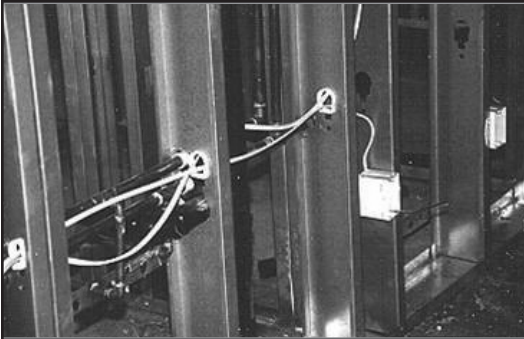




**Construction Methods, Details,
and Tips for Plumbers and Electricians**



Steel Trade Contractor Guide

s t e e l f r a m i n g . o r g



STEEL TRADE CONTRACTOR

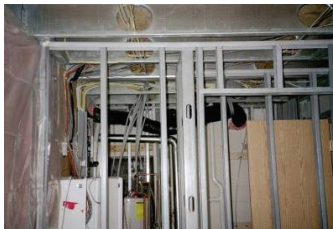
AN EASY-TO-USE GUIDE FOR STEEL

STEEL TRADE CONTRACTOR GUIDE

INTRODUCTION

This guide will introduce both the plumbing and electrical trades to steel framing, while sharing the experience of industry veterans.

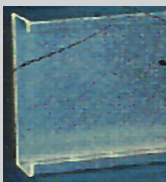
Steel framing has been the material of choice for commercial construction projects for many years because of its long-term durability and ability to withstand natural hazards like tornado and hurricane winds, earthquakes, wildfires and insect infestation. Since steel wall systems are designed so that trades can easily integrate their systems, cold-formed steel (CFS) has also served as the preferred material for commercial interior and curtain walls. All of these attributes are being employed in today's construction market for single, multifamily and mid-rise structures with steel framing as the main structural element.



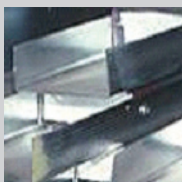
With some pre-planning and use of the pre-manufactured punchouts in the steel framing members, trades throughout the construction industry find installation to be easy.

Cold-formed steel framing has five basic shapes that are rolled from sheet steel to form components that can be assembled into the structural framework of a building. The shapes are known by the acronym **S-T-U-F-L**, for **S**tud, **T**rack, **U**-channel, **F**urring, and **L**-header.

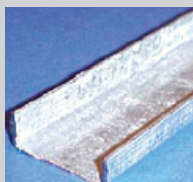
Cold-Formed Steel Shapes



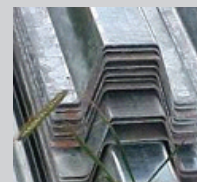
Stud or joist



Track



U-channel



Furring channel



L-header

FREQUENTLY ASKED QUESTIONS

1 one

CAN I USE THE SAME DRILL AND BITS THAT I USE WITH WOOD FOR PLUMBING AND ELECTRICAL RUNS IN STEEL FRAMES?

Forget about the drill! Factory installed punchouts in the webs of studs provide a ready pathway for horizontal utility runs. Plastic isolators are inserted in the punchouts (they snap right in) to separate and protect PEX and copper pipe.

Tip: Use the isolators or grommets to provide a recognizable and permanent route at job start—just snap them in at intervals as you move through the building planning the layout. A helper can drop back and fill in isolators and grommets in the intermediate studs.

2 two

WHERE ARE THE PUNCHOUTS LOCATED, AND DO THEY ALWAYS LINE UP?

Punchouts are located at 24 inches on center along the length of a stud or joist and begin at least 10 inches from either end. Punchouts will align because, like good carpenters, steel framers have been trained to incorporate utility subsystems into their layouts.



GUIDE

FRAME CONSTRUCTION

3 three

HOW LARGE ARE THE PUNCHOUTS?

Punchouts are sized to accept 1 3/8 inches isolators. Actual punchout shape and size varies by manufacturer.

4 four

WHAT OTHER TOOLS DO I NEED FOR STEEL FRAMING?

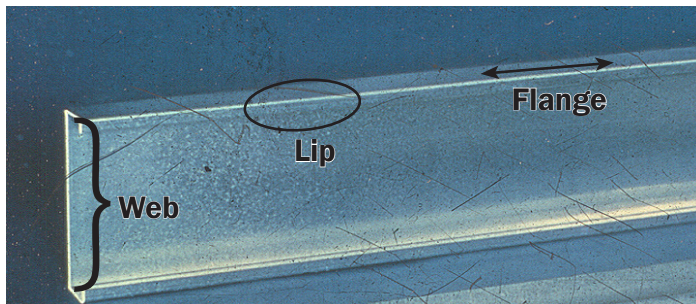
Along with tools of your trade, you will need a variable speed, low rpm (0-2,500) screwgun, bits for the screwgun, a hole saw and drill. (See **Tools for the Trades**, page 5.)

5 five

ARE PIPE AND WIRE SHIELD METAL PLATES REQUIRED IN STEEL FRAMING?

Building codes specify that flanges and lips of studs, joists, and track cannot be cut so these will provide pipe and wire protection in lieu of shield plates in some applications. Because the code also requires shield plates to be a minimum thickness of 62 mils (.062 of an inch), the code official may require pipe shield plates on non-structural CFS studs, or thicknesses less than 62 mils where the punchout is within 1 1/2 inches of the member's edge. (See **Code at a Glance**, IRC P2603.2.1 and NEC 300.4(B), back cover.)

Parts of a Cold-Formed Steel Stud or Joist



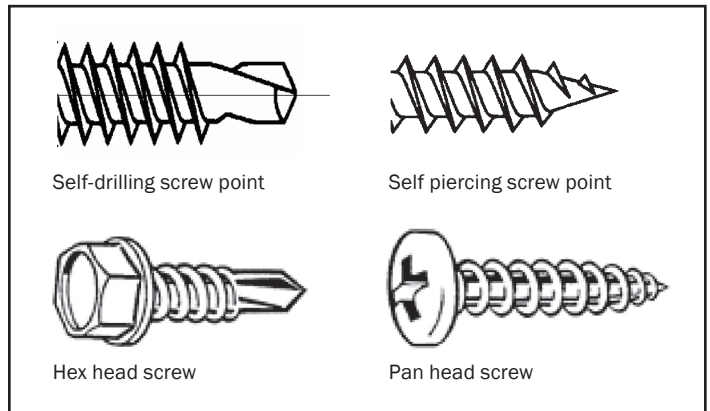
6 six

WHAT SCREWS SHOULD BE USED WITH BRACKETS, BOXES, AND SUPPORTS?

The screws that are used depend on the thickness of the steel framing material upon which they will be mounted. No. 6 self-piercing screws will suffice to penetrate steel members to thicknesses of 33 mils. Self-drilling screws will be required for steel thicknesses over 33 mils. Self-drillers are available in screws of No. 6 diameter in lengths up to 1 inch, so the location of the support accessory will determine the screw selection. The figure below shows the two most common screw point and head styles.

Tip: Hex head fasteners will be the easiest to drive home.

Fastener Point and Head Types



7 seven

HOW CAN I DETERMINE THE THICKNESS OF CFS?

Ask the builder what thicknesses of steel were specified in the structure, or run some test screws before job start-up (have screws with both self-drilling and self-piercing points handy). Or, you can identify the thickness on the steel stud or joist. The following picture shows a typical CFS identification mark where the 600S162-54 indicates that the piece is 6.00 inches "stud shaped" by 1.62 inches (1 5/8 inches) and 54 mils (thousands of an inch) in thickness.

STEEL TRADE CONTRACTOR

AN EASY-TO-USE GUIDE FOR STEEL

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Cold-Formed Steel Identification



There may be several different thicknesses of steel in one house. Make a point of knowing what thicknesses have been installed as interior and exterior walls and joists, and plan the layout to simplify the work by routing pipes and wires along steel members that are of lesser thickness whenever possible.

Tip: Keep plumbing pipes and drains out of exterior walls whenever possible. Routing pipes through interior walls protects them against freeze and leaves more of the exterior wall cavity free for insulation installation which promotes the energy efficiency of the building and the hot water supply system.

Minimum Thickness of Cold-Formed Steel

Designation (mils)	Minimum Thickness (inches)	Reference Gauge Number
18 ^A	.018	25
27 ^A	.027	23
30 ^A	.030	22
33 ^B	.033	20
43 ^B	.043	18
54 ^B	.054	16
68 ^B	.068	14
97 ^C	.0966	12
118 ^C	.118	10

^A Nonstructural steel from Steel Stud Manufacturer's Association (SSMA), *Product Technical Information*.

^B Structural steel from Table R505.2(2) of the IRC.

^C Steel Framing Alliance, *The Right STUFL*.

HOW-TO...

SELECT AND USE THE RIGHT SCREWGUN FOR THE JOB

The screw is the most frequently used fastener with CFS and its application tool is called a screwgun, or (electric or cordless) screwdriver. Steel trades should have one to connect accessories of their craft, like pipe brackets and wire boxes, securely to a steel frame.

A screwgun is an electric screwdriver, not a drill. Screws driven with a screwgun will spin only if pressure is applied against the screw tip. This permits a screw to be positioned on the bit tip while the screwgun is running which improves installation efficiency. Screwguns run at variable speeds which prevent the screw from stripping or breaking before it penetrates the steel. Drill-driven screws spin if the motor is running—this makes rapid and repetitive screw attachment difficult and dangerous. Screwdrivers, on the other hand, allow the driving clutch to rotate freely when there is no pressure on the bit tip, so screws can be quickly set in place while the tool is running. As pressure is applied to the tip, the clutches engage and rotate the spindle and accessories.

Industrial grade screwguns will produce the best results. Industrial grade power tools have a metal casing and clutch housing and are rated at 5–6 amps minimum.

The manufacturer contours screwguns to ergonomically fit the hand for faster and more efficient screw application without fatigue. Hold the back of the screwgun firmly against the palm of the hand, with the top of the back nested in the web of the hand between the thumb and the first finger. Apply pressure through the arm to drive the

screw into the material. Do not hold the screwgun by the base of the handle. It will be unstable and the screw may fall over while the wrist will tire easily.





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Squeeze the trigger using the third or fourth finger as the trigger finger (some models have two-fingered triggers). An adjustable clutch and torque model with a maximum speed range of 0–2,500 rpm is the most highly-recommended screwgun for steel to steel connections. (Steel of lesser thickness, 33 mils and lower, require a 0–4,000 rpm gun.) The adjustable torque feature automatically stops the screwgun from continued spinning once the screw is properly seated. This prevents stripping and allows the user to concentrate on productivity. The reverse switch is used to remove incorrectly installed screws or screws that secure temporary bracing. A quick change bit chuck for holding

bit tips will allow rapid removal/installation when switching hex- and Phillips head tips, the most common screw head configurations used on cold-formed steel members.

Bit tip holders are metal shafts that fit into the screwgun. A bit tip fits in the holder's slot. Bit tip holders and drivers are often magnetized to hold the screws in place while driving.

Hex head drivers range in length from 2 ½ inches to 6 inches. The longer lengths are recommended for use with adjustable clutch screwguns. The added length allows access to hard-to-reach areas. Magnetic hex head drivers that are 5/16 inches in length are recommended for hex head screws.

TOOLS FOR THE TRADES

Fastening Tools

Screwgun – Adjustable Clutch/Torque; Industrial Grade

Use: Steel to steel and sheathing to steel fastener seating

Max steel thickness: 33 to 97 mils

Cost: Corded \$55; cordless \$150–\$250

Specs: 0-2500 rpm (var. speed); 5.4 amp motor; reversible with bit top holder release. (Use a 4000 rpm model for the non-structural thicknesses of steel; 30–18 mils.)



Bit Tips

Use: Drive anchor for each screw head profile

Max steel thickness: 97 mils
Cost: 75¢/ea.



Bit Tip Holders and Hex Head Drivers, Magnetic

Use: Seat bit tips

Max steel thickness: 97 mils

Cost: \$2

Specs: Hex head, or Phillips head



Cutting Tools

1 3/8" Hole Saw

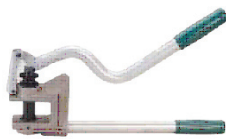


Use: Cutting MEP holes in studs and joists

Max steel thickness: 97 mils

Cost: Starting at \$20

1-3/8" Hole Punch



Use: Cutting MEP holes in studs and joists

Max steel thickness: 33 mils

Cost: Starting at \$275

Single Flute Unibits



Use: Cutting MEP holes in studs and joists

Max steel thickness: All

Cost: Starting at \$25

Portable Plasma Cutter



Use: Cutting MEP holes in studs and joists

Max steel thickness: All

Cost: Starting at \$1,500

Accessories

Pipe Bracket



Use: Supporting and isolating supply line at stud punchouts

Max steel thickness: All

Cost: Starting at 20¢

Pipe Insulator

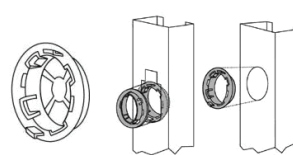


Use: Isolating and supporting pipes from steel in stud punchouts

Max steel thickness: All

Cost: Starting at 20¢

Grommet



Use: Protecting and supporting wires from sharp steel in stud punchouts

Max steel thickness: All

Cost: Starting at 15–20¢

Standoff Bracket



Use: Isolating and supporting wires in the middle of the stud

Max steel thickness: All

Cost: Starting at 65¢



CONSTRUCTION DETAILS

FOR STEEL TRADE CONTRACTORS



Insulated Duct in Attic



Wastewater, Supply and HVAC



Electrical Box and Wiring



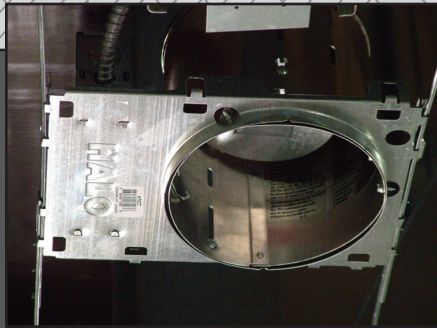
Wastewater and HVAC



Copper Supply Pipes



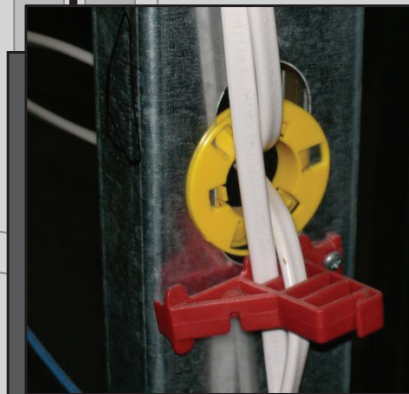
Cut Track with Copper and Wastewater



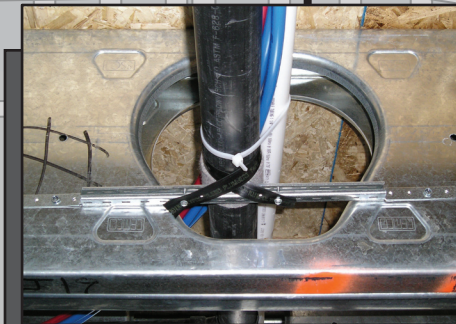
Recessed Light Housing



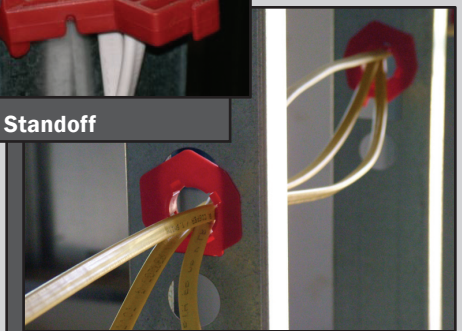
Electrical Wiring



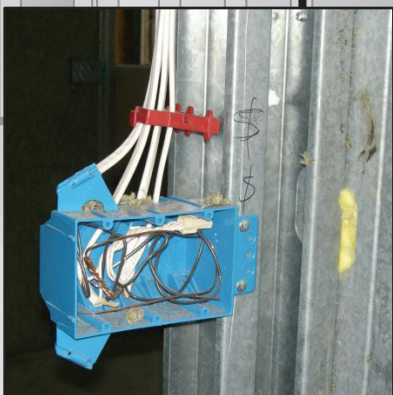
Grommet and Standoff



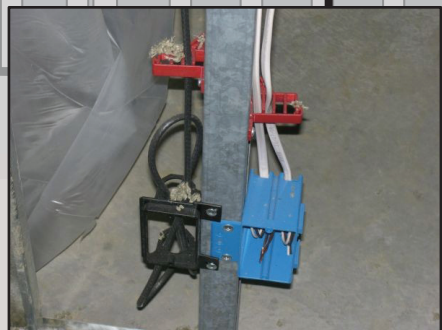
Wastewater, Supply and Fire Sprinkler



Grommets



Face Mounted Electrical Box



Electrical Box and Low Voltage Wiring



FREQUENTLY ASKED QUESTIONS – PLUMBERS

1 ^{one}

CAN ANY TYPE OF PLUMBING SUPPLY PIPE BE USED IN A CFS STRUCTURE—COPPER, CPVC, AND PEX?

Yes, any type of supply pipe material can be used when properly installed in a steel-framed structure. Supply, waste and vent lines of metal, PVC and similar plastics, and metal gas lines can all be accommodated within steel frames.

2 ^{two}

DOES IT TAKE MORE TIME TO INSTALL ROUGH PIPING IN A STEEL HOME?

Veterans indicate that the rough-in plumbing work goes faster in a steel framed house. Pre-punched utility pathways (punchouts) and in-line framing keep the job of integrating pipe into the assembly simple. Unlike other light framing materials, CFS is installed in-line which means that wall studs and joists and wall studs and rafters/trusses align—leaving space for direct pipe runs to all floors.

3 ^{three}

WHAT SHOULD I EXPECT AT PLUMBING ROUGH-IN IN A CFS BUILDING?

Expect simplicity. Steel studs have been used extensively in the commercial sector for tenant fit-ups and retrofits because of their ease of use and reuse by the framing, plumbing, and electric trades. Metals, like copper, require separation from the steel due to galvanic reaction and polyethylene pipe like PEX requires protection from the sharp edges of steel. Accessories called isolators are installed in the punchouts for plumbing pipes.

4 ^{four}

WHERE CAN I PURCHASE ISOLATORS?

Isolators can be purchased from your plumbing supply distributor or manufacturer representatives identified on the product websites. Isolators retail at prices that are comparable with other pipe accessories, like hangers and brackets.

5 ^{five}

HOW HARD IS IT TO INSTALL ISOLATORS?

It is simple to install isolators when you use the one piece type—they snap into the stud's punchout from either side of the web using one hand and very little pressure. Isolators, or pipe-eyes as they are sometimes called, are sized for the outside diameter of the pipe. Some can be rotated in place within the punchout to position the pipe.



Courtesy: Sioux Chief

6 ^{six}

WHAT ABOUT VERTICAL RUNS TO THE SECOND STORY—HOW DO I GET PIPES THROUGH THE WALL TRACK?

A drill with 1 3/8 inches metal hole saw bit can be used to penetrate the wall track. Hole punches that match standard pipe isolator sizes are also available. Larger diameter holes for drain and vent stacks can be cut with hole saws, hole punches, or unibits. At higher cost, a plasma cutter will also perform the job. These same tools will penetrate a stud or joist web if a custom punchout is needed. (See **Tools for the Trades**, page 5.)



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FRAME CONSTRUCTION

Tip: Center custom holes in the web. Space holes at least 10 inches away from the end of the member. Maintain a minimum of 24 inches between holes. (See **Code at a Glance**, back cover.)

7 seven

HOW ARE PIPES SUPPORTED IN CFS FRAMES?

Pipe talons and standoff brackets will support any of the supply pipe types allowed by the building codes. The supports are fastened to the steel with screws rather than nails.

8 eight

ARE JOIST PUNCHOUTS LARGE ENOUGH TO ACCOMMODATE 3-INCH DRAIN PIPES?

Punchouts in generic joists may be up to 4 ¾ inches x 6 inches in size, dependent upon the joist dimension and manufacturer. (Specifics on allowable hole locations for generic steel shapes are covered in Table R505.2(3) in the International Residential Code.) There are many specialty joist products available with larger utility punchouts.

FREQUENTLY ASKED QUESTIONS – ELECTRICIANS

1 one

CAN ANY TYPE OF WIRING BE USED IN A CFS STRUCTURE?

Non-metallic sheathed wire, or Romex, common to residential applications, and armored cable, or BX, used in commercial applications will be featured in this guide, and each are commonly used in steel buildings.

2 two

DOES IT TAKE MORE TIME TO INSTALL WIRING IN A STEEL HOME?

The rough-in electric work goes faster in a steel-framed house because punchouts keep the job of drilling holes to a minimum. The large area of the punchout in CFS has encouraged some electricians to pull bundles of wire simultaneously, further speeding the installation.

3 three

WHAT SHOULD I EXPECT AT ELECTRIC ROUGH-IN OF A CFS BUILDING?

Expect to use your drill less because of the punchouts for horizontal wire runs. Metal-sheathed wire, like BX, doesn't require any separation from contact with the steel but non-metallic sheathed wired, like Romex, will require protection from the sharp edges of the punched hole. Accessories called grommets are installed in the punchouts.

4 four

WHERE CAN I PURCHASE GROMMETS?

Grommets can be purchased from your electric supply distributor or manufacturer representatives identified on the product websites. Grommets retail at prices that are comparable with other electrical accessories, like boxes and wire ties.

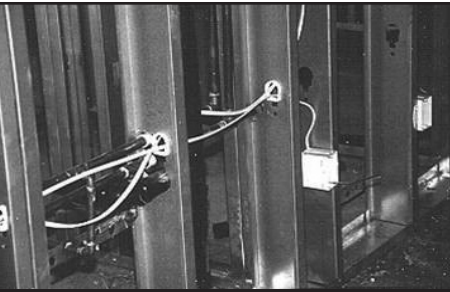
5 five

HOW HARD IS IT TO INSTALL GROMMETS?

It is simple to install grommets when you use the one piece type—they snap into the stud's punchout from either side of the web using one hand and very little pressure.



SB3, SB30



6 six

WHAT TOOLS CAN BE USED TO MAKE CUSTOM HOLES IN STEEL WHEN THEY ARE REQUIRED?

A drill with a 1 3/8 inches metal hole saw bit can be used to penetrate the wall track for vertical wire runs from floor to floor. Hole punches that match standard grommet sizes are also available. At higher cost a unibit or a plasma cutter will also perform the job. These same tools will penetrate a stud or joist web if a custom punchout is needed. (See **Tools for the Trades**, page 5.)

7 seven

CAN I STAPLE VERTICAL NM WIRE TO THE CFS?

No, NM wire is not stapled to a CFS stud because the staples will not penetrate the steel. Instead, wires are held in place with wire ties fed through punchouts in the CFS or with mounted head cable ties which are cinched around wire bundles. Mounting hole or mounted head cable ties are specialized ties that have a ring at one end that serves for fastening the tie to a CFS component with a screw. Other specialized wire accessories are available to re-support wires, like cable supports and standoffs.

8 eight

CAN I USE THE SAME PLASTIC BOXES THAT I USE IN WOOD FRAMES WITH ROMEX WIRE?

The receptacle and switch boxes that are used with CFS frames will have screw mounts rather than nails and several manufacturers, including Caddy-Erico¹ and Arlington Industries² produce brackets that can be mounted to steel to carry generic plastic boxes.

¹ <http://www.ericco.com/public/library/Fixing/FieldCat/LT0452.pdf>
² http://aifittings.com/arliprod6_c.htm

9 nine

HOW IS THE SERVICE PANEL BOX INSTALLED IN A STEEL FRAME?

The service panel box can be installed with steel blocking behind the box. Additional blocking above the box will provide the attachment surface for the wires.

10 ten

WHAT ABOUT GROUNDING A STEEL HOUSE?

The National Electrical Code® (NEC) requires that the electric service to any house be grounded. The metal frame of a steel building is a permitted electrode for grounding so long as the frame follows the code prescribed methods for earth connection, such as 10 feet or more of a metal member in direct contact with the earth or in encased concrete that is in direct contact with the earth. In the above-ground framework, bushings, grommets, and non-metallic sheathing isolate the wiring from the structure.

11 eleven

HOW MANY WIRES CAN BE RUN THROUGH ONE GROMMET?

The number of wires that may be run through one punchout, inside the grommet, is limited by the number of wires that a standoff or support can carry. The codes require that wiring that parallels a wall stud remain 1 1/4 inches from the framing member's edge to prevent physical damage to the wire by



#8 self-tapping sheet metal screw CS205C

the following trades, so wire supports that “stand off” the member with multiple wire runs are used. The support shown will hold six runs of NM wire in the center of a wall cavity.

Courtesy: Arlington Industries, Inc.



GUIDE

FRAME CONSTRUCTION

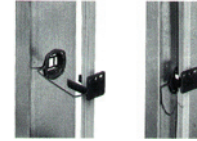
Mounted Head Cable Tie Side Mounted Electrical Box



Courtesy: Cable Ties Plus, Inc.



Cable Support



RESOURCES

International Code Council

International Plumbing Code®

International Residential Code®

<http://www.iccsafe.org>

National Electrical Code®

<http://www.nfpa.org/index.asp?cookie%5Ftest=1>

Steel Framing Alliance

<http://www.steel framing.org>

Steel Stud Manufacturer's Association

<http://www.ssma.com/>

CHECKLIST FOR STEEL TRADE CONTRACTORS

1. Preplan	<input type="checkbox"/> Meet with the builder before project start to discuss service utility routes.
	<input type="checkbox"/> Verify availability of material and accessories with distributors.
2. Start Smart	<input type="checkbox"/> Equip your team with the right tools. (Page 5)
	<input type="checkbox"/> Review the building code requirements for pipe or wire protection with the team.
	<input type="checkbox"/> Order the required accessories.
3. Prestart Site Visit	<input type="checkbox"/> Test drill CFS components along the preplanned layout.
	<input type="checkbox"/> Verify that punchouts are aligned.
4. Arrive Ready	<input type="checkbox"/> Use a permanent magic marker to write on steel.
	<input type="checkbox"/> Use grommets and isolators to mark horizontal layout paths.
5. Work Smart	<input type="checkbox"/> All pipe/wire protection should be installed before the rough-in system.
	<input type="checkbox"/> Do not cut lips or flanges of steel components.
6. Work Safely	<input type="checkbox"/> Hold and use the screwgun correctly to prevent fatigue and injury from repetitive stress. (Page 4)
	<input type="checkbox"/> Wear gloves to protect against the sharp edges of steel.
	<input type="checkbox"/> Wear safety glasses to protect eyes from metal shavings.

Code at Glance – International Residential Code

R603.3.4 Cutting and Notching

Flanges and lips of steel studs and headers shall not be cut or notched.

R603.3.5 Hole Patching

Stud web holes with dimensions conforming to Section R603.2 that are closer than 10 inches (254 mm) from the edge of the hole to the end of the member shall be patched with a solid steel plate, C-section or track section in accordance with Figure R603.3.5. The patch shall be of a minimum thickness as the stud member and shall extend at least 1 inch (25.4 mm) beyond all edges of the hole.

The patch shall be fastened to the web with No. 8 screws (minimum) spaced not greater than 1 inch (25.4 mm) center to center along the edges of the patch, with a minimum edge distance of 1/2 inch (12.7 mm)... Holes in wall studs and other structural members shall not exceed 1.5 inches (38 mm) in width or 4 inches (102 mm) in length as shown in Figure R603.2(3). Holes shall be permitted only along the centerline of the web of the framing member. Holes shall not be closer than 24 inches (610 mm) center to center and shall not be located less than 10 inches (254 mm) from edge of hole to end of member unless patched in accordance with Section R603.3.5.

R804.3.6 Hole Patching

Holes in ceiling joist and rafters with dimensions conforming to Section R804.2 that are closer than 10 inches (254 mm) from the edge of the hole to the edge of bearing surface shall be patched with a solid steel plate, C-section or track section in accordance with Figure R804.3.6. The steel patch shall be of a minimum thickness as the receiving member and shall extend at least 1 inch (25.4 mm) beyond all edges of the hole. The steel patch shall be fastened to the web with No. 8 screws (minimum) spaced no greater than 1 inch (25.4 mm) center-to-center along the edges of the patch, with a minimum edge distance of 1/2 inch (12.7 mm).

P2603.2 Drilling and Notching

Wood-framed structural members shall not be drilled, notched or altered in any manner except as provided in Sections R502.8, R602.5, R602.6, R802.7 and R802.7.1. Holes in cold-formed steel-framed load-bearing members shall be permitted only in accordance with Sections R505.2, R603.2 and R804.2. In accordance with the provisions of Sections R603.3.4 and R804.3.5 cutting and notching of flanges and lips of cold-formed steel-framed load-bearing members shall not be permitted.

P2603.2.1 Protection against Physical Damage

In concealed locations, where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1.5 inches (38 mm) from the nearest edge of the member, the pipe shall be protected by shield plates. Protective shield plates shall be a minimum of 0.062-inch-thick (1.6 mm) steel, shall cover the area of the pipe where the member is notched or bored and shall extend a minimum of 2 inches (51 mm) above sole plates and below top plates.

Table 2605.1 Piping Support

Copper: Support at maximum of 12' horizontally and 10' vertically.
PEX (>2" diam.): Support at maximum 32" horizontally and mid-story (5') vertically.
CPVC: Support at maximum 3' horizontally and at mid-story (5') vertically.
PVC: Support at maximum 10' horizontally and at 10' vertically. Diameter under 2"; support at mid-story (5') vertically.

Code at a Glance – National Electrical Code

250.52 Grounding Electrodes

Specific earth connection is required for service grounding.

300.4(B) Protection Against Physical Damage

(1) NM sheathed cable and NM tubing in metal framing members requires securely fastened bushings or listed grommets covering all metal edges of factory or field punched holes in metal members.

(2) NM sheathed cable and electrical NM tubing requires a steel clip of 1.6 mm (1/16 in.) in thickness for protection where nails or screws are likely to penetrate (the cable or tubing).

(D) Cables and raceway-type wiring installed parallel to framing members shall be supported so that nearest surface of the cable/raceway is not less than 32 mm (1 1/4 in.) from the edge of the framing member or furring strips where nails or screws are likely to penetrate. Where this distance cannot be maintained, the cable or raceway shall be protected from penetration by nails or screws by a steel plate, sleeve, or equivalent at least 1.6 mm (1/16 in.) thick.

Exception No. 3: A listed and marked steel plate less than 1.6 mm (1/16 in.) that provides equal or better protection against nail or screw penetration shall be permitted.

334.17 Through and Parallel to Framing Members

Types NM, NMC and NMS cable shall be protected in accordance with 300.4 where installed through or parallel to framing members. Grommets used as required in 300.4(B)(1) shall remain in place and be listed for the purpose of cable protection.

334.30 Securing and Supporting

Nonmetallic-sheathed cable shall be supported and secured by staples, cable ties, straps, hangers, or similar fittings designed and installed so as not to damage the cable, at intervals not exceeding 1.4 m (4 1/2 ft.) and within 300 mm (12 in.) of every outlet box, junction, box, cabinet or fitting. Flat cables shall not be stapled on edge.

334.30(A) Horizontal Runs Through Holes and Notches

In other than vertical runs, cables installed in accordance with 300.4 shall be considered to be supported and secured where such support does not exceed 1.4 m (4 1/2 ft.) intervals and nonmetallic-sheathed cable is securely fastened in place by an approved means within 300 mm (12 in.) of each box, cabinet, conduit body or other nonmetallic-sheathed cable termination.

Code at a Glance – International Plumbing Code

305.8 Protection against Physical Damage

In concealed locations where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1.5 inches (38 mm) from the nearest edge of the member, the pipe shall be protected by shield plates. Protective shield plates shall be a minimum of 0.062-inch-thick (1.6 mm) steel, shall cover the area of the pipe where the member is notched or bored, and shall extend a minimum of 2 inches (51 mm) above sole plates and below top plates.

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Information in this publication is based on the "Prescriptive Method," basis of the steel requirements in the International Residential Code (IRC) and International Building Code (IBC). Some information has been summarized from the Steel Framing Alliance's (SFA) "National Training Curriculum." For more information or to obtain these publications, visit www.steel framing.org.

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