Salisbury Guide to Code Requirements for Residential Decks

Current as of 6/1/2019

- **Where does this Guide apply?** 1 & 2 Family Homes Only**.** Commercial, Multi-Family, Multi-Level and Decks with Roofs have different requirements.

- **What are the rules to follow?** The Massachusetts State Building Code is the 2015 IRC, Section R507. Additional guidance comes from the Document **DCA6** by the American Wood Council where the State Building Code is silent on an issue; (http://www.awc.org/pdf/codes-standards/publications/dca/AWC-DCA62015-DeckGuide-1804.pdf)

- **Are there special rules for the Beach?** Decks on Salisbury Beach *require* stainless steel Hangers and Fasteners (Salisbury Beach area is ANY property east of Old County Way). This is a part of the FEMA NFIP requirements.

- **What about footings at the Beach?** Decks at the beach may also require special footings and approval from the Conservation Commission.

- **Do Plans need to be provided with the Permit Application?** Yes. Submit scaled Construction Plans that show specific and substantial detail on materials to be used – how many joists and beams, what size joists and beams, what size and how many footings, fasteners, etc. (see attached).

- **Is a Site Plan/Plot Survey required as well?** Maybe. A Site Plan may be required (see attached) to verify conformance to Zoning and verify Wetlands and Flood Zone jurisdiction. If evidence can be provided to show that the deck is more than 2x the setback distance required, and that there is no wetlands or flood zone in the vicinity, then a zoning waiver can be submitted in lieu.

- **Is anything exempt from Zoning?** A landing, no greater than 25 sf, and stairs are exempt from zoning setbacks when used for egress only.

- **What size footings should be used?** Footings shall be minimally sized as follows;
  - A 10” sonotube per 30 sf of Deck
  - A 12” sonotube per 50 sf of Deck
  - A 16” sonotube per 80 sf of deck

  Footings are sized based upon 1500 psf soil bearing, 10 psf dead load and 40 psf live load.

- **What about handrails and guardrails?** Bottom-notched handrail posts are NOT allowed, and all posts must be counter-blocked into the framing. Posts cannot be installed on the outside of the band joists without a tieback connection to prevent rotation. Follow guidelines from DCA-6.

- **Do I need a handrail on the stairs?** Provide a single continuous and grippable handrail, with returned ends top and bottom, at all exterior stairs from deck.

- **How strong do guardrails and handrails need to be?** Rail posts must withstand 200lbs of load and the balusters must withstand 50lbs of load. Do not attach balusters with finish nails.

- **What about all of the connections between the lumber?** All connection points must have a hanger or bracket, no toe-nail only connections are allowed. (see attached articles)

- **Is blocking required?** Joist and beams ends must be constrained from twisting with blocking or appropriate connectors

- **Can 1 ½" long Joist Hanger Nails be used?** No. 1-1/2" 'Joist Hanger' nails are not allowed for the toe-nail connection on joist hangers and must be 2 ½" 10D min. per manufacturer's instructions (see attached Simpson details).

- **Is a Lateral Load hanger required even if the ledger board is screwed/bolted in?** Yes. Decks require Lateral Load Anchors, minimum of 2 ea. (or 4 ea. with alternate anchor) + 1 for each 10' feet of ledger in addition to normal attachment of the ledger board to the house.

- **How are the various products used correctly?** Follow Manufacturer's Recommendation for all Materials, including hangers, deck boards, etc.

- **Can a carrying beam be mounted to the side of the deck support posts?** No. All beams must sit atop the a support post or upon a notch in that post (see DCA6). Carriage or thru-bolted, side-mounting is NOT allowed.

- **How are support posts attached to the footings?** Posts must be anchored to, and separated from by a spacer bracket, the concrete footing. This can be a pier, sonotube, precast, Diamond pier or other type of foundation that is appropriate for your location.

- **How are Stair Stringers connected to the deck?** Stair Stringers must be tied to deck with Metal Connectors/Hanger (do not use strapping or vertical grained materials) which must be anchored to a header beam. Do not use strapping, plywood and other light materials and do not put a screw through to the end grain of the stringer.

- **Are open risers allowed?** No, they must be at least partially enclosed so that the largest gap is 4".

- **How long can the stars run?** The stringers may have a maximum 6'-0" unsupported horizontal run.

- **What inspections are required to build a deck?** The Building Department will view your excavation prior to pouring concrete to verify the proper depth and good soils. Once the deck is completed, the Building Department will also view the entire frame, guardrails and handrails, stairs and all other elements to ensure that the deck is constructed per code and this Guide.

- **Who asks for these inspections?** It is the responsibility of the Applicant, either Homeowner or Contractor, to call the Building Department office at 978-462-7839 to schedule each inspection and allow access. Please call at least the day ahead so that we can be sure to fit it into the schedule.

- **When can the deck be used?** Once the final inspection has been completed and the Building Department issues a Certificate of Occupancy, the deck can them be used.

Sample Plot Plan [8 ½ x 11]

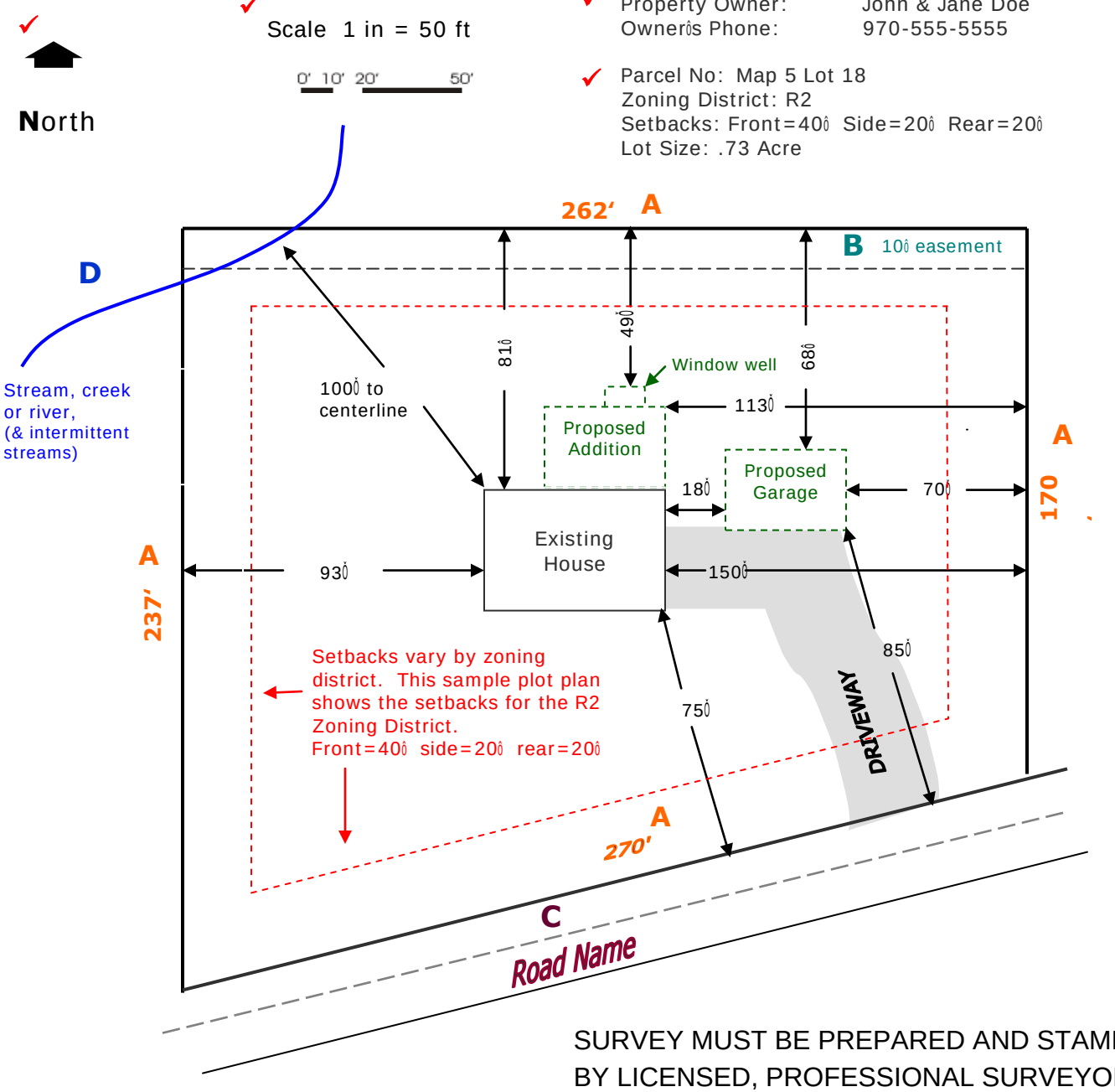
September 12, 2015

✓ Job Site Address: 123 Any Street, Salisbury, MA
Property Owner: John & Jane Doe
Owner's Phone: 970-555-5555

✓ Scale 1 in = 50 ft

0' 10' 20' 50'

✓ Parcel No: Map 5 Lot 18
Zoning District: R2
Setbacks: Front=40' Side=20' Rear=20'
Lot Size: .73 Acre



SURVEY MUST BE PREPARED AND STAMPED BY LICENSED, PROFESSIONAL SURVEYOR!

CHECKLIST

- ✓ North Arrow
- ✓ Plot Plan Scale
- ✓ Property Owner Info
- ✓ Parcel No. & Zoning

A Property Dimensions
B Easements
C Roads and Streets
D Stream, Creek or River (& intermittent streams)

↕ Use arrows to show distance from buildings to setbacks.

Existing buildings
Use solid lines to indicate existing structures

Proposed buildings
Use dotted lines to indicate ***proposed*** structures

Note:

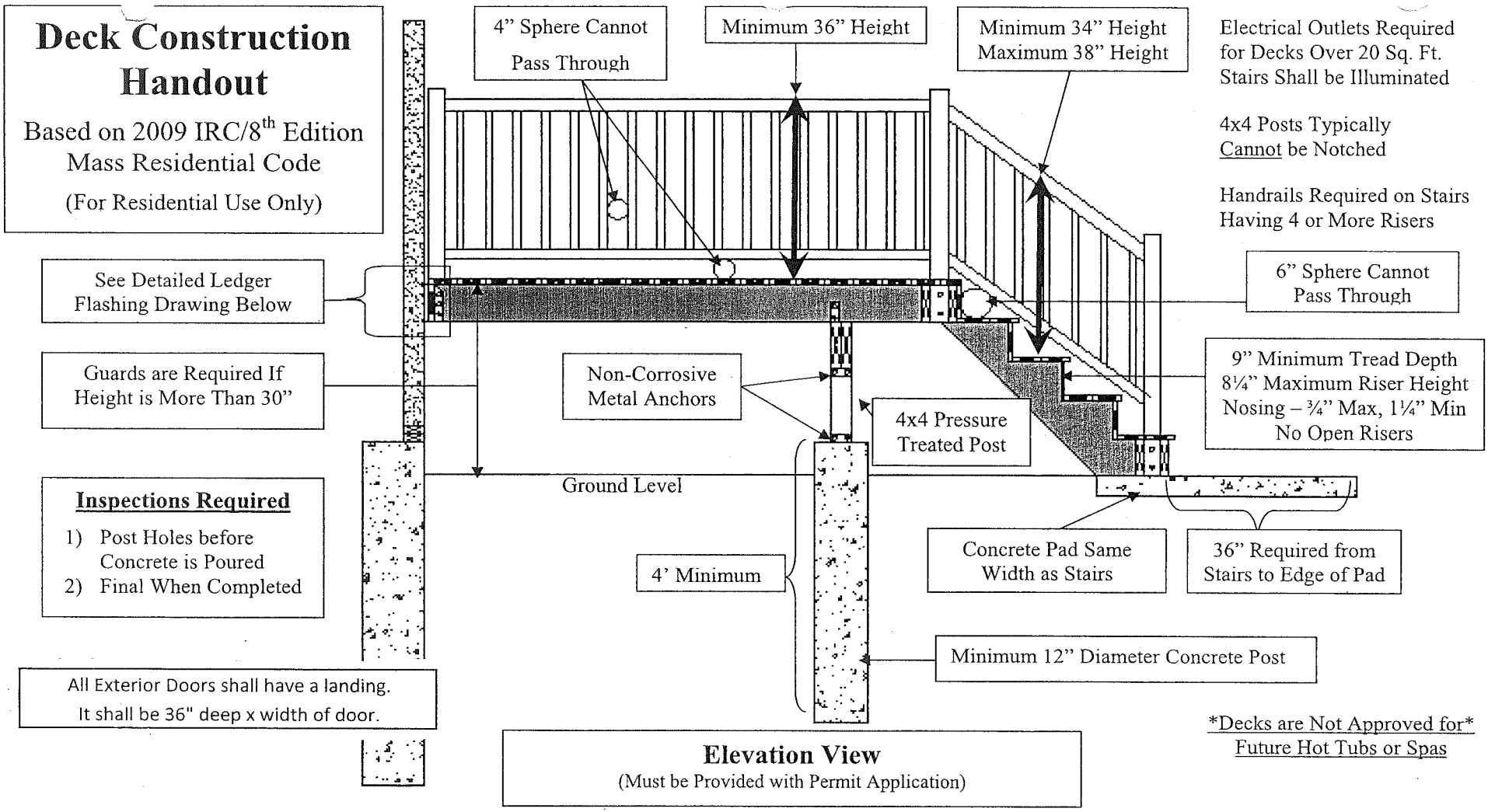
This Sample Plot Plan uses color to clarify requirements.

Your Plot Plan **does not** need to be in color.

Deck Construction Handout

Based on 2009 IRC/8th Edition Mass Residential Code

(For Residential Use Only)



Elevation View

(Must be Provided with Permit Application)

Town of Salisbury, MA

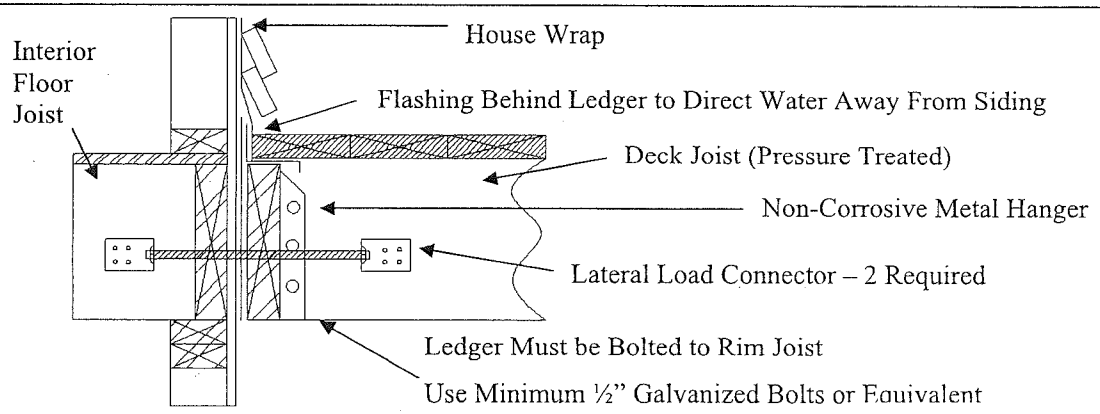
Inspections Dept.

5 Beach Rd.

Salisbury, MA 01952

(978) 462-7839

(See also DCA6 at www.awc.org)



Common Deck Stair Defects

Build deck stairs according to best practices rather than code to protect your customers and avoid liability

BY BRUCE BARKER

As an ASHI home inspector, I inspect decks every day. Most have multiple defects, which is to be expected on older decks. But I also find serious problems with recently built decks, which is less understandable. In particular, I like to focus on stairs, because of the role they play in deck safety.

Indoors or out, stairs are one of the most dangerous systems anywhere in a building. Falls involving stairs can result in serious personal injury; that's where the big money is for attorneys. On a deck, stairs are third (behind ledger detachment and guard failures) in terms of number of injuries suffered.

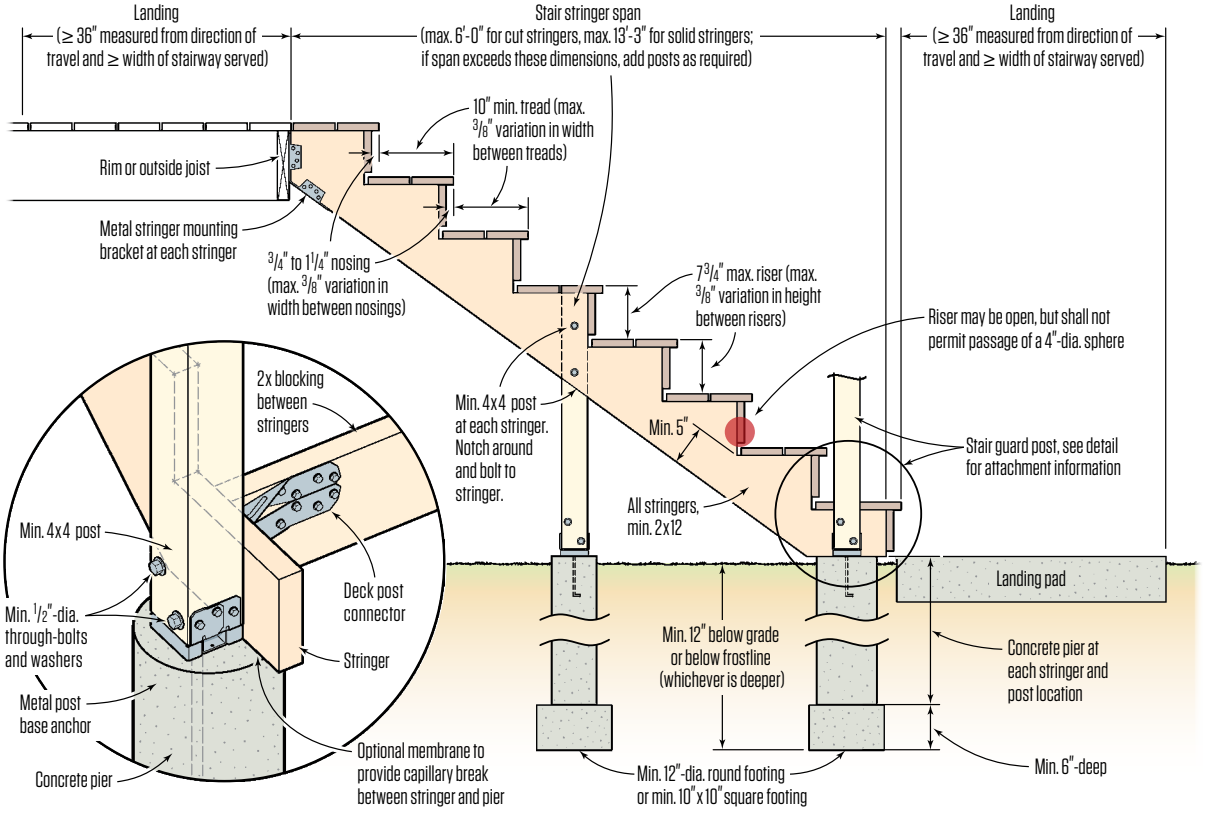
Photos by Bruce Barker

STAIRS BUILT RIGHT

Interior and exterior stairs share almost all of the same requirements. If anything, deck builders should be more careful about applying current safety and structural standards to exterior stairs because they are subject to environmental conditions that may exacerbate safety and structural problems.

But which standards apply? It's best to think of building codes as minimum standards, not as the standards for contractors who build quality decks. Keep in mind that even when a deck complies with a local building code, the code official who inspects it is not

Deck Stair Requirements



Shown here are DCA 6 recommended standards for deck stair stringers, risers, treads, and landings, and the components that support them. Note that in the stair example shown here, two posts and piers support each stringer; a typical 36-inch stair with three stringers requires six post and pier supports. Extending piers below frost depth is critical in cold climates where frost heave could lift the landing at grade. Wet and clayey soils are most at risk for substantial heave.

responsible for ensuring that the deck is safe.

To improve safety and to reduce liability risk, deck builders should follow current best practices as presented in the latest edition of DCA 6, the American Wood Council's *Prescriptive Residential Wood Deck Construction Guide*. Accordingly, I define "defect" as a failure to comply with these best practices. In fact, since a deck that passes local code inspection may still be unsafe, I believe that DCA 6 should be the standard to which all decks are built, regardless of what might be allowed by local building codes.

STRINGERS

Before getting into deck stair defects, let's look at how DCA 6 recommends that stairs should be built, starting with the stringers, risers, treads, and landings, and the components that support them (see "Deck Stair Requirements," above). When I'm evaluating a deck stair, this is where I start.

Stringers typically have two bearing points, with the plumb (vertical) cut bearing on a rim joist or on a beam, and the seat (horizontal) cut bearing on—at minimum—a solid landing. To help resist both vertical and lateral loads, stringers require proper support and attachment at these bearing points. Without proper support, vertical loads (gravity) can pull the stringers down from their bearing points, while lateral (horizontal) loads can pull the stringers away from their bearing points. Most builders worry more about vertical loads, but lateral loads are also a frequent cause of a deck stair failure: The fasteners withdraw from the bearing point, then gravity takes over.

Seat cut. DCA 6 recommends supporting the stringers using

All illustrations by Tim Healey

TOP ROW: The bottom of the stringer also needs adequate bearing: At least 1 1/2 inches of the heel of the seat cut should bear on the landing. This example **(1)** is prone to splitting along the grain. Stringers also require adequate bearing on either a rim joist or a dropped header. Without it, the stringer can split along the grain **(2, 3)**.
SECOND ROW: Fastening stringers with nails through the header into the end grain of a stringer **(4)** has minimal resistance to withdrawal. Toenailed stringers are less susceptible to withdrawal, but the connection can still fail as the framing ages and is structurally compromised **(5)**. At a cost of a few dollars each for the connectors and recommended fasteners, the most cost-effective way to hang a stringer is with metal hardware. But this one **(6)** has been installed incorrectly: The stringer isn't fully bearing on the connector seat. Another red flag: The fasteners are drywall screws instead of approved connector nails.

posts that bear on footings, but this is an installation detail that I can't recall ever seeing. If there is good stringer bearing on a solid landing, and if the stringers are restrained against lateral movement, I usually declare victory and move on. But I live in a warm climate, where we don't have to worry about frost heaves that could move the stringers and loosen the connection at the plumb cut. Those who build decks in cold climates should consider using the DCA 6 details.

It's best if the entire stringer seat cut bears on a solid landing, but at minimum, at least 1 1/2 inches of the seat-cut heel should bear on the landing. Allowing the toe of the seat cut to be the only part of the stringer that bears on the landing can cause the stringer to shear along the wood grain **(1)**.

Plumb cut. For maximum plumb-cut bearing and fastening area, the ideal stringer position has the top tread even with the deck flooring, which allows the stringer plumb cut to fully bear on the rim joist or beam. This location makes installing the stair guards and handrails more difficult, however, so it's more common to see the top tread dropped one riser below the deck flooring. Unfortunately, I've found that this often leads to unsafe attachment details with inadequate bearing that can allow the stringer to shear along the grain **(2, 3)**.

Stringer attachment. One of the most serious deck stair defects is a poor connection between the stringers and the deck. Failure at this important connection is common, particularly when the stringers have been nailed to the framing, because nails are subject to withdrawal.

For example, I often see stringers fastened to a dropped header

A 2x12 stringer has a maximum unsupported span of 6 feet. These stairs **(7)** are likely to deflect and cause the stringers to either pull loose from the framing or shear along the grain. The problem is made worse with overcut notches, which weaken a stringer **(8)**. The minimum recommended depth of the uncut portion of the stringer is 5 inches, as measured to the closest saw kerf and not the notch itself. Shown in the illustration on the facing page are the recommended standards for deck stair guards, which are subject to the same requirements as interior stairs.

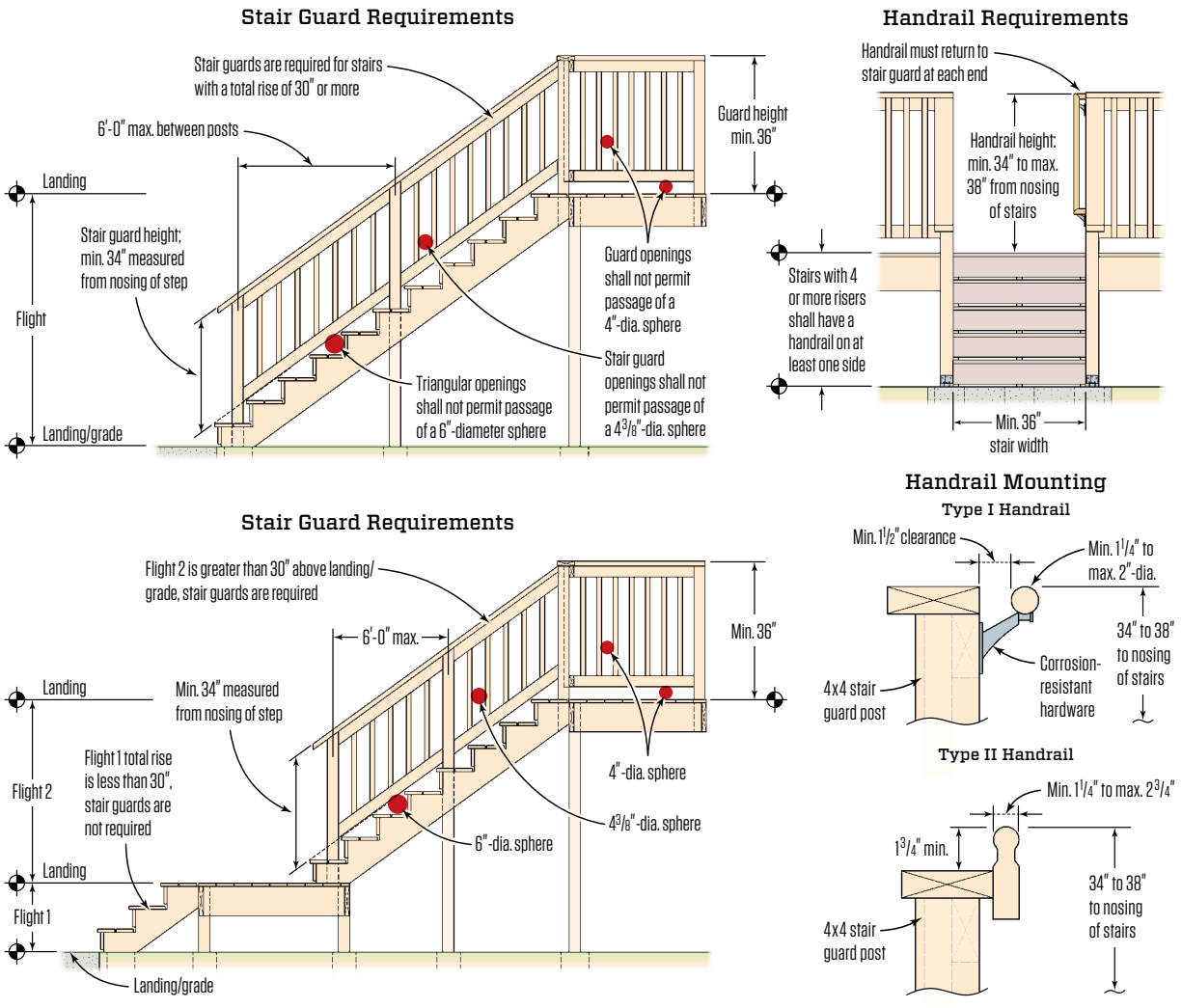
with nails driven into the stringers' end grain **(4)**. If the stringers are also bearing on—but not attached to—a landing and have no other attachment to resist lateral loads, the nails will do little to prevent the stringers from pulling away from the framing. If the stringers are bearing on the ground, the problem is even worse.

Sometimes the stringers are toenailed to the deck framing **(5)**, an attachment method where the nails aren't quite as subject to withdrawal. Sometimes this method works—if an adequate quantity of the correct kind of nails is properly installed (there are rules about how to correctly install toenails), and if the wood and the nails maintain their integrity over the life of the deck. That is a lot of ifs.

To avoid extra work and eliminate drop headers, end-nailing, toenailing, and other questionable stringer connection methods, DCA 6 recommends the use of metal hardware specifically designed for stringers, such as Simpson Strong-Tie's LSCZ or LSSU connectors. At a cost of a few dollars each for the connectors and recommended fasteners, this is the most cost-effective stringer connection method.

But in order to provide both the vertical and lateral support for the stringers, these connectors must be installed according to manufacturer's instructions. For example, stringers should fully bear on the connector seats. Screws are not allowed—unless specifically allowed by manufacturer's instructions, and then only manufacturer-supplied screws may be used. Deck screws and drywall screws are not allowed **(6)**. Finally, the round and oblong holes are there for a reason: They are saying, "Put a fastener here."

Stringer construction. Almost all stringers on deck stairs are



cut stringers. The two most common cut-stringer defects that I see are overspanning and overcutting.

The minimum recommended size for a deck stair stringer is 2x12, which has a maximum recommended unsupported span of 6 feet. Often this maximum span is dangerously exceeded, resulting in overspanned stringers that will deflect and cause the connection at the deck to pull loose and fail. In some cases, overspanned stringers may shear along the wood grain **(7)**.

The minimum recommended depth of the uncut portion of the stringer is 5 inches. The measurement is to the saw kerf, and it's common to find stringers with dangerously overcut notches **(8)**. Stringers that are overcut have the same potential failures as overspanned stringers. In both cases, they can be repaired by installing intermediate support posts.

RISERS AND TREADS

In both DCA 6 and the 2015 IRC, requirements for riser height and tread depth are 7¾ inches (max.) and 10 inches (min.) respectively, though local requirements vary. These measurements are taken at the leading edge of the treads.

To me, the more important safety issue is that the riser heights and tread depths be uniform. Risers or treads that vary more than ⅜ inch between any two risers or treads create a fall hazard, because people become accustomed to a certain feel when using stairs. A variance can cause someone to lose balance and fall. The most common location for a large variance between riser heights is at landings.

Many deck builders seem to be unaware that open risers allowing a 4-inch-diameter sphere to pass through are not permitted on

Though common, 2x4 handrails **(9)** are not considered graspable and should be avoided. Bottom guard rails on stairs should be oriented close enough to the tread nosings so that a 6-inch-diameter sphere will not pass through the triangle created by the riser, tread, and rail **(10)**. Wooden stair guard posts should be located so that the span between posts (as measured horizontally) is no more than 6 feet. This is a new deck stair that passed inspection **(11)**.

stairs that are more than 30 inches above grade (or the floor below). This is a common defect in older decks, but I often find it on newer decks too.

HANDRAILS

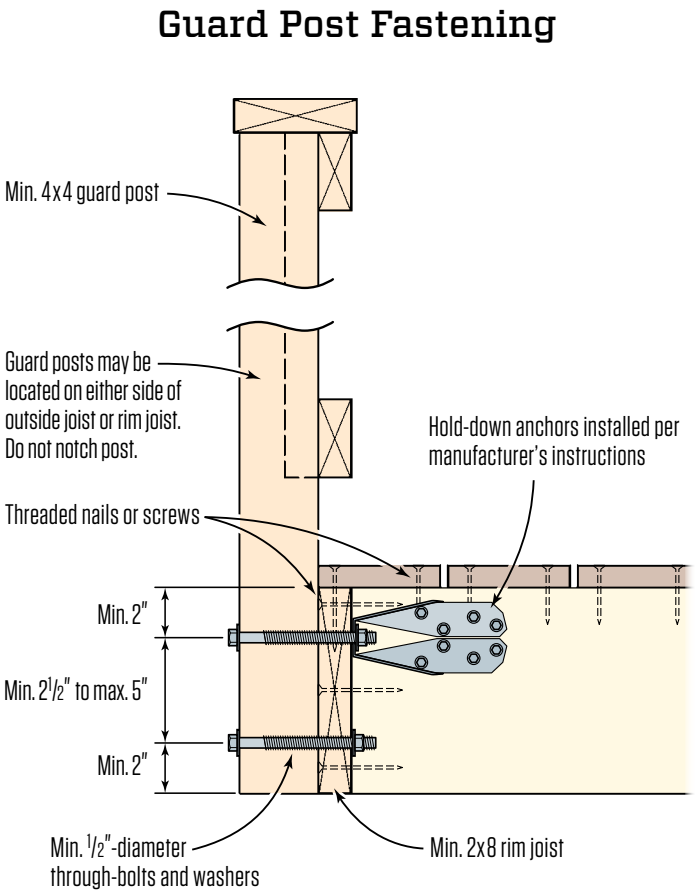
Like deck stair guards, deck stair handrails share the same requirements as for interior stairs, including requirements for a graspable shape and termination in a post or a return. This means that very few deck handrails comply with code or best practices, including those with typical 2x4 and 5/4 rail caps **(9)**. A 2x4 handrail is not graspable, especially by children and others with small hands, the elderly, and those with impaired mobility—the people who need a safe, graspable handrail the most.

Deck stair handrails should also be continuous from above the top tread or landing to above the last tread in the flight of stairs, and terminate in a return or into a support post. If the guard is properly installed otherwise (which it often isn't), the easiest fix for most handrail problems is to install a separate graspable handrail.

GUARDS

Guards for deck stairs share the same requirements as guards for interior stairs (see "Stair Guard Requirements," page 45). Two of the more common stair-guard defects I see include failing to install vertical infill components so that a $4^{3}/_{8}$-inch-diameter sphere will not pass through, and failing to install the guard bottom rail so that a 6-inch-diameter sphere will not pass through the triangle created by riser, tread, and guard bottom rail **(10)**.

In addition, 4x4 wood support posts for stair guards should be



A strong connection between guard posts and deck framing is critical to deck safety. The illustration (above left) shows an example of a connection made with a metal hold-down anchor, and details the other DCA 6 fastening requirements for guard posts. Above all, avoid notched posts **(12)**, which may develop cracks originating in the corner of the notch and running parallel to the grain, which weakens the post.

installed so that they are no more than 6 feet apart. Post spacing must be measured horizontally, not along the length of the guard.

Guard posts must be able to withstand a 200-pound load in any direction. The easiest way to comply with this requirement is to install hold-down connectors, especially at the top of the stairs, following the manufacturer's instructions (see "Guard Post Fastening," above).

Posts should never be notched around the framing, because that practice increases the odds that the post will develop cracks that originate in the corner of the notch and run parallel to the grain, weakening the post **(12)**.

If the bottom guard post extends below grade and also supports the stair stringer, a pair of ½-inch-diameter hot-dipped galvanized machine bolts (not carriage bolts) with washers on each end can be used to fasten the post to the stringer. This same detail can be used with intermediate stair guard posts.

LANDINGS

A solid landing, at least as wide as the stairs and at least 36 inches deep in the direction of travel, should be located at the top and bottom of each flight of stairs. A flight of stairs should not rise vertically more than 147 inches without a landing. An intermediate landing is a small deck, and should be built as such, including appropriate footings, posts, and bracing.

Bruce Barker is a licensed contractor and certified ICC inspector. He owns Dream Home Consultants, in Cary, N.C. A version of this article originally appeared in Professional Deck Builder.

SIMPSON Strong-Tie®

Deck Connection and Fastening Guide

RECOMMENDATIONS FOR THE CONSTRUCTION OF CODE-COMPLIANT DECKS

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Contents

Visit the Deck Center at
www.strongtie.com/deckcenter

Everything You Need in One Place

We have brought together all of our information and training on building stronger, safer decks in one location to make learning easier than ever.

A Word About Building Codes

This guide recommends connectors and fasteners for deck construction that may meet the requirements of the 2009/2012 International Building Code® and the 2009/2012 International Residential Code®. The information contained here is a summary of the requirements of these codes as they pertain to the connections highlighted in this guide. The building codes contain other requirements regarding aspects of deck construction that are not addressed here, check the codes for details. Check with your local building department to verify what building codes have been adopted in your area.

Selection of products based upon performance and/or suitability for a specific application should be made by a qualified professional. Simpson Strong-Tie recommends that deck designs are approved by the local building department before construction begins.

International Building Code and International Residential Code are registered trademarks of their respective organizations.

Limited Warranty

Simpson Strong-Tie Company Inc. warrants catalog products to be free from defects in material or manufacturing. Simpson Strong-Tie Company Inc. products are further warranted for adequacy of design when used in accordance with design limits in this catalog and when properly specified, installed, and maintained. This warranty does not apply to uses not in compliance with specific applications and installations set forth in this catalog, or to non-catalog or modified products, or to deterioration due to environmental conditions.

Simpson Strong-Tie® connectors are designed to enable structures to resist the movement, stress, and loading that results from impact events such as earthquakes and high velocity winds. Other Simpson Strong-Tie products are designed to the load capacities and uses listed in this catalog. Properly-installed Simpson Strong-Tie products will perform in accordance with the specifications set forth in the applicable Simpson Strong-Tie catalog. Additional performance limitations for specific products may be listed on the applicable catalog pages.

Due to the particular characteristics of potential impact events, the specific design and location of the structure, the building materials used, the quality of construction, and the condition of the soils involved, damage may nonetheless result to a structure and its contents even if the loads resulting from the impact event do not exceed Simpson Strong-Tie catalog specifications and Simpson Strong-Tie connectors are properly installed in accordance with applicable building codes.

All warranty obligations of Simpson Strong-Tie Company Inc. shall be limited, at the discretion of Simpson Strong-Tie Company Inc., to repair or replacement of the defective part. These remedies shall constitute Simpson Strong-Tie Company Inc.'s sole obligation and sole remedy of purchaser under this warranty. In no event will Simpson Strong-Tie Company Inc. be responsible for incidental, consequential, or special loss or damage, however caused.

This warranty is expressly in lieu of all other warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose, all such other warranties being hereby expressly excluded. This warranty may change periodically – consult our website *www.strongtie.com* for current information.


Summer brings deck danger to light

Construction problems can go unnoticed

By Bob Swanson
USA TODAY

Improperly Built Decks Can Be Dangerous

More than a million decks are built and replaced each year in the United States. While decks are a popular feature of many homes, the construction and safety of decks have become a real concern within the building industry. Improper deck building has resulted in a growing number of deck failures and related injuries and deaths.

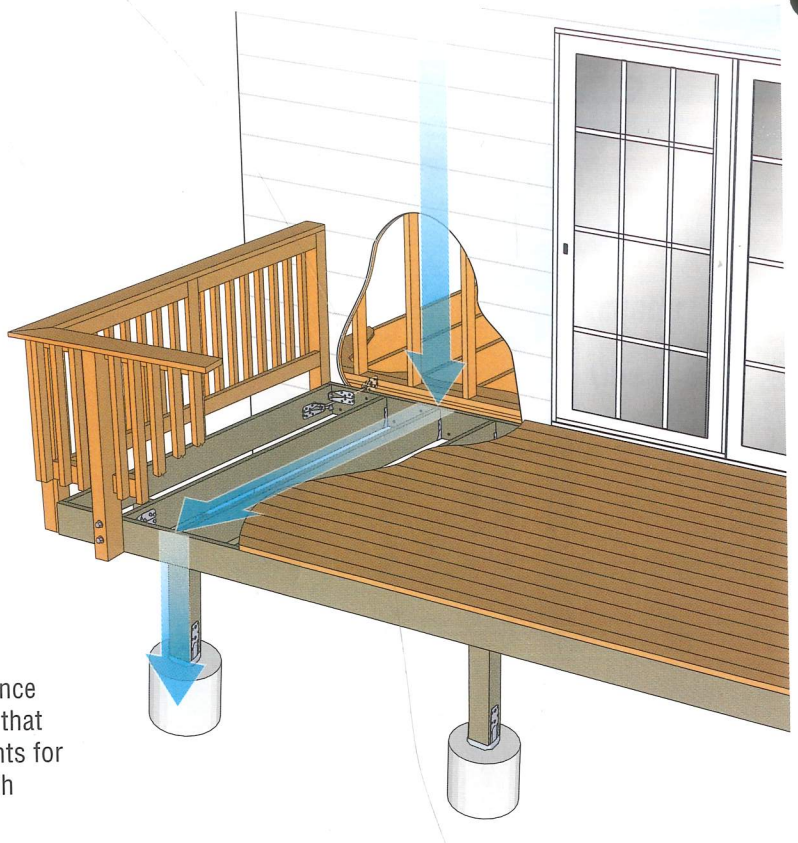
> **"Decks cause more injuries and loss of life than any other part of the home structure."**
>
> *—**Don Bender**, Director, Composite Materials and Engineering Center, Washington State University*

According to Don Bender, the director of the Composite Materials and Engineering Center at Washington State University, the deck is the most dangerous part of the house. Washington State Magazine's article Making Decks Safer reports "Decks cause more injuries and loss of life than any other part of the home structure. Except for hurricanes and tornadoes, more injuries may be connected to deck failures than all other wood building components and loading cases combined."

While decks are required to meet certain code standards and load capacities, it's estimated that of the 40 million existing decks, only half are code compliant — leaving 20 million decks that need to be rebuilt or retrofitted.

To help design and building professionals build code-compliant, safe decks, Simpson Strong-Tie has created this *Deck Connection and Fastening Guide*. This guide focuses on the critical connections involved in deck construction and what the code requires for these areas. It is intended to help designers, contractors, inspectors and do-it-yourselfers ensure that their decks are properly constructed per the International Building Code® (IBC) and International Residential Code® (IRC). The guide includes a complete deck connector system that covers all the hardware needs for deck construction and references the code to ensure it meets current requirements.

Do Decks Really Need to Meet Code Requirements?



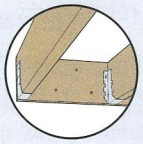
Because they look relatively simple to build, many people do not realize that decks are structures that need to be designed to adequately resist certain stresses. Like a house, or any other building, a deck must be designed to support the weight of people and objects placed on them, as well as lateral and uplift loads that can act on the deck as a result of occupant movement, wind or seismic activity. The 2009/2012 versions of both the IBC and IRC contain language outlining the general design requirements of structures. This excerpt from the 2009/2012 IRC (Section R301.1) represents a summary of the intent of both codes:

"The construction of buildings and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets all requirements for the transfer of all loads from their point of origin through the load-resisting elements to the foundation."

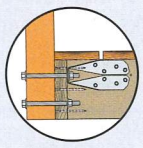
The concept of a complete or continuous load path refers to a series of solid connections within the structure of a deck that transfer load through its frame to the ground or adjacent, supporting structure *(commonly a building)*. This same principle is applied to the design of all types of wood frame buildings. This continuous load path is created by using a system of structural connectors and fasteners to connect the wood members together.

Common Code Violations

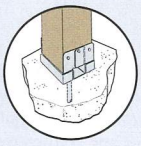
The following code requirements can be easily overlooked in deck construction:



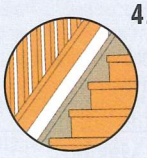
1. **Proper fastening of the ledger connection**
The building code prohibits the "use of toenails or nails subject to withdrawal" when making this connection, yet a number of deck failures result due to using these or other types of improper fasteners.



2. **Proper fastening of guardrails to the deck**
The IRC requires the guardrail to resist a 200-pound load. This load applied at the top of the guardrail, creates a large leverage force where the guardrail attaches to the deck framing.



3. **Post-base connections**
The IRC requires posts "be restrained to prevent lateral displacement at the bottom end". This requirement is important as most decks cannot safely support part or all of its structure, if a post is removed.



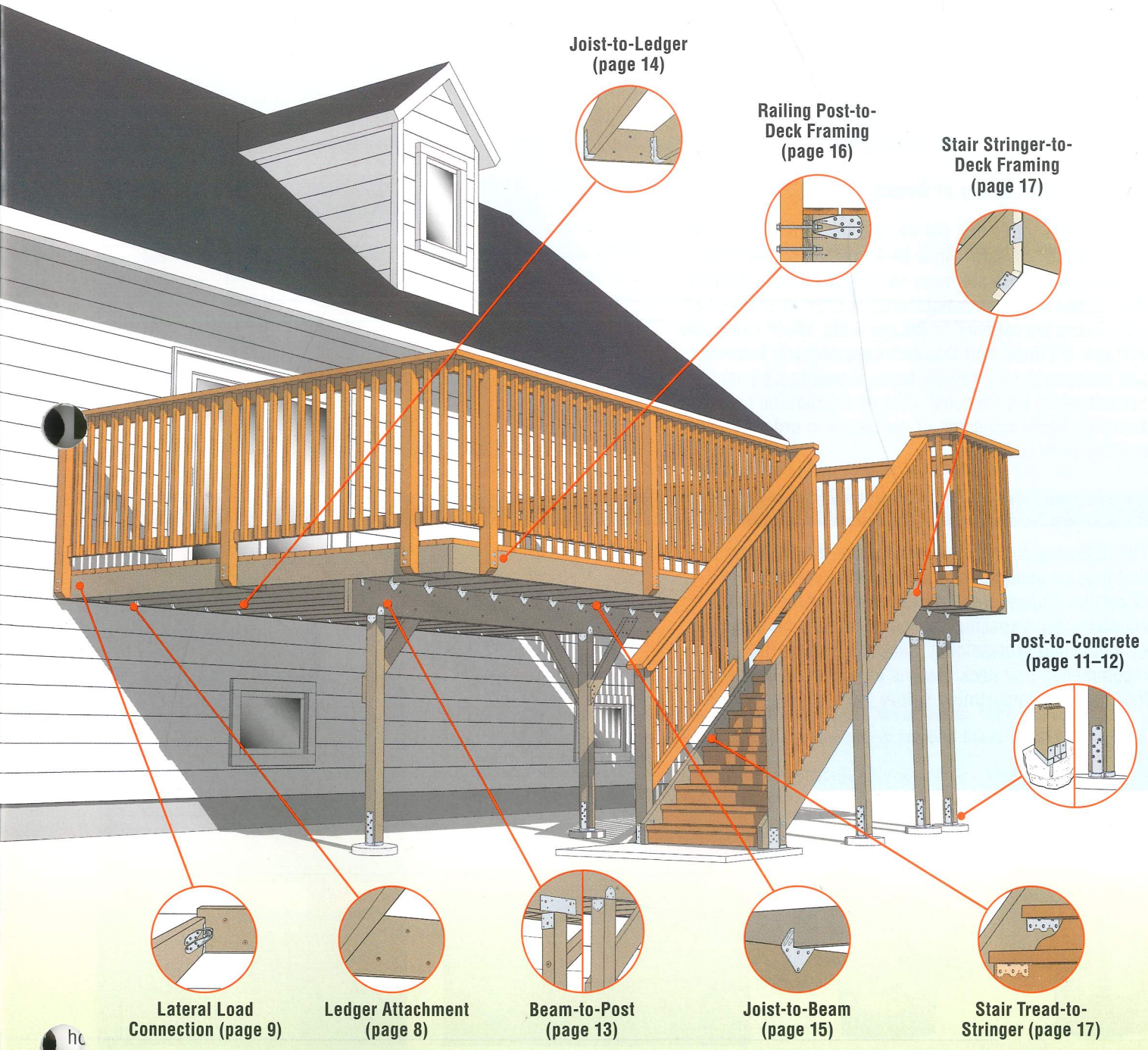
4. **Openings in guards and stair railings**
The building code places a limit on the size of openings, for the occupant's safety in case of tripping or falling, or the safety of small children.

Critical Deck Connections

A system of key connections throughout the deck framing, also known as a continuous load path, is essential to building a safe, code-compliant deck. When this system of connections is made properly, loads are transferred throughout the deck's frame and into the ground and/or the adjacent structure to which the deck is connected.

The connections called out below are necessary in order to create an effective continuous load path.

For information on the inspection of existing decks, see page 7.



Do I Need To Retrofit?

Retrofitting an Existing Deck

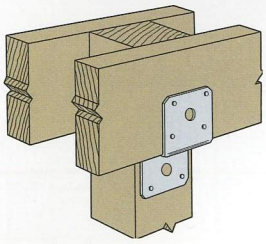
It is estimated that of the approximately 40 million existing decks, only half are code-compliant. Experts believe that it is likely that many of these decks are potentially unsafe. In situations where it is not feasible to rebuild an existing deck, it may be preferable to retrofit it by applying hardware to existing framing members. Many of the products shown in this guide may be installed after deck framing is in place and can improve the safety of the structure and help bring it within the requirements of the code.

The Life Expectancy of Decks

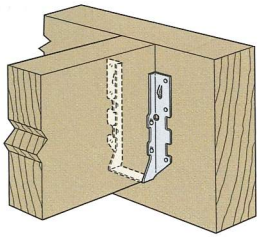
Most experts agree that the average life expectancy of a deck is 10 to 15 years. Since deck building started over 30 years ago, there are many existing decks that are past their useful life. Deck maintenance is often overlooked as well. Decks are exposed to the elements, which can cause damage. It's important that decks are properly inspected and maintained on a routine basis. If unsure it's best to consult with a professional, such as a structural engineer, architect, home inspector, or contractor in order to make sure the deck is safe.

Connector Solutions for Retrofitting

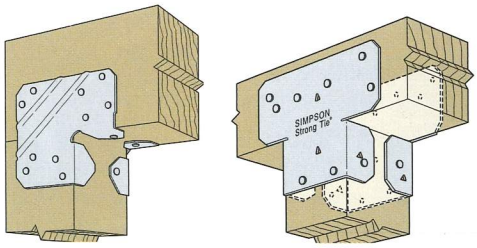
The following connectors are some of the products that may be suitable for deck retrofit. Selection of products based upon performance and/or suitability for a specific application should be made by a qualified professional. Simpson Strong-Tie recommends that deck designs be approved by the local building department before work begins.



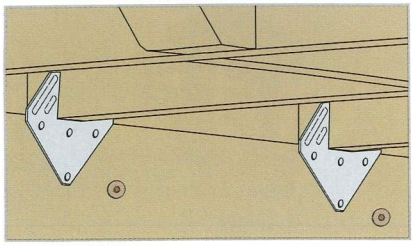
DJT: Connects beams at the side of the post.



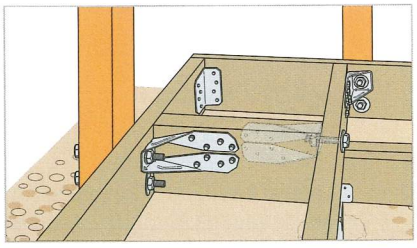
LUS Joist Hanger: Provides bearing and uplift resistance, features double-shear nailing for added strength.



LCE/AC Retrofit Post Caps: Two-piece cap may be installed before or after lumber is in place.



H1 Hurricane Tie: Holds joist on both sides.



DTT Deck Tension Tie: Horizontal application fastening railing post to deck framing.

5 Things to Look for On an Existing Deck

When inspecting a deck to determine overall safety and compliance to building codes, look at the five areas below. Use this check list to help ensure a thorough evaluation.

☐ Improper Connections

Any connections that do not meet the requirements discussed in this guide can compromise the safety of the deck. In many cases toenailing (i.e. joining two wood members with angled nailing) does not constitute a proper connection. Connectors must be installed with the correct fastener.

☐ Loose Connections

Vital connections may have degraded over time. Wobbly railings, loose stairs and ledgers that appear to be pulling away from the adjacent structure are all causes for concern.

☐ Corrosion

Metal connectors and fasteners can corrode over time, especially if a product with insufficient corrosion resistance was originally installed. See page 18 for more information on corrosion.

☐ Rot

Wood can rot and degrade over time with exposure to the elements. Members within the deck frame that have rotted may no longer be able to perform the function for which they were installed.

☐ Cracks

As wood ages it is common for cracks to develop. Large cracks or excessive cracking overall can weaken deck framing members.

Ledger Attachment

Code Requirements

✓ 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. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal.

IRC 2009 Section R502.2.2
IRC 2012 Section R507.1
IBC 2009/2012 Section 1604.8.3

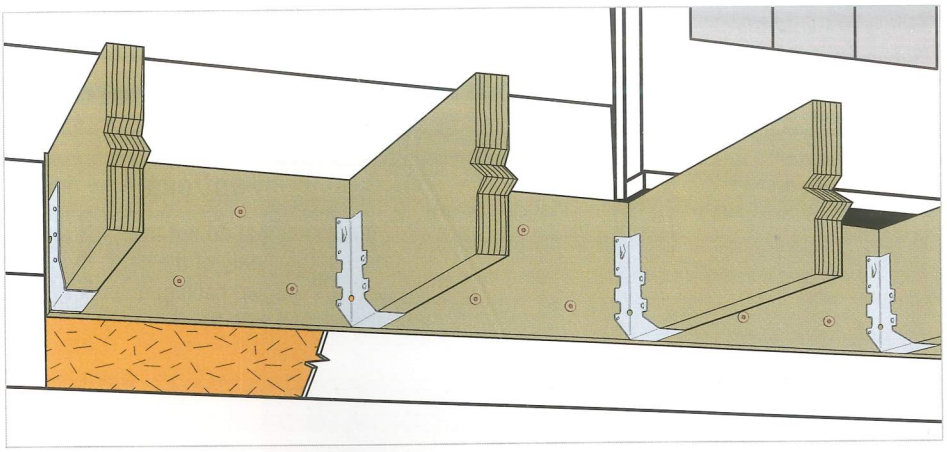
✓ For decks supporting a total design load of 50 pounds per square foot (40 pounds per square foot live load plus 10 pounds per square foot dead load), the connection between a deck ledger of pressure preservative-treated Southern Pine, incised pressure-preservative-treated Hem-Fir or approved decay-resistant species, and a 2-inch nominal lumber band joist bearing on a sill plate or wall plate shall be constructed with ½-inch lag screws or bolts with washers in accordance with Table R502.2.2.1 (IRC 2012 Table R507.2).

IRC 2009 Section R502.2.2.1
IRC 2012 Section R507.2

✓ Deck ledger connections not conforming to Table R502.2.2.1 (IRC 2012 Table R507.2) 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.

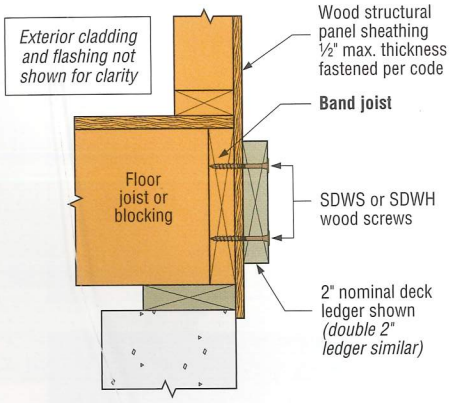
IRC 2009, Section R502.2.2.2.
IRC 2012 Section R507.2.2

Selection of products based upon performance and/or suitability for a specific application should be made by a qualified professional. Simpson Strong-Tie recommends that deck designs be approved by the local building department before construction begins.



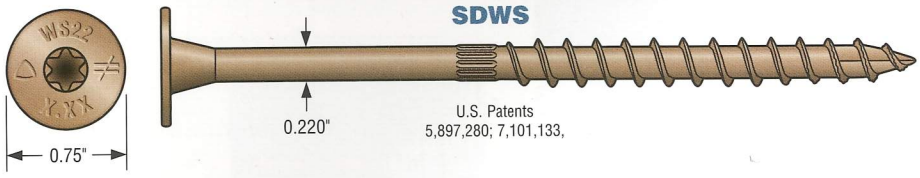
One of the most common causes for deck failure is ledgers that pull away from the primary structure, resulting in complete collapse.

The Simpson Strong-Tie Strong-Drive SDWS and SDWH structural wood screws provide an easy-to-install, high-strength alternative to lag screws and through-bolts. They are ideal for securely attaching ledgers to structural wood members, are easier to drive than comparable fasteners, and are coated for many exterior and preservative-treated wood applications.



Ledger-to-Band Joist Assembly

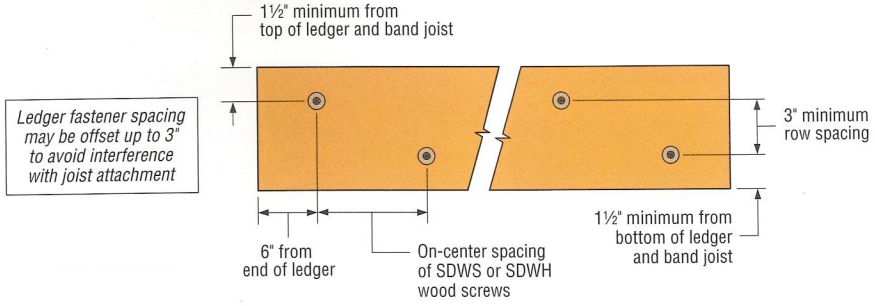
Strong-Drive® Structural Wood Screw



- 4CUT™ tip, serrated thread, and knurled shank reduce installation torque
- Identification on all screw heads
- Low-profile washer head provides excellent bearing area and a clean look

Code listed per IAPMO UES ER-192.

For stainless-steel ledger fastening, use the Strong-Drive SDS structural wood screw *(page 21)*.



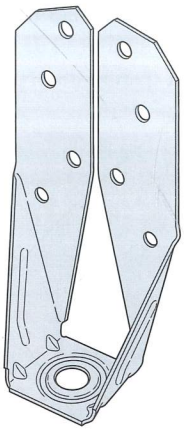
SDWS/SDWH Screw Spacing Detail

For more information on ledger attachment see *Fastening Systems* catalog C-FS and flier F-SDWSSDWH.

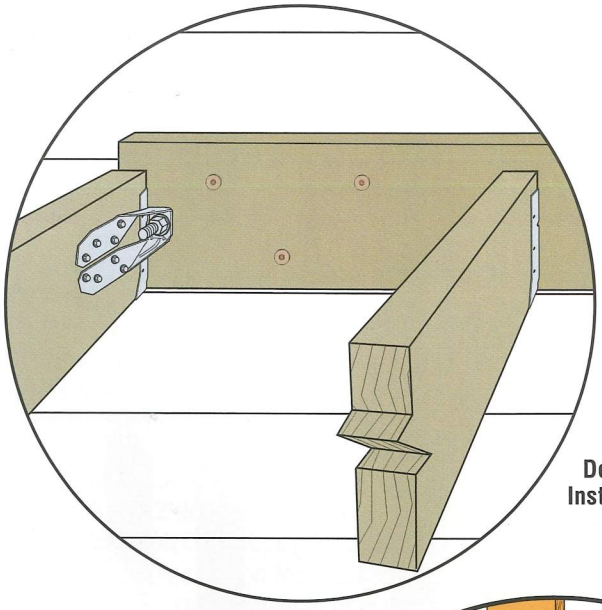
Lateral-Load Connection

For decks that are partially supported by an adjacent structure, the connection between the deck and that structure is vital. A bolted or screwed ledger-to-rim board connection is suitable to support gravity loads, however in some cases the building codes require a connection that is able to resist higher lateral loads. In these situations tension ties are typically called out to tie the joists of the deck directly to the joists of the structure.

The Simpson Strong-Tie® DTT2 Deck Tension Tie complies with IRC provisions for laterally tying the deck to the house. The DTT2 fastens easily to the joist using Simpson Strong-Tie® Strong Drive® screws (included).

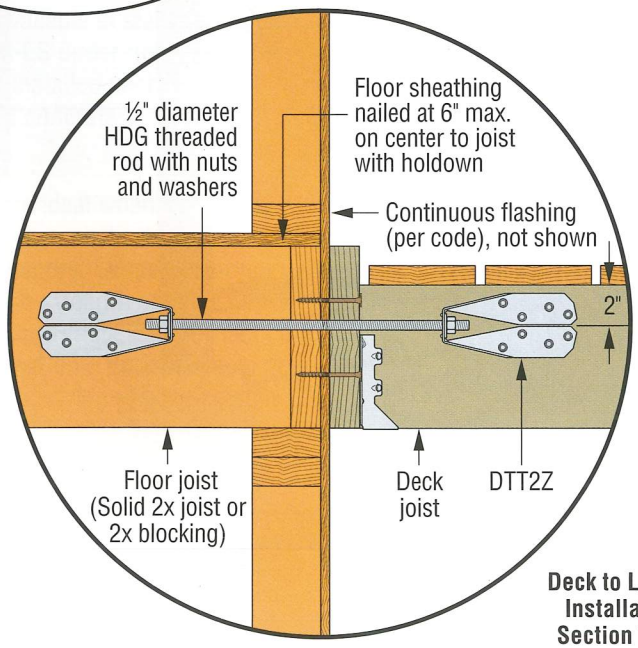


The DTT2Z Deck Tension Tie is a multi-purpose connector ideal for lateral load and deck-post connections. It features a ZMAX® coating for added corrosion resistance. For stainless steel model use the DTT2SS.



Deck to Ledger Installation Detail

For more information on common framing conditions not addressed by the 2009/2012 IRC detail, refer to Simpson Strong-Tie technical bulletin T-DECKLATLOAD.



Deck to Ledger Installation Section View

Code Requirements

✓ 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.

IRC 2009 Section R502.2.2.3

✓ The lateral load connection required by Section R507.1 shall be permitted to be in accordance with Figure R507.2.3. Where the lateral load connection is provided in accordance with Figure R507.2.3, 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.

IRC 2012 Section R507.2.3

Selection of products based upon performance and/or suitability for a specific application should be made by a qualified professional. Simpson Strong-Tie recommends that deck designs be approved by the local building department before construction begins.

ZMAX G185

HOT-DIP GALVANIZED

SST300 STAINLESS STEEL

These products are available with a ZMAX® or hot-dip galvanized coating. Stainless-steel connectors are also available for higher exposure environments or applications using certain preservative-treated woods. See page 18 for more details.

Footings

Code Requirements

Footings

- ✓ The building codes include specific requirements regarding footing size that are dependent upon factors such as the dead and live loads the deck is designed to resist as well as soil conditions. Footing should be designed per

  IRC 2009/2012, Section R403 or IBC 2009/2012, Chapter 18

Minimum Footing Depths By Code

(See the codes for actual footing size required.)

- ✓ Footings shall be at least 12" below the undisturbed ground surface.

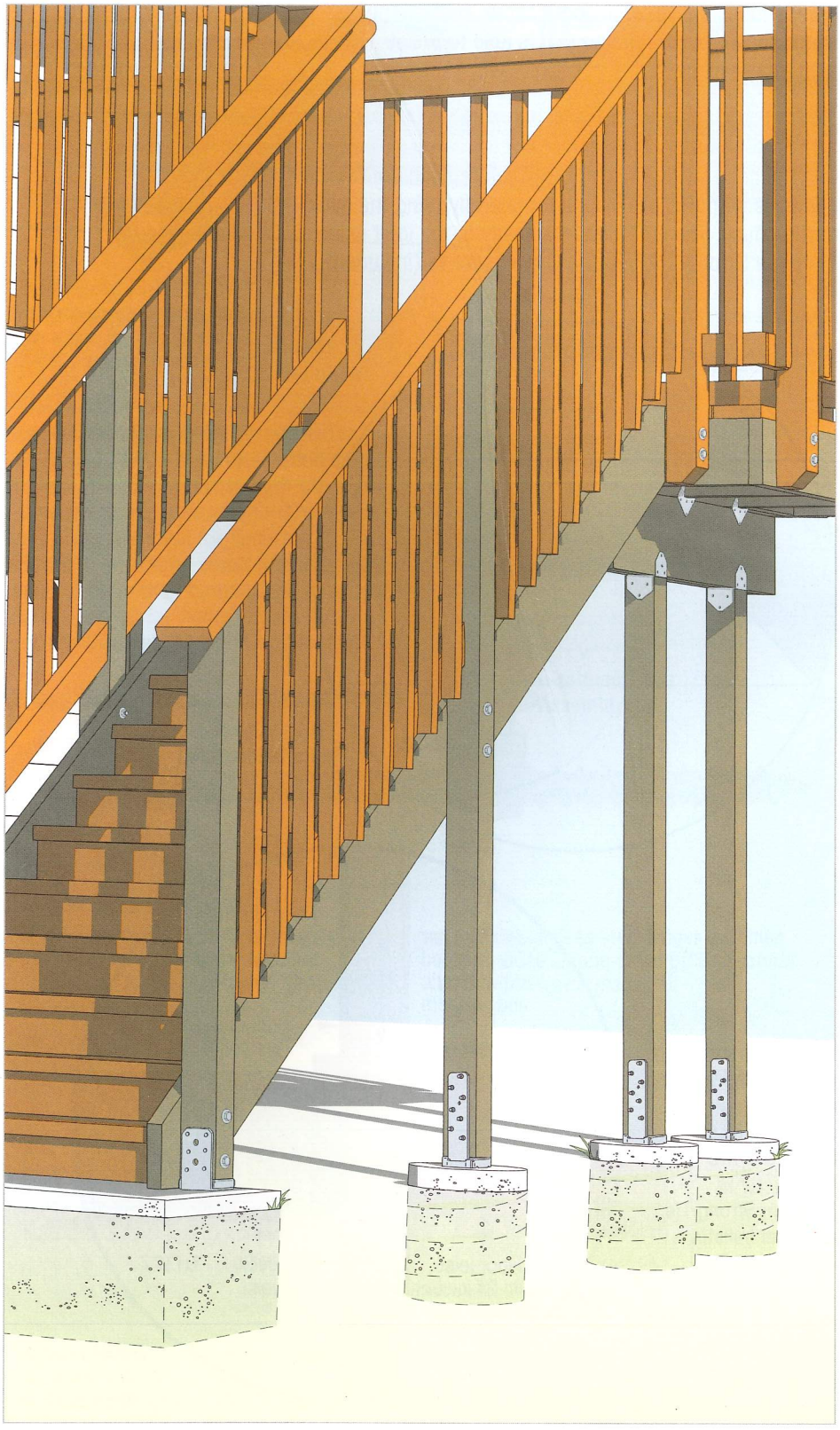
  IRC 2009/2012, Section R403.1.4

- ✓ The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1.

  IRC 2009/2012 Section R403.1.1

Note: In order to achieve published load values, footings must provide sufficient concrete cover of the embedded portion of Simpson Strong-Tie® cast-in-place post and column bases. In some cases a footing larger than the minimum required by the building codes will be necessary to meet these requirements. See the Simpson Strong-Tie® *Wood Construction Connectors* catalog for more information.

In order for posts to properly resist various types of loads they must be supported by, and anchored to, concrete footings. Concrete patios and pre-cast concrete piers do not qualify as proper footings for deck construction.

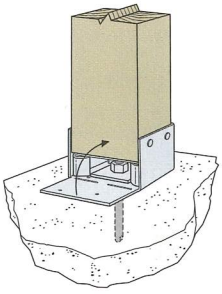


Post Bases (Hardened Concrete)

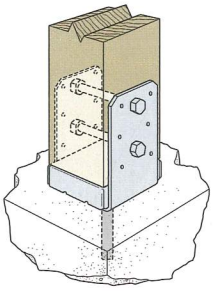
Posts must be correctly attached to a concrete footing in order to resist lateral and uplift loads. Preservative treated wood that is cut must be field treated or the post must be elevated off the concrete by 1".

Simpson Strong-Tie® Solutions

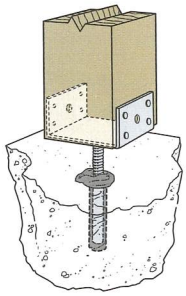
These products utilize anchors installed during the pour or after the concrete hardens.



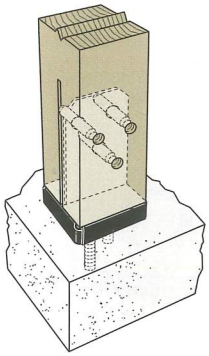
ABW Adjustable Post Base with Standoff
Available in ZMAX® coating.



ABU Adjustable Post Base with Standoff
ZMAX coating or stainless steel recommended.



EPB44PHDG Elevated Post Base
Available with hot-dip galvanized coating



CPTZ Concealed Post Tie
Available in ZMAX coating.

Post-Installed Anchors

Installing a post base on hardened concrete requires the installation of a post-installed anchor to attach the base to the concrete. Simpson Strong-Tie offers a variety of mechanical anchors and anchoring adhesives that are code listed for structural applications.

Mechanical Anchors:
Strong-Bolt® 2 Wedge Anchor

The Strong-Bolt® 2 wedge anchor is the next-generation solution for cracked and uncracked concrete. Available in stainless steel, it is code-listed by ICC-ES under the 2009 IBC requirements for post-installed anchors in cracked and uncracked concrete

Anchoring Adhesives

Anchoring adhesives are ideal when maximum strength is needed or when anchoring close to the edge of concrete or masonry. Simpson Strong-Tie® SET-XP® epoxy is a high-strength epoxy adhesive and AT-XP® is an acrylic formula ideal for fast cure and cold-weather applications. Both products are available in a variety of cartridge sizes, including convenient single-tube cartridges. Hot-dip galvanized or stainless-steel threaded rod recommended.

For more information on these products see the Simpson Strong-Tie® *Anchoring and Fastening Systems for Concrete and Masonry* catalog or visit ***www.strongtie.com/anchors***.

Code Requirements

Load Resistance

✓ Columns shall be restrained to prevent lateral displacement at the bottom end. Wood columns shall not be less in nominal size than 4" x 4".

IRC 2009/2012, Section R407.3

✓ Column and post-end connections shall be fastened to resist lateral and net induced uplift forces.

IBC 2009/2012, Section 2304.9.7

Decay Resistance of Post

✓ Wood columns shall be approved wood of natural decay resistance or approved pressure-preservative-treated wood. Exception: Columns exposed to the weather when supported by concrete piers or metal pedestals projecting 1" above a concrete floor or 6" above exposed earth and the earth is covered by an approved impervious moisture barrier.

IRC 2009/2012 Section R317.1.4
IBC 2009/2012 Section 2304.11.2.7

Selection of products based upon performance and/or suitability for a specific application should be made by a qualified professional. Simpson Strong-Tie recommends that deck designs be approved by the local building department before construction begins.

Post Bases (Wet Concrete)

Code Requirements

Load Resistance

✓ Columns shall be restrained to prevent lateral displacement at the bottom end. Wood columns shall not be less in nominal size than 4" x 4".

IRC 2009/2012, Section R407.3

✓ Column and post-end connections shall be fastened to resist lateral and net induced uplift forces.

IBC 2009/2012, Section 2304.9.7

Decay Resistance of Post

✓ Wood columns shall be approved wood of natural decay resistance or approved pressure-preservative-treated wood. Exception: Columns exposed to the weather when supported by concrete piers or metal pedestals projecting 1" above a concrete floor or 6" above exposed earth and the earth is covered by an approved impervious moisture barrier.

IRC 2009/2012 Section R317.1.4
IBC 2009/2012 Section 2304.11.2.7

Selection of products based upon performance and/or suitability for a specific application should be made by a qualified professional. Simpson Strong-Tie recommends that deck designs be approved by the local building department before construction begins.

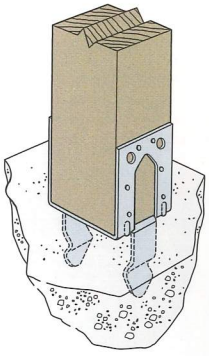
ZMAX G185
HOT-DIP GALVANIZED
SST300 STAINLESS STEEL

These products are available with a ZMAX® or hot-dip galvanized coating. Stainless-steel connectors are also available for higher exposure environments or applications using certain preservative-treated woods. See page 18 for more details.

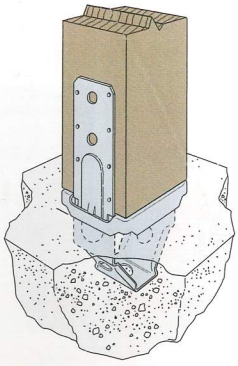
Simpson Strong-Tie® Solutions

Cast-in-Place

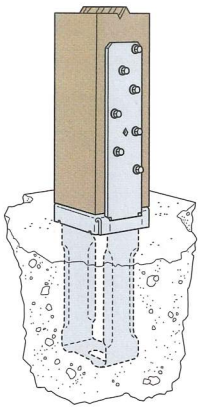
These products are cast into the concrete at the time of the pour.



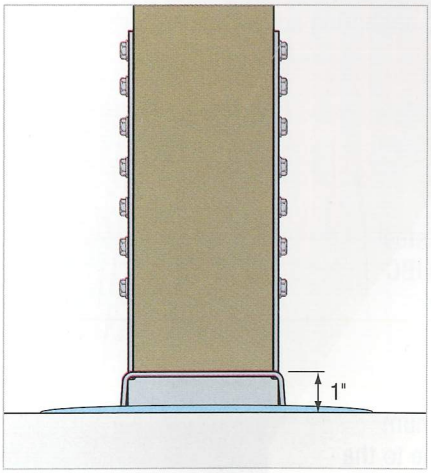
PB Post Base:
For use with decay resistant or preservative-treated wood. ZMAX® or hot-dip galvanized coating recommended.



PBS Post Base with Standoff:
Features a 1" standoff. ZMAX or hot-dip galvanized coating recommended.



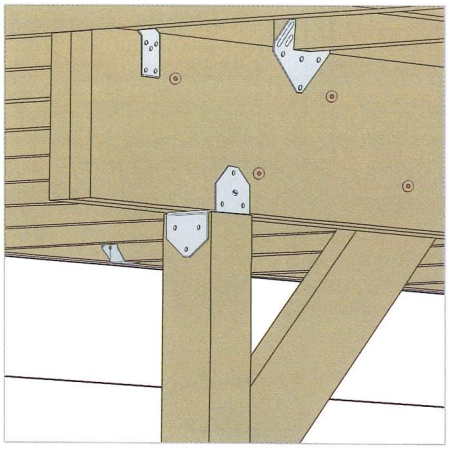
CBSQ Column Base:
Installs with Strong-Drive® SDS wood screws and features a 1" standoff. Hot-dip galvanized coating recommended.

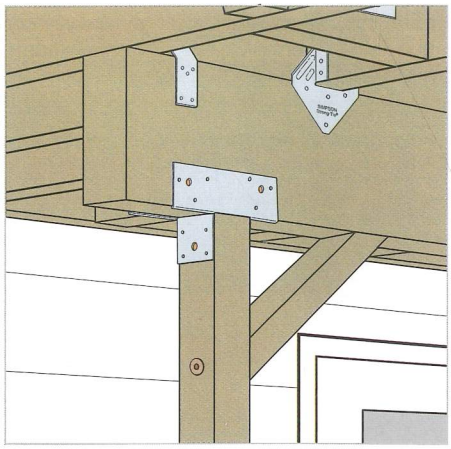


A 1" standoff at the base of the post is required when building with wood that is not preservative treated or decay resistant. The standoff plate raises the post end off the concrete, keeping it drier and reducing the chances of decay. For best long-term results, Simpson Strong-Tie recommends that a base with a standoff be used in exterior/wet applications.

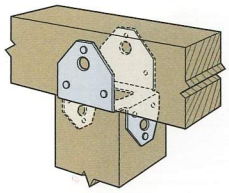
Beam-to-Post Connections

At the point where a beam meets a post, it must be properly connected to the post in order to resist gravity, lateral and uplift loads. This pertains to solid sawn beams or those comprised of multiple members, whether they rest on top or are fastened to the side of the post.

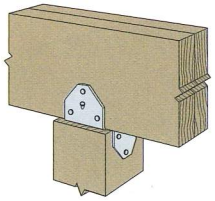




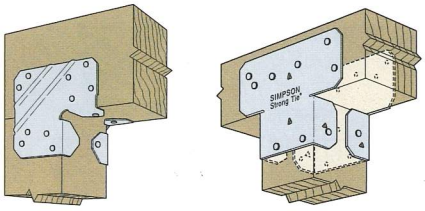
Simpson Strong-Tie® Solutions



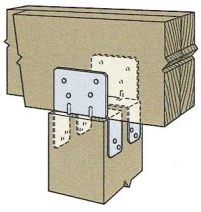
BC Post Cap: For single-member solid sawn beams. ZMAX® coating or stainless steel recommended.



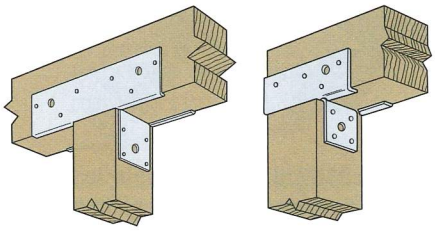
BCS Post Cap: Connects double 2x's to a 4x post or triple 2x's to a 6x post. ZMAX coating or stainless steel recommended.



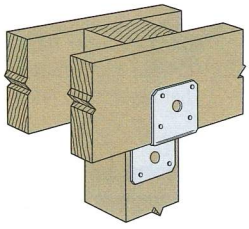
LCE/AC Retrofit Post Caps: Two-piece cap may be installed before or after lumber is in place when the sides of the post and beam are flush. ZMAX coating or stainless steel recommended.



LPC Post Cap: Two-piece cap adjusts for beams smaller than post width. Features a ZMAX coating.



PC/EPC Post Caps: Connects beams at the top of the post. ZMAX coating recommended.



DJT14: Connects beams at the side of the post. ZMAX coating or stainless steel recommended.

Code Requirements

- ✓ Where posts and beam or girder construction is used to support floor framing, positive connections shall be provided to ensure against uplift and lateral displacement.

  IRC 2009/2012, Section R502.9
  IBC 2009/2012, Section 2304.9.7

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Joists Terminating into Beam/Ledger

When joists terminate into a beam or ledger, a connection is required to provide bearing. In cantilever applications the connection must also resist uplift.

Code Requirements

Bearing

✓ The ends of each joist, beam or girder shall have at least 1½" of bearing on wood or metal except where supported on a 1"x4" ribbon strip nailed to adjacent studs.

IRC 2009/2012, Section R502.6
IBC 2009/2012, Section 2308.8.1

✓ Joists framing into the side of a wood beam shall be supported by approved framing anchors.

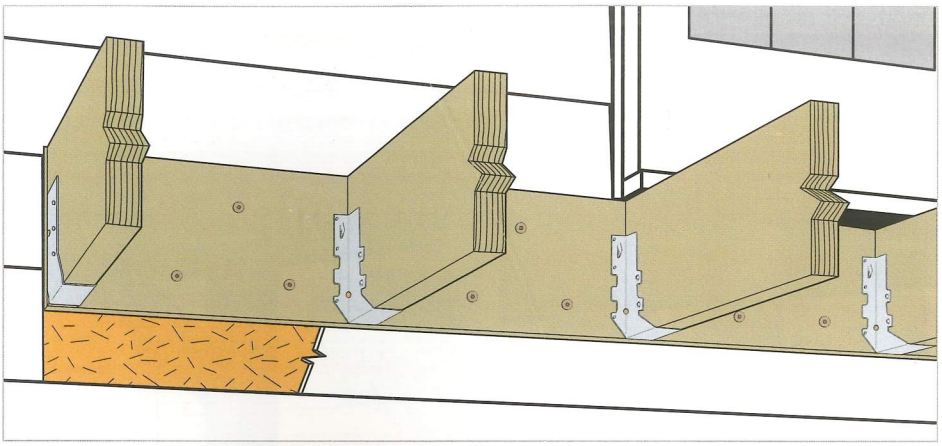
IRC 2009/2012, Section R502.6.2
IBC 2009/2012, Section 2308.8.2

Cantilevered Applications

✓ 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 acting on the cantilevered portion of the deck.

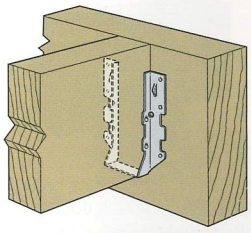
IRC 2009, Section R502.2.2
IRC 2012, Section R507.1
IBC 2009/2012, Section 1604.8.3

Selection of products based upon performance and/or suitability for a specific application should be made by a qualified professional. Simpson Strong-Tie recommends that deck designs be approved by the local building department before construction begins.

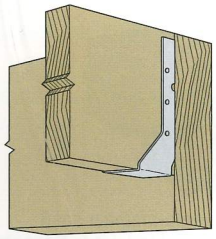


Ledger may not be installed over siding or stucco. It must be fastened directly to the rim joist or sheathing.

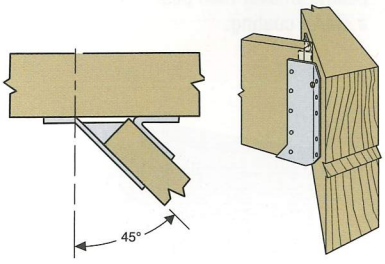
Simpson Strong-Tie® Solutions



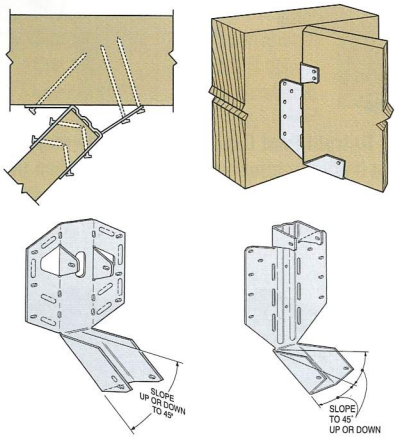
LUS Joist Hanger: Provides bearing and uplift resistance, features double-shear nailing for added strength. ZMAX® coating or stainless steel recommended.



LUC Concealed Flange Joist Hanger: Provides bearing and uplift resistance, concealed flanges for cleaner look and for end conditions. ZMAX coating or stainless steel recommended.



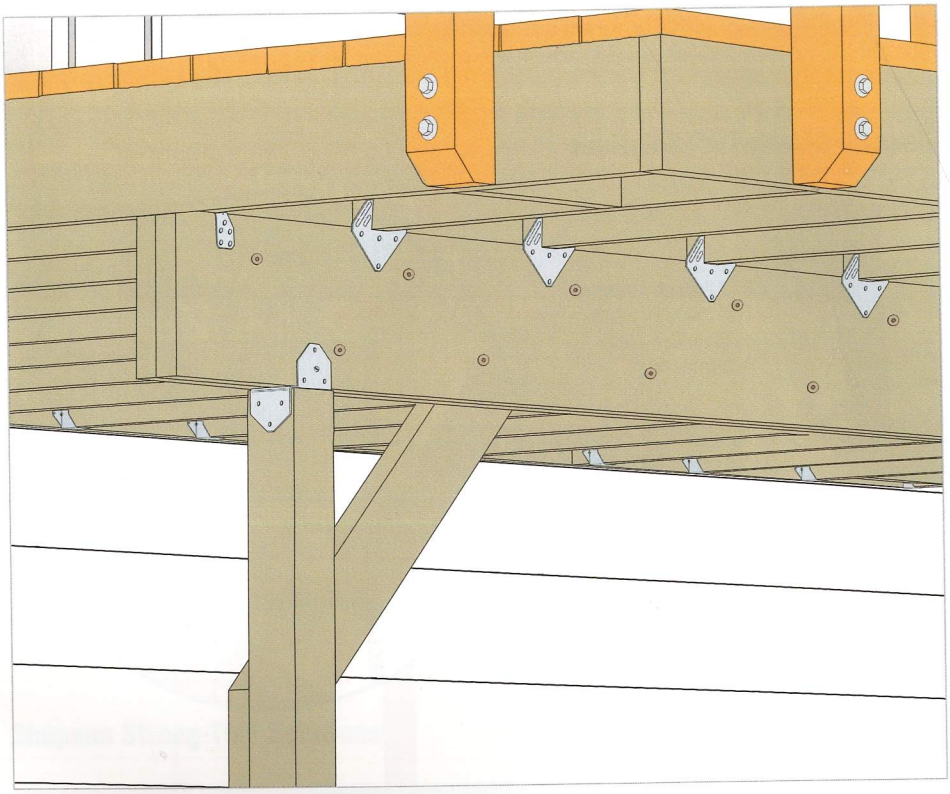
SUR/SUL Skewed Joist Hanger: 45° skewed hanger (available in skewed right and left versions), provides bearing and uplift resistance. ZMAX coating or stainless steel recommended.



LSU26/LSSU210 Field Skewable Joist Hanger: Field skewable right or left up to 45°, provides bearing and uplift resistance. Also field slopeable up or down to 45°. Available with a ZMAX coating.

Joists Bearing on a Beam

At the point where the joist bears on top of a beam, there must be a connection to resist lateral and uplift forces. Blocking or framing is also required to prevent overturning of the joists.



Code Requirements

✓ Where posts and beam or girder construction is used to support floor framing, positive connections shall be provided to ensure against uplift and lateral displacement.

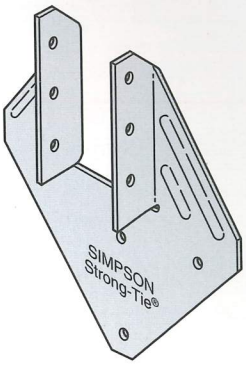
IRC 2009/2012, Section R502.9
IBC 2009/2012, Section 2304.9.7

✓ Joists must be supported laterally at the ends by solid blocking or attachment to a full depth header, band or rim joist. Lateral restraint must be provided at each support.

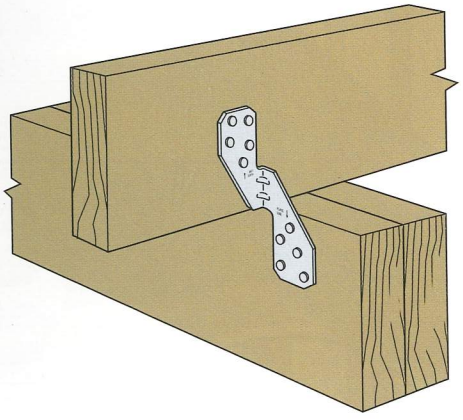
IRC 2009/2012 Section R502.7
IBC 2009/2012 Section 2308.8.2

Selection of products based upon performance and/or suitability for a specific application should be made by a qualified professional. Simpson Strong-Tie recommends that deck designs be approved by the local building department before construction begins.

Simpson Strong-Tie® Solutions



H1 Hurricane Tie: Holds joist on both sides. ZMAX® coating recommended.



H2.5A Hurricane Tie: Suitable for single-sided applications. ZMAX coating or stainless steel recommended.

Simpson Strong-Tie offers a full range of hurricane ties for all types of applications and load requirements. See the Simpson Strong-Tie® *Wood Construction Connectors* catalog for more information.

Railing Post-to-Deck Framing

Code Requirements

When required

✓ Guards shall be located along many surfaces more than 30" above the floor or grade below including porches, balconies, raised floor areas, stairways, landings and open-sided walking surfaces.

IRC 2009, Section R312.1
IRC 2012, Section R312.1.1
IBC 2009, Section 1013.1
IBC 2012, Section 1013.2

Height

✓ Guards shall be a minimum of 36" tall (IRC) or up to 42" tall for certain occupancies (IBC).

IRC 2009, Section R312.2
IRC 2012, Section R312.1.2
IBC 2009, Section 1013.2
IBC 2012, Section 1013.3

Load Resistance

✓ Handrail assemblies and guards shall be able to resist a single concentrated load of 200 pounds, applied in any direction at any point along the top.

IRC 2009/2012, Table R301.5
IBC 2009, Section 1607.7.1
IBC 2012, Section 1607.8.1
(1 and 2 family dwellings)

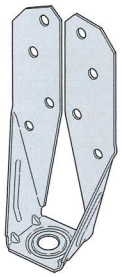
Selection of products based upon performance and/or suitability for a specific application should be made by a qualified professional. Simpson Strong-Tie recommends that deck designs be approved by the local building department before construction begins.

ZMAX G185
HDG HOT DIP GALVANIZED®
SST300 STAINLESS STEEL®

These products are available with a ZMAX® or hot-dip galvanized coating. Stainless-steel connectors are also available for higher exposure environments or applications using certain preservative-treated woods. See page 18 for more details.

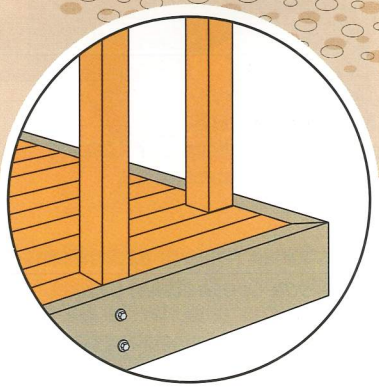
The railing post connection is a crucial connection pertaining to safety, and it is often inadequately constructed. In order to provide the required load resistance at the guardrail, the post must not only be fastened to the rim joist, but also tied back into the joist framing. Machine bolts through the post and rim joist alone do not typically meet the performance requirements of the code. The details below have been shown through testing to resist the forces called out by the codes for a maximum guardrail height of 36" above the deck surface.

Simpson Strong-Tie® Solutions



DTT2 Deck Tension Tie: ZMAX® coating or stainless steel recommended.

For more information on this application, see Simpson Strong-Tie technical bulletin T-GRDRLPST



For a 42" tall guardrail see engineering letter L-GRDRLPST42 on ***www.strongtie.com***.

For more information on connecting posts inside the rim joist, see Simpson Strong-Tie technical bulletin T-GRDRLPST.

Selecting Connectors & Fasteners

Corrosion Issues

When selecting hardware or fasteners for deck construction it is important to use connectors with a level of corrosion resistance appropriate to the application.

Outdoor environments are generally more corrosive to steel because connectors are exposed to the elements. If building a deck in an area especially prone to moisture, such as homes along the coast or near bodies of water, the risk of corrosion is much higher. In addition, the chemicals used in some preservative-treated woods have been found to increase the corrosion of connectors and fasteners. Other corrosion risk factors include exposure to fire retardants, fumes, fertilizers, soil, industrial zones, acid rain, and other corrosive elements.

Depending on the deck materials and environmental conditions, Simpson Strong-Tie® ZMAX® coated (G185) and hot-dip galvanized (HDG) connectors and fasteners may provide adequate corrosion resistance. If you choose to use ZMAX or HDG on your deck project, you should periodically inspect your connectors and fasteners or have a professional inspection performed. Regular maintenance including water-proofing of the wood used to construct your deck is also a good practice. When using ZMAX/HDG connectors, you must use fasteners galvanized per ASTM A153, SDS screws with a double-barrier coating, or SD screws with a mechanically-galvanized coating.

For higher exposure applications, stainless-steel connectors and fasteners offer the best defense against corrosion. Simpson Strong-Tie offers a variety of connectors and fasteners for deck construction in stainless steel. Remember when using stainless-steel connectors, you must also use stainless-steel fasteners.

For more information on corrosion and selecting the appropriate finish for your application visit ***www.strongtie.com/info***.

Use the chart below, which was created based on Simpson Strong-Tie testing and experience, to select the connector finish or material suitable for various types of preservative-treated wood.

Environment/Treatment Classification Chart

Environment	Material to be Fastened							
	Untreated Wood or Other Material	Preservative-Treated Wood					ACZA	Other or Uncertain
		SBX/DOT & Zinc Borate	MCQ/ MCA	ACQ-C, ACQ-D (Carbonate), CA-B, CA-C/μCA-C				
				Without Ammonia	With Ammonia	Higher Chemical Content		
Interior – Dry	Low	Low	Low	Med[3]	Med	High	High	High
Exterior – Dry	Low	N/A	Med	Med	High	High	High	High
Exterior – Wet	Med	N/A	Med	Med	High	High	High	High
Higher Exposure	High	N/A	High	High	High	High	High	High
Uncertain	High	High	High	High	High	High	High	High

1. Higher chemical content refers to wood for ground contact with actual retention levels greater than 0.40 pcf for ACQ, 0.34 pcf for MCQ, 0.21 pcf for CA-B, 0.15 pcf for CA-C and MCA, or 0.14 pcf for μCA-C. In these cases, stainless-steel products are recommended. Verify actual retention levels with the wood treater.
2. Borate treated woods are not appropriate for outdoor use.
3. Where noted in the table, applications where the wood is dry *(moisture content less than 19%)* when installed and will remain dry in-service may use a minimum classification coating recommendation of "Low" for connectors.
4. Some treated wood may have excess surface chemicals making it potentially more corrosive. If uncertain, use types 304/305/316 stainless steel products.
5. Test results indicate that ZMAX®, hot-dip galvanized, mechanically galvanized *(class 55 and 65)* and double-barrier coatings *(SDS screws)* will perform adequately, subject to regular maintenance and periodic inspection. However, the test protocol followed was a modified version of the nationally recognized test method AWPA E12-94. This test method is an accelerated test, so data over an extended period of time is not available. Also noteworthy is that tests run in a laboratory may not correlate to service conditions. If uncertain, use stainless steel.
6. Type 316 stainless-steel products are the minimum recommendation for ocean-salt air and other chloride environments.
7. Ammonia is typically used as a chemical carrier for difficult to treat wood species, such as, but not exclusive to, Douglas Fir and Hem Fir, which are usually found in the western United States. Amine carriers are used in some of the eastern species, such as Southern Yellow Pine. If uncertain, verify chemical with wood treater.
8. Exterior Dry applications only apply to connectors. For anchors, use Exterior Wet for any exterior application.
9. Mechanically galvanized Titen HD® anchors *(medium classification)* are only recommended for temporary exterior applications.

Coatings Available

Not all products are available in all finishes. Contact Simpson for product availability, ordering information and lead times.

Finish/Material	Description	Level of Corrosion Resistance
Gray Paint	Water-based paint intended to protect the product while it is warehoused and in transit to the jobsite.	Low
Powder Coating	Baked on paint finish that is more durable than our standard paint and produces a better looking finished product.	Low
Standard G90 Zinc Coating	Zinc galvanized coating containing 0.90 oz. of zinc per square foot of surface area *(total both sides)*.	Low
ZMAX G185	Galvanized (G185) 1.85 oz. of zinc per square foot of surface area *(hot-dip galvanized per ASTM A653 total both sides)*. These products require hot-dip galvanized fasteners *(fasteners which meet the specifications of ASTM A153)*.	Medium
HDG HOT DIP GALVANIZED®	Products are hot-dip galvanized after fabrication (14 ga. and thicker). The coating weight increases with material thickness. The minimum specified coating weight is 2.0 oz./ft² *(per ASTM A123 total both sides)*. These products require hot-dip galvanized fasteners *(fasteners which meet the specifications of ASTM A153)*.	Medium
Type 410 Stainless Steel with Protective Top Coat	Carbon martensitic grade of stainless steel which is inherently magnetic, with an added protective top coat. This material can be used in mild atmospheres and many mild chemical environments.	Medium
Mechanically-Galvanized Coating, Class 55 *(SD screws)*	Simpson Strong-Tie Strong-Drive® SD structural-connector screws are manufactured with a mechanically-applied zinc coating in accordance with ASTM B695, Class 55 with a supplemental overcoat. These fasteners are compatible with painted and zinc-coated (G90 and ZMAX) connectors.	Medium
Double-Barrier Coating *(SDS Screws)*	Simpson Strong-Tie Strong-Drive SDS screws are manufactured with two different finishes that together provide a level of corrosion protection that equals that provided by the previous HDG coating.	Medium
SST300 STAINLESS STEEL®	Connectors are manufactured from Type 316L stainless steel, and provide greater durability against corrosion. Stainless-steel fasteners are required with stainless-steel products, and are available from Simpson Strong-Tie.	High

Stainless-Steel Connectors

The Science Behind Stainless Steel

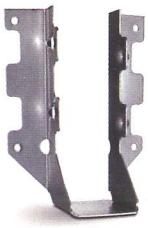
Each Simpson Strong-Tie® stainless-steel connector is made with type 316L stainless steel. Because it contains an additional level of nickel chromium, type 316L stainless steel develops a thin coat of chromium oxide on the surface of the metal that insulates the connector from corrosive attack. Molybdenum is also added, which helps increase corrosion resistance in chloride-type areas, such as salt water environments. Type 316L has shown no visible sign of surface red rust after 1,000 hours of an ASTM B117 salt spray test. For more information about corrosion, visit ***www.strongtie.com/corrosion***.

Common Corrosive Factors That Can Negatively Affect Structural Connections

- Ocean salt air
- Water
- Preservative-treated wood
- Fire retardant-treated wood
- Salt used to de-ice or melt snow
- Pool or hot tub chemicals
- Fertilizers
- Soil
- Industrial zones
- Concrete

Always Use Stainless-Steel Fasteners with Stainless-Steel Connectors

LCE4SS



LUS26SS

A35SS

ABU46SS

Model	Description
Joist Hangers Face Mount	
LUC26SS	For 2x6, 2x8 joist
LUC210SS	For 2x10, 2x12 joist
LUS26SS	For 2x6, 2x8 joist
LUS28SS	For 2x8, 2x10 joist
LUS210SS	For 2x10, 2x12, 2x14 joist
LUS26-2SS	For Double 2x6, 2x8 joist
LUS28-2SS	For Double 2x8, 2x10 joist
LUS210-2SS	For Double 2x10, 2x12 joist
SUL26SS	Skewed 45° left for 2x6, 2x8 joist
SUR26SS	Skewed 45° right for 2x6, 2x8 joist
SUL210SS	Skewed 45° left for 2x10, 2x12 joist
SUR210SS	Skewed 45° right for 2x10, 2x12 joist
Post Caps	
AC4SS	For 4x beam, 4x post
ACE4SS	For 4x beam, 4x post
AC6SS	For 6x beam, 6x post
ACE6SS	For 6x beam, 6x post
LCE4SS	For 4x or 6x post
Caps	
BC4SS	For 4x beam, 4x post
BC6SS	For 6x beam, 6x post
BCS2-2/4SS	For Double 2x beam to 4x post
BCS2-3/6SS	For Triple 2x beam to 6x post
BC40SS	For 4x beam
Post/Column Bases	
ABU44SS	For 4x4 post
ABU46SS	For 4x6 post
ABU66SS	For 6x6 post
ABU88SS	For 8x8 post
CB44SS	For 4x4 post
CB66SS	For 6x6 post
CBSQ44SS	For 4x4 column
CBSQ46SS	For 4x6 column
CBSQ66SS	For 6x6 column
Hurricane Ties	
H2ASS	For joist to beam
H2.5ASS	For joist to beam
H3SS	For joist to beam
H4SS	For joist to beam
H5SS	For joist to beam
H8SS	For joist to beam
H10ASS	For joist to beam
HPTSS	For joist to beam
Framing Angles	
A34SS	Multi-purpose angle
A35SS	Multi-purpose angle
LS50SS	Skewable angle
ML24SS	Multi-purpose angle
ML26SS	Multi-purpose angle
TA9SS	Staircase angle
TA10SS	Staircase angle
Straps	
LTS12SS	Light twist strap
LTS18SS	Light twist strap
MTS12SS	Medium twist strap
MSTA12SS	Straight strap
MSTA18SS	Straight strap
MSTA24SS	Straight strap
MSTA36SS	Straight strap
Miscellaneous	
DJT14SS	For side-loaded 2x beams
DTT2SS	Deck tension tie
LSCSS	Stair stringer

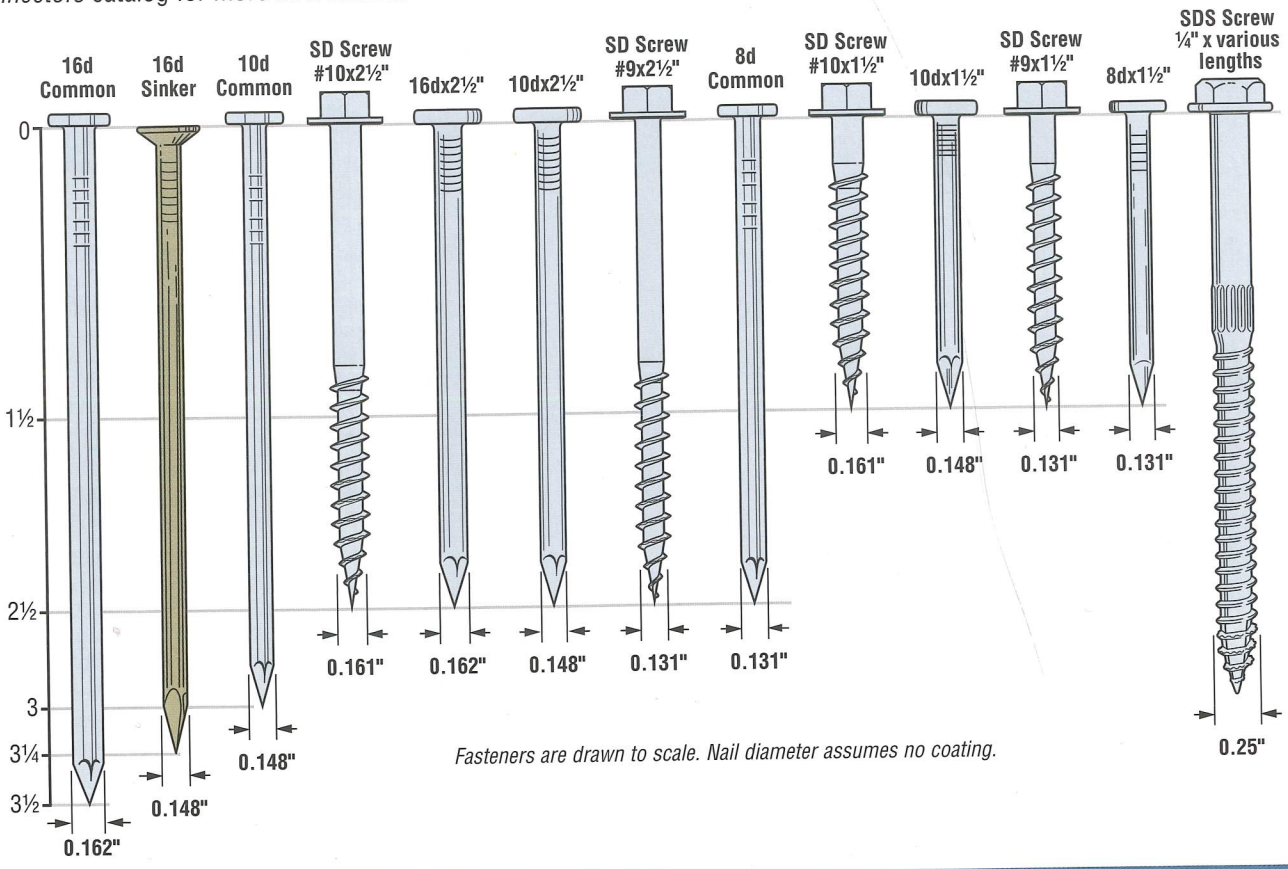
Correct Fasteners for Use with Simpson Strong-Tie® Connectors

Fastener Types and Sizes Specified for Simpson Strong-Tie® Connectors

Many Simpson Strong-Tie connectors have been designed and tested for use with specific types and sizes of fasteners. The specified quantity, type and size of fastener must be installed in the correct holes on the connector to achieve published loads.

Other factors such as fastener material and finish are also important. Incorrect fastener selection or installation can compromise connector performance and could lead to failure.

Simpson Strong-Tie does not offer all of these fasteners, see ***www.strongtie.com/fastenerfinder*** or *Wood Construction Connectors* catalog for more information.



Fasteners are drawn to scale. Nail diameter assumes no coating.

Incorrect Applications

SHORT NAILS Do not use short (1½") nails for double shear nailing.

Double shear nailing should use full length common nails

Shorter nails may not be used as double shear nails

The Simpson Strong-Tie Strong-Drive® SD structural-connector screw is the only screw approved for use with our connectors.

FRAMING NAIL-GUNS

Collated framing-nailer fasteners can only be used if:

1. Correct diameter and length
2. Correct material or finish is installed
3. Correct quantity is installed
4. Driven with a hole-locating tool *(finds the hole)* or by hand

NOTE:

- Nails with .131 diameter may not be used to replace 10d common or 16d sinker nails
- Do not overdrive
- Drive only through punched holes

See technical bulletin T-PNEUMATIC for more information.

Pneumatic nails must meet ASTM A153 or equivalent specification for ZMAX® or hot dipped galvanized applications. Most framing nails are only zinc plated and do not meet this outdoor preservative treated wood requirement.

Consult the current Simpson Strong-Tie *Wood Construction Connectors* catalog for complete fastener and fastening requirements.

Structural Wood Fastening

Structural Wood-to-Wood Connections

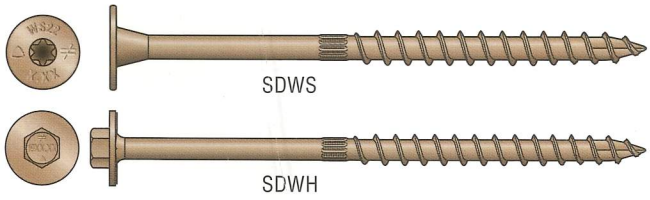
Simpson Strong-Tie® Strong-Drive® structural wood screws make high-strength wood-to-wood connections easier and stronger. Designed for both ease of installation and superior strength, these versatile screws are a time-saving alternative to multiple smaller fasteners or larger screws or bolts that require pre-drilling.

Strong-Drive® SDWS and SDWH Structural Wood Screw

The Simpson Strong-Tie Strong-Drive SDWS and SDWH wood screws are designed to provide an easy-to-install, high-strength alternative to through-bolting and traditional lag screws. These structural wood screws are ideal for the contractor and do-it-yourselfer alike.

Features:

- Bold thread design that provides superior holding power
- Double-barrier coating
- Patented 4CUT™ tip that ensure fast starts, reduces installation torque and eliminates the need for pre-drilling in most applications
- Under-head nibs that offer greater installer control when seating the head
- Large washer head provides maximum bearing area



Codes/Standards: IAPMO UES ER-192

Strong-Drive® SDS Structural Wood Screw

The Simpson Strong-Tie Strong-Drive SDS screw is a ¼" diameter high-strength structural wood screw ideal for various connector installations as well as wood-to-wood applications.

Features:

- Available with a double-barrier coating or type 316 stainless steel
- Patented 4-CUT™ point (coated version) and type-17 point (stainless version) enable easy driving with no pre-drilling and minimal splitting
- Double-barrier coating provides corrosion resistance equivalent to hot-dip galvanization
- Head is stamped with the Simpson Strong-Tie® "≠" sign and fastener length for easy identification after installation

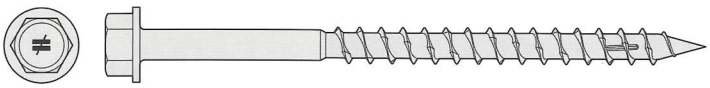
Codes/Standards: ICC-ES ESR-2236

Strong-Drive® Stainless-Steel Heavy-Duty Wood Screw

The Simpson Strong-Tie Strong-Drive stainless steel heavy-duty wood screws are designed for lag screw replacement. These load-rated ¼" and ⅜" diameter hex-head fasteners require no pre-drilling, making them easier to install than typical lag screws.

Features:

- Shear load values exceed that of a ½" lag screw
- Type 316 stainless steel for superior corrosion resistance
- Type-17 point provides fast starts and eliminates predrilling in most applications
- 4-corner box thread design significantly reduces driving torque compared to lag screws
- Code-equivalent fastening for deck ledger-to-band joist connections



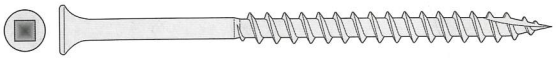
Corrosion-Resistant Fasteners for Decking

Simpson Strong-Tie offers a variety of premium solutions for fastening wood, PVC or composite decking. Our fasteners are designed specifically to perform in their target decking material and many of our fasteners are available in colors to provide a fastening solution that blends with the deck surface.

Stainless-Steel Screws

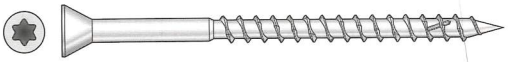
Bugle-Head Wood Decking Screw

For all types of wood decking including cedar, redwood and preservative-treated woods *(non-hardwood)*



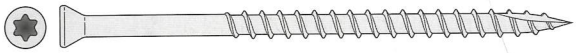
Hardwood Decking Screw

For the hardest wood products



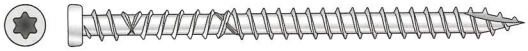
Trim-Head Decking Screw

For wood decking and some composite decking materials



Dexxter

For composite decking



Exterior Grade Screws

DSV Decking Screw

For preservative-treated wood

Trim-Head Decking Screw

For wood decking and some composite decking materials

Dexxter

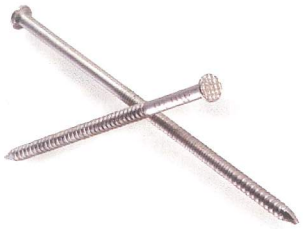
For composite decking

For more information on fasteners, please visit ***www.strongtie.com/fastenerfinder.***

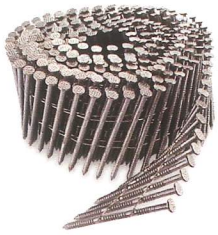
Corrosion-Resistant Fasteners for Decking

Stainless-Steel Nails

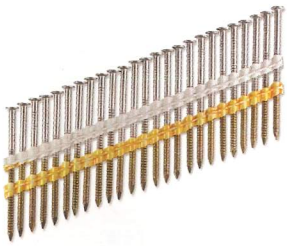
Hand-Drive
Decking and Siding Nails



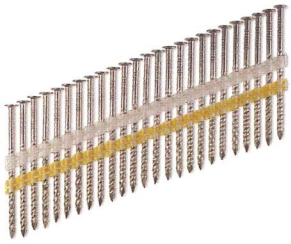
15°
Wire Coil, Full Round
Checkered Head, Ring Shank.
Types 304 and 316 Stainless Steel



20–22°
Plastic Strip, Full Round
Checkered Head, Ring Shank
Types 304 and 316 Stainless Steel



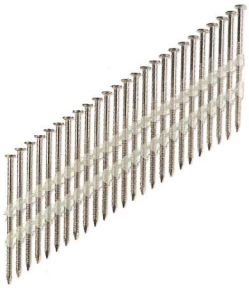
20–22°
Plastic Strip, Full Round
Smooth Head, Screw Shank
Types 304 and 316 Stainless Steel



20–22°
Plastic Strip, Checkered,
Casing Head, Ring Shank
Type 304 Stainless Steel

28°
Wire Weld, Clipped
Smooth Head, Ring Shank
Type 304 Stainless Steel

31–34°
Plastic Strip, Full Round
Checkered Head, Ring Shank
Types 304 and 316 Stainless Steel



31–34°
Paper Tape, Clipped
Smooth Head, Ring Shank
Types 304 and 316 Stainless Steel

For more information on fasteners, please visit ***www.strongtie.com/fastenerfinder.***