Code-Compliant Repair and Protection Guide

FOR THE INSTALLATION OF UTILITIES IN WOOD-FRAME CONSTRUCTION
A Word About Building Codes

All of the major building codes feature regulations on the size and/or location of penetrations in wood members for plumbing, HVAC and electrical components. In many cases, in order to comply with the code, hardware is required to:

• Restore strength to wood members
• Protect utilities within the wall

This guide is intended to illustrate the penetrations that are allowed under the various codes with and without repair or protection. Simpson Strong-Tie® offers a range of products to help meet these code requirements.


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 flier. 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 strongtie.com for current information.
Repair and Protection Products

PSPN516 Repair and Shield Plate: Reinforcement and Protection

Repair and shield plates reinforce top or bottom plates drilled or cut during construction. They also protect piping within the wall. They are 16-gauge steel, install with 16d nails and protrude at least 2” above or below single or double plates to meet the requirements of the code for repair and protection. They are available with a standard galvanized coating or a ZMAX® galvanized coating for added corrosion resistance for use with some preservative-treated lumber. See page 11 for complete fastener and load information.

RPS Repair Strap: Reinforcement

Repair straps reinforce top and bottom plates notched or cut during construction. They are 16-gauge steel and install with 16d nails to meet the requirements of the code for repair. They are available with a standard galvanized coating or a ZMAX galvanized coating for added corrosion resistance for use with some preservative-treated lumber. See page 11 for complete fastener and load information.

MSTC Strap: Reinforcement

MSTC straps reinforce top or bottom plates drilled or cut during construction. They are 16-gauge steel and install with 16d nails to meet the requirements of the code for repair. Recommended for applications where two plate penetrations are too close together for separate RPS straps to be installed (example: HVAC chase). See page 11 for complete fastener and load information.

CTS218 Compression and Tension Straps

The CTS218 compression-tension strap is the only light-gauge steel strap that handles both tension and compression loads. It is designed to repair excessive cutting of wood members such as top plates, studs and trusses. The strap’s unique rolled edges allow gaps as wide as 4½” to be repaired, and its 1½” width facilitates installation on the narrow face of 2x lumber. The CTS218 installs quickly with 10d x 1½” nails or, for increased capacity, with #9 x 1½” Simpson Strong-Tie® Strong-Drive® SD screws.

HSS and SS Stud Shoe: Reinforcement and Protection

Stud shoes (SS) and heavy-duty stud shoes (HSS) reinforce stud bored or notched during construction and protect piping within the wall. Suitable for piping with a maximum outside diameter of 2¼", they are available in sizes for single, double and triple 2x studs as well as single 3x (SS only) and 4x (HSS only) studs. Made from 16-gauge steel to meet the protection requirements of the code and feature a galvanized coating. Stud shoes resist compression loads only; see page 11 for complete fastener and load information.

PSPN58 Shield Plate: Protection

Shield plates prevent penetration of fasteners into wiring or piping at the top and bottom plates of the walls. They are 16-gauge steel and protrude at least 2” above/below single or double plates to meet the protection requirements of the code. They are available with a standard galvanized coating or a ZMAX galvanized coating for added corrosion resistance for use with some preservative-treated lumber.

NS Nail Stop: Protection

Nail stops prevent penetration of fasteners into wiring or piping. They are 16-gauge steel to meet the protection requirements of the code and feature a galvanized coating. Install with prongs or 8d common nails.

Some of the products shown are available with a ZMAX galvanized coating for extra corrosion protection. ZMAX coating is sometimes recommended for applications where hardware is being installed onto preservative-treated wood members such as mudsills. See the current Wood Construction Connectors catalog or visit strongtie.com/info for more details.
Building Code Analysis

When installing plumbing throughout a wood structure, the building codes address two requirements regarding top, bottom and sill plates: the reinforcement of members where material has been removed and the protection of piping within walls.

Structural repair is required when:

- A hole, cut or notch that is more than 50% of the top plate width is removed in an exterior wall, or interior load-bearing wall for piping (except when the side of the wall with the notch or cut is covered by wood structural panel sheathing). (IRC)
- The plates in, or partly in, a partition are cut for plumbing, heating or other pipes (IBC).

Required repairs:

- A galvanized, 16-gauge metal tie that is at least 1 1/2" wide (IRC, IBC).
- This tie must be fastened with (8)16d nails on each side of the opening (IRC) or (6) 16d nails on each side of the opening (IBC). 10d x 1 1/2" (0.148 x 1 1/2") nails satisfy the IRC requirements.
- Note: Nails can be 16d box (0.135 x 3 1/2") or 16d common (0.162 x 3 1/2").

Protection of piping within the wall is required when:

- Piping other than cast iron or galvanized steel (e.g. PVC or ABS) is closer than 1 1/2" to the edge of the plate (IRC, IPC, IMC).
- Plastic and copper piping run through framing members is closer than 1" from the edge of the framing member (UPC).

Required protection:

- A 16-gauge steel protective plate that covers the side of the plate and extend 2" above/below it (IRC, IPC, IMC).
- A steel protective plate not less than 18 gauge, that extends along the framing member on each side at least 1 1/2" beyond the pipe (UPC).

Under the various building codes, the following penetrations are allowed without any type of protection or repair to the wood members.

Allowable Penetrations with No Repair/Protection — IRC/IPC/IMC/UPC

- Top plate can be cut, drilled or notched up to 50% of its width
- Pipes must be at least 1 1/2" (1" UPC) from the edge of the top/bottom plate

Allowable Penetrations with No Repair/Protection — IBC

- No cuts, notches or holes for plumbing, heating or other pipes are allowed in the top or bottom plates without a structural repair strap.
Top and Bottom Plates

Repair/Protection — IRC (Piping other than cast iron or galvanized steel)

Top Plate Repair/Protection

Load Bearing

PSPN516 – When more than 50% of the width of the top plate is removed and piping is closer than 1 1/2” from the edge of the top plate, a galvanized structural repair/protection plate is required. The plate must be fastened with (8) 16d nails (10d x 1 1/2” nails, IRC) on each side of the cut and the protection plate must extend 2” below the framing member.

Interior Non-Load Bearing

PSPN58 – When piping is closer than 1 1/2” from the edge of the plate, a protection plate that extends 2” below the framing member is required.

Bottom Plate Protection

PSPN58 – When piping is closer than 1 1/2” from the edge of the plate, a protection plate that extends 2” below the framing member is required.

Repair/Protection — IBC/IPC/IMC/UPC/UMC

Top and Bottom Plate Repair/Protection – Piping closer than 1 1/2” to edge of plate

RPS18 – Whenever the soles or plates are cut, a galvanized structural repair plate that is 16 gauge x 1 1/2” wide is required that is fastened with (6) 16d nails on each side of the cut (IBC).

PSPN58 – If piping is closer than 1 1/2” to the edge of the lumber, a repair plate is required that extends 2” above/below the framing member (IPC, IMC). When plastic and copper piping penetrates framing members to within 1” of the edge, a steel nail plate not less than 18 gauge, that extends 1 1/2” beyond the pipe or tubing on each side, is required (UPC).

PSPN516 – See both references above.

Top and Bottom Plate Repair – Piping further than 1 1/2” (1” UPC) from the edge of the plate (no protection required)

RPS18 – Whenever the soles or plates are cut, a galvanized structural repair strap that is 16 gauge x 1 1/2” is required and is to be fastened with (6) 16d nails on each side of the cut (IBC).

Where PSPN58 cannot attach to plate, 2x wood blocking should be added on either side of notch/hole to accept prongs.

Top and Bottom Plate Repair/Protection – Piping closer than 1 1/2” to edge of plate and most of plate width removed

CTS218 – Whenever both the compressive and tensile capacities of the plates are compromised, this strap provides capacities for an engineered solution while also meeting prescriptive requirements.

PSPN516 – See both references above.

Building Code References

International Residential Code (IRC)

Repair top plates and protect piping

• Sections: R602.6.1, M1308.2 and P2603.2.1
• Suitable product: PSPN516 Repair and Shield Plate

Protect piping

• M1308.2 and P2603.2.1
• Suitable product: PSPN516 Repair and Shield Plate

International Building Code (IBC)

Repair top and bottom plates

• Section 2308.9.8
• Suitable product: RPS Repair Strap
• RPS22

International Plumbing Code (IPC), International Mechanical Code (IMC) and Uniform Plumbing Code (UPC)

Protect piping

• IPC section: 305.8
• IMC sections: 305.5
• UPC section: 313.9
• Suitable product: PSPN58 Shield Plate or PSPN516 Repair and Shield Plate

Product recommendations based upon prescriptive requirements of the codes cited. For technical information on these products, see page 11.

Some of the products shown are available with a ZMAX® galvanized coating for extra corrosion protection. ZMAX coating is sometimes recommended for applications where hardware is being installed onto preservative-treated wood members such as mudsills. See the current Wood Construction Connectors catalog or visit strongtie.com/info for more details.
Studs

Building Code Analysis

When installing plumbing throughout a wood structure, the building codes address two requirements regarding studs: the reinforcement of members where material has been removed and the protection of piping within walls.

Structural repair is required when:
- (IRC, IBC, IMC) A stud is notched to a depth greater than 25% of the width in bearing walls, or 40% in non-bearing partitions.
- (IRC, IBC, IMC) A hole is bored to a diameter exceeding 40% of the stud width in bearing walls, or 60% in non-bearing partitions.
- In no case shall edge of the bored hole be closer than $\frac{5}{8}$" from the edge of the stud.
- Bored holes shall not be located at the same section of the stud as a cut notch.
- Exception: a hole may be drilled between 40–60% of the stud diameter in bearing walls if the bored stud is doubled and not more than two successive doubled studs are bored.

Required repairs:
- If maximum hole/notch specifications are exceeded:
  - A suitable stud shoe, approved by the building official, must be installed (IRC).
  - It is the responsibility of the Designer to provide an engineered solution (IBC). See page 11 for technical information on stud shoes.

Protection of piping within the wall is required when:
- Piping other than cast iron or galvanized steel (e.g. PVC or ABS) is closer than $1\frac{1}{2}$" to the edge of the stud (IRC, IPC, IMC).
- Plastic and copper piping run through framing members is closer than 1" from the edge of the framing member (UPC).

Required protection:
- A 16-gauge steel shield plate that covers the area of the pipe where the member is notched or bored (IRC, IPC, IMC).
- A steel protective plate not less than 18 gauge, that extends $1\frac{1}{2}$ beyond the pipe on each side (UPC).

Under the various building codes, the following penetrations are allowed without repair of the wood members.

Allowable Penetrations with No Repair/Protection — IRC/IBC/IPC/IMC/UPC

<table>
<thead>
<tr>
<th>Stud Size (in.)</th>
<th>Application</th>
<th>Maximum Hole Diameter (in.)</th>
<th>Maximum Notch Depth (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x4</td>
<td>Interior / Non-bearing</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Exterior / Bearing</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>2x6</td>
<td>Interior / Non-bearing</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>Exterior / Bearing</td>
<td>2%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Under the various building codes, the following penetrations are allowed without repair of the wood members.

Maximum Bored Hole Diameter / Notch Depth

Bored holes shall not be located in the same cross section of cut or notch in stud.

Studs doubled to meet requirements of code relating to allowable drilled hole diameter.
Studs

Repair/Protection — IRC/IBC/IPC/IMC/UPC

Stud Protection

**NS** – When piping is closer than 1½" from the edge of the stud, a protection plate is required.

Stud Repair

**SS/HSS** – When notching exceeds guidelines outlined in the code (see drawing to left), a suitable stud shoe should be installed with the approval of the Building Official or Designer.

Supply lines

½" min.

5½" min.

5½" min.

Supplies or
Vent pipe

Waste or vent pipe to 2nd floor

Building Code References

**International Residential Code (IRC)**

Repair stud and protect piping

- Sections: R602.6, M1308.2 and P2603.2.1
- Suitable products:
  - SS Stud Shoe
  - HSS Heavy Stud Shoe

Protect piping

- Sections: M1308.2 and P2603.2.1
- Suitable product: NS Nail Stop

**International Building Code (IBC)**

Repair stud

- Sections: 2308.9.10 and 2308.9.11
- Suitable products (as determined by Designer):
  - SS Stud Shoe
  - HSS Heavy Stud Shoe

**International Plumbing Code (IPC), International Mechanical Code (IMC) and Uniform Plumbing Code (UPC)**

Protect piping

- IPC section: 305.8
- IMC sections: 305.5
- UPC section: 313.9
- Suitable product: NS Nail Stop

Product recommendations based upon prescriptive requirements of the codes cited. For technical information on these products, see page 11.

Some of the products shown are available with a ZMAX® galvanized coating for extra corrosion protection. ZMAX coating is sometimes recommended for applications where hardware is being installed onto preservative-treated wood members such as mudsills. See the current Wood Construction Connectors catalog or visit strongtie.com/info for more details.
Top and Bottom Plates

Building Code Analysis
When installing HVAC throughout a wood structure, the building codes address the reinforcement of top and bottom plates where material has been removed to allow the passage of ductwork.

Structural repair is required when:
• (IRC) A hole or notch that is more than 50% of the top plate width is removed in an exterior wall, or interior load-bearing wall for piping or ductwork, unless the entire side of the wall with the notch or cut is covered by wood structural-panel sheathing.
• (IBC) The soles or plates in, or partly in, a partition are cut for ductwork.

Required repair:
• (IRC) A galvanized, 16-gauge metal tie that is at least 1 1/2" wide is required on one or more of the top plate.
• (IBC) A galvanized, 16-gauge metal tie that is at least 1 1/2" wide is required on both top plates and on the bottom plate.
• When the entire top plate is removed for ductwork, a 16-gauge metal tie should be installed on both sides of the cut plate (load-bearing wall only in IRC).
• Where the top plate has been removed from two consecutive bays, a 3" wide strap that spans both bays is one possible method.
• Fastening on each side of opening (IBC) (6) 16d common nails (2006 IRC) (8) 16d common or box nails. (2009 and 2012 IRC) (8) 10d x 1 1/2" nails with strap extending 6" past opening.

Note: Nails can be 16d box (0.135 x 3") or 16d common (0.162 x 3 1/2__). See page 11 for more information on fasteners.

Under the various building codes, the following penetrations are allowed without any type of repair to the wood members.

Allowable Penetrations with No Repair/Protection — IRC

Allowable Penetrations with No Repair/Protection — IBC
No cuts, notches or holes for plumbing, heating or other pipes are allowed in the top or bottom plates without a structural repair strap.
Heating, Ventilation and Air Conditioning (HVAC)

Top and Bottom Plates

**HVAC Repairs — IRC**

**Top Plate Repair**

**Exterior or Load Bearing**

RPS28 – When more than 50% of the width of the top plate is removed, a galvanized structural repair strap that is not less than 16 gauge x 1 1/2" wide is required. The strap must be installed on the uppermost plate, and fastened on either side of the cut with (8) 16d nails.

Non-Load Bearing – No repair required.

**Top Plate Repair — Side-by-Side Ductwork**

**Load Bearing**

MSTC52 – When more than 50% of the width of the top plate is removed, a galvanized structural repair strap that is not less than 16 gauge x 1 1/2" wide is required. In this application a 3" wide strap provides equivalent tension capacity as long as it is fastened on each side of the cut with (8) 16d nails.

Non-Load Bearing – No repair required.

**Building Code References**

**International Residential Code (IRC)**

Repair top plates

- R602.6.1
- Suitable product:
  - RPS and MSTC Repair Straps

**International Building Code (IBC)**

Repair top and bottom plates

- Section 2308.9.8
- Suitable product:
  - RPS and MSTC Repair Straps

Product recommendations based upon prescriptive requirements of the codes cited. For technical information on these products, see page 11.

**HVAC Repairs — IBC**

**Top and Bottom Plate Repair**

RPS28 – Whenever the soles or plates are cut, a galvanized structural repair strap that is not less than 16 gauge x 1 1/2" wide is required on each plate and is to be fastened with (6) 16d nails on each side of the cut.

**Top and Bottom Plate Repair — Two Consecutive Bays**

MSTC52 – Whenever the soles or plates are cut, a galvanized structural repair strap that is not less than 16 gauge x 1 1/2" wide is required on each plate. In this application a 3" wide strap provides equivalent tension capacity as long as it is fastened on each side of the cut with (6) 16d nails per plate.

Some of the products shown are available with a ZMAX® galvanized coating for extra corrosion protection. ZMAX coating is sometimes recommended for applications where hardware is being installed onto preservative-treated wood members such as mudsills. See the current Wood Construction Connectors catalog or visit strongtie.com/info for more details.
Top Plate, Bottom Plate and Studs

Building Code Analysis
When installing electrical wiring throughout a wood structure, the building codes require protection of the wiring to prevent damage.

Protection of wiring within the wall is required when:

- A hole is closer than 1 1/4" to the edge of a wood member (IRC, N.E.C.).

Required repair:

- A 16-gauge protective steel plate that covers the area of the wiring (IRC, N.E.C.).

While the codes do not specifically address top or bottom plate repair for electrical applications, Simpson Strong-Tie recommends that the guidelines shown on page 5 be considered. This will help ensure that plates perform as intended after electrical is installed.

Building Code References

International Residential Code (IRC) and National Electric Code (NEC)

Protect wiring

- IRC Table E3702.1
- NEC Section 300.4
- Suitable product: NS Nail Stops

Product recommendations based upon prescriptive requirements of the codes cited. For technical information on these products, see page 11.

Some of the products shown are available with a ZMAX® galvanized coating for extra corrosion protection. ZMAX coating is sometimes recommended for applications where hardware is being installed onto preservative-treated wood members such as mudsills. See the current Wood Construction Connectors catalog or visit strongtie.com/info for more details.
Technical Information

CTS218 Compression and Tension Strap
Codes: ICC-ESR-2105; City of LA RR5713; Florida FL 13904

<table>
<thead>
<tr>
<th>Strap Qty</th>
<th>Installation</th>
<th>Fasteners (Per Strap)</th>
<th>Allowable Loads DF/SP</th>
<th>Allowable Loads SPF/HF</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>One sided</td>
<td>(24) 10d x 1½&quot;</td>
<td>(160) 1,020</td>
<td>(160) 2,270</td>
</tr>
<tr>
<td>2</td>
<td>One sided</td>
<td></td>
<td>(160) 2,045</td>
<td>(160) 4,540</td>
</tr>
<tr>
<td>2</td>
<td>Two sided</td>
<td></td>
<td>(160) 2,370</td>
<td>(160) 5,140</td>
</tr>
<tr>
<td>3</td>
<td>Two sided</td>
<td></td>
<td>(160) 3,725</td>
<td>(160) 7,305</td>
</tr>
<tr>
<td>4</td>
<td>Two sided</td>
<td>(24) SD #9 x 1¼&quot;</td>
<td>(160) 4,740</td>
<td>(160) 9,980</td>
</tr>
</tbody>
</table>

1. Allowable loads have been increased for wind or seismic with no further increase allowed. Reduce where other loads govern.
2. Fastener quantities are for a single strap.
3. Maximum gap between wood members is 4".
4. Fasteners: 10d x 1½" = 0.148" dia. x 1½" long.
   SD #9 x 1¼" = 0.131" dia. x 1¼" long.

PSPN Repair and Shield Plates

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<tr>
<td></td>
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<td></td>
<td>DF/SP/Nails (in.)</td>
<td>SPF/HF/Nails (in.)</td>
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<tr>
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<td></td>
<td>(W x L)</td>
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<tr>
<td>PSPN58Z</td>
<td>16</td>
<td>5</td>
<td>5⁄16</td>
<td>5⁄16</td>
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<tr>
<td>PSPN516Z</td>
<td>16</td>
<td>5</td>
<td>1⁄2</td>
<td>1⁄2</td>
</tr>
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</table>

1. Unless otherwise noted “16d” refers to 16d common nails. To meet the prescriptive IRC requirement, 16d box nails (0.135" dia. x 3½" long) may be used. Allowable tension load is 0.75 of table loads when installed with 16d box nails. 10d x 1½" (0.148" dia. x 1½" long) may be used to meet the 2009 IRC prescriptive requirement.
2. Nails: 16d common = 0.162" dia. x 3½" long.

RPS Repair Strap
Codes: ICC-ER 5357; City of L.A. RR25281; Florida FL 503 and FL 1901

<table>
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<td></td>
<td>DF/SP/Nails (in.)</td>
<td>SPF/HF/Nails (in.)</td>
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<td>(W x L)</td>
<td>(W x L)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>(160)</td>
<td>(160)</td>
</tr>
<tr>
<td>RPS18</td>
<td>16</td>
<td>1½</td>
<td>≤ 5½&quot;</td>
<td>(12) 16d</td>
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<td>RPS22</td>
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<td>1½</td>
<td>≤ 5½&quot;</td>
<td>(12) 16d</td>
<td>1,380</td>
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<td>RPS28</td>
<td>16</td>
<td>2½</td>
<td>≤ 12&quot;</td>
<td>(12) 16d</td>
<td>1,380</td>
</tr>
</tbody>
</table>

1. To meet the prescriptive IRC requirement 16d box nails (0.135" dia. x 3½" long) may be used. Allowable tension load is 0.75 of table loads when installed with 16d box nails. 10d x 1½" (0.148" dia. x 1½" long) may be used to meet the 2009 IRC prescriptive requirement.
2. Install with 12 fasteners to meet IBC requirement, and 16 to meet IRC.
3. Nails: 16d common = 0.162" dia. x 3½" long.

MSTC Repair Strap
Codes: ICC-ESR-2529; City of L.A. RR5713; Florida FL 10852

<table>
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<tr>
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<td></td>
<td>Nails (in.)</td>
<td>DF/SP/Nails (in.)</td>
<td>SPF/HF/Nails (in.)</td>
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<td></td>
<td></td>
<td>(W x L)</td>
<td>(W x L)</td>
<td>(W x L)</td>
</tr>
<tr>
<td>MSTC52</td>
<td>16</td>
<td>52¼</td>
<td>(12) 16d sinkers</td>
<td>1,150</td>
<td>995</td>
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<tr>
<td></td>
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<td></td>
<td>(16) 16d sinkers</td>
<td>1,335</td>
<td>1,335</td>
</tr>
</tbody>
</table>

1. To meet the prescriptive IRC requirement, 16d common or 16d box nails (0.135" dia. x 3½" long) may be used. Allowable tension load is 0.98 of table loads when installed with 16d box.
2. Nails: Install 8 nails at each end of strap.

HSS/SS Stud Shoes
Codes: ICC-ESR-2608; Florida FL 10864

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Ga.</th>
<th>Stud Size</th>
<th>Fasteners</th>
<th>Allowable Loads</th>
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<tbody>
<tr>
<td></td>
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<td>DF/SP Compression Tension</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Floor (100) Roof (125)</td>
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<tr>
<td>HSS1.5</td>
<td>16</td>
<td>2x</td>
<td>(12) 10d x 1½&quot;</td>
<td>500</td>
</tr>
<tr>
<td>HSS2.5</td>
<td>16</td>
<td>3x</td>
<td>(12) 10d x 1½&quot;</td>
<td>500</td>
</tr>
<tr>
<td>HSS3</td>
<td>16</td>
<td>4x</td>
<td>(12) 10d x 1½&quot;</td>
<td>665</td>
</tr>
<tr>
<td>HSS4</td>
<td>16</td>
<td>4x</td>
<td>(12) 10d x 1½&quot;</td>
<td>875</td>
</tr>
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<td>HSS2-SDS1.5</td>
<td>16</td>
<td>2x</td>
<td>(12) SDS 4½&quot; x 1½&quot;</td>
<td>1,200</td>
</tr>
<tr>
<td>HSS2-2-SDS</td>
<td>16</td>
<td>2x</td>
<td>(12) SDS 4½&quot; x 3&quot;</td>
<td>1,200</td>
</tr>
<tr>
<td>HSS2-3-SDS</td>
<td>16</td>
<td>3x</td>
<td>(12) SDS 4½&quot; x 3&quot;</td>
<td>1,200</td>
</tr>
<tr>
<td>HSS4-SDS</td>
<td>16</td>
<td>4x</td>
<td>(12) SDS 4½&quot; x 3&quot;</td>
<td>1,200</td>
</tr>
</tbody>
</table>

1. Roof loads are 125% of floor loads unless limited by other criteria. Floor loads may be adjusted for other load durations according to the code, provided they do not exceed roof loads. Tension loads may not be adjusted.
2. Nails: 10d = 0.148" dia. x 3" long, 10d x 1½" = 0.148" dia. x 1½" long.

NS Nail Stops

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Ga.</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS1</td>
<td>16</td>
<td>1½&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>NS2</td>
<td>16</td>
<td>1½&quot;</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>

1. Optional Nails: 8d = 0.131" dia. x 2½" long.

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