provided:

1. At the top and bottom of ramps,
2. Where doors open onto ramps,
3. Where ramps change direction.

R311.6.3 Handrails required. Handrails shall be provided on at least one side of all ramps exceeding a slope of one unit vertical in 12 units horizontal (8.33-percent slope).

R311.6.3.1 Height. Handrail height, measured above the finished surface of the ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

R311.6.3.2 Handrail grip size. Handrails on ramps shall comply with Section R311.5.6.3.

R311.6.3.3 Continuity. Handrails where required on ramps shall be continuous for the full length of the ramp. Handrail ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1.5 inches (38 mm) between the wall and the handrails.

SECTION R312
GUARDS

R312.1 Guards required. Porches, balconies or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads.

Porches and decks which are enclosed with insect screening shall be provided with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

R312.2 Guard opening limitations. Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 inches (102mm) or more in diameter.

Exceptions:

1. The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere 6 inches (152 mm) cannot pass through.
2. Openings for required guards on the sides of stair treads shall not allow a sphere $4^3/_8$ inches (107 mm) to pass through.

SECTION R313
SMOKE ALARMS

[F] R313.1 Smoke alarms. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional story of the dwelling, including basements but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels.

than the top of the threshold. The floor or landing at exterior doors other than the exit door required by Section R311.4.1 shall not be required to comply with this requirement but shall have a rise no greater than that permitted in Section R311.5.3.

> Exception: The landing at an exterior doorway shall not be more than 7 3/4 inches (196 mm) below the top of the threshold, provided the door, other than an exterior storm or screen door does not swing over the landing.

The width of each landing shall not be less than the door served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel.

R311.4.4 Type of lock or latch. All egress doors shall be readily openable from the side from which egress is to be made without the use of a key or special knowledge or effort.

R311.5 Stairways.

R311.5.1 Width. Stairways shall not be less than 36 inches (914 mm) 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 (114 mm) 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 (787 mm) where a handrail is installed on one side and 27 inches (698 mm) where handrails are provided on both sides.

> Exception: The width of spiral stairways shall be in accordance with Section R311.5.8.

R311.5.2 Headroom. The minimum headroom in all parts of the stairway shall not be less than 6 feet 8 inches (2036 mm) measured vertically from the sloped plane adjoining the tread nosing or from the floor surface of the landing or platform.

R311.5.3 Stair treads and risers.

R311.5.3.1 Riser height. The maximum riser height shall be 7 3/4 inches (196 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

R311.5.3.2 Tread depth. The minimum tread depth shall be 10 inches (254 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured as above at a point 12 inches (305) mm from the side where the treads are narrower. Winder treads shall have a minimum tread depth of 6 inches (152 mm) at any point. Within any flight of stairs, the greatest winder tread depth at the 12 inch (305 mm) walk line shall not exceed the smallest by more than 3/8 inch (9.5 mm).

R311.5.3.3 Profile. The radius of curvature at the leading edge of the tread shall be no greater than 9/16 inch (14.3 mm). A nosing not less than 3/4 inch (19 mm) but not more than 1 1/4 inch (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch (9.5 mm) between two stories, including the nosing at the level of floors and landings. Beveling of nosing shall not exceed 1/2 inch (12.7 mm). Risers shall be vertical or sloped from the underside of the leading edge of the tread above at an angle not more than 30 (0.51 rad) degrees from the vertical. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.

Exceptions:

1. A nosing is not required where the tread depth is a minimum of 11 inches (279 mm).
2. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

R311.5.4 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway.

> Exception: A floor or landing is not required at the top of an interior flight of stairs, provided a door does not swing over the stairs.

A flight of stairs shall not have a vertical rise greater than 12 feet (3658 mm) between floor levels or landings.

The width of each landing shall not be less than the stairway served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel.

R311.5.5 Stairway walking surface. The walking surface of treads and landings of stairways shall be sloped no steeper than one unit vertical in 48 inches horizontal (2-percent slope).

R311.5.6 Handrails. Handrails shall be provided on at least one side of each continuous run of treads or flight with four or more risers.

R311.5.6.1 Height. Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

R311.5.6.2 Continuity. Handrails for stairways shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above lowest riser of the flight. Handrail ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1 1/2 inch (38 mm) between the wall and the handrails.

Exceptions:

1. Handrails shall be permitted to be interrupted by a newel post at the turn.
2. The use of a volute, turnout, starting easing or starting newel shall be allowed over the lowest tread.