



August, 2003








Fastener Guide for Sheet Steel Building Products

Fastener Materials


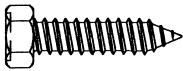
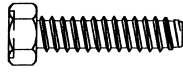

Fasteners are manufactured from several materials and coatings. For the purpose of this fact sheet, the material selection is limited to case hardened carbon steel, 304 high tensile stainless steel, and 410 stainless steel case hardened, which represent the majority of fasteners used in the sheet steel industry.



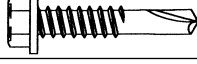
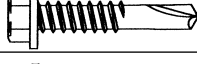
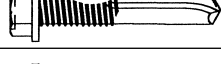
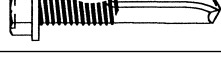
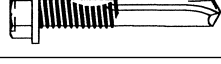

Fastener Construction

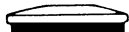

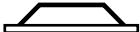

While there are a multitude of fastener sizes and shapes in the construction market, they have several things in common:


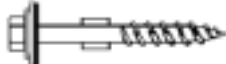
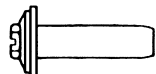
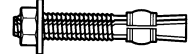
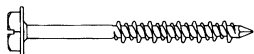
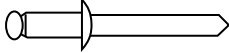

Head Styles		
Hex Head	Most common head design for thread - forming self-tapping screws.	
<ul style="list-style-type: none"> • Hex Washer Head • Zinc Alloy Cast Head • 300 Series Stainless Capped Head • Capped Fasteners • Nylon Head Rigid and Flexible Flange 	Most common head design for self-drilling, self-tapping screws.	
Large Hex Flange Head	The head profile captures and controls the sealing washer for improved appearance and increased sealing washer life.	
Pancake Head	Seats near flush with the surface - ideal for low profile applications such as clip fastening.	
Pan Head	A popular head style - provides neat finish appearance for general applications.	
Wafer Head	Designed to seat flush with the surface - ideal for fastening plywood to metal.	
Flat Head	Designed to countersink and seat flush without splitting the wood.	

Coloured Heads	
Liquid Painting or Powder Coating	General applications of pre-finished coloured sheet steel, using exposed fasteners painted or coated to match the cladding colours.
Molded Nylon Heads	These heads are injection molded from coloured nylon to match the pre-finished sheet steel colour.

Fastener Thread Styles Requiring a Pre-Drilled Hole (Self-tapping)		
Type A #14-10 x L	Provides panel to panel installation up to .075" thick - 3/16" pre-drilled hole in top of sheet.	
Type AB 1/4-14 x L	A combination of tight thread configuration and sharp point for alignment provides installation of pre-finished sheet metal to pre-drilled light structural up to 3/16" thick.	
Type B 1/4-14 x L	A tighter thread configuration and a blunt point provide pre-finished sheet metal to pre-drilled structural installation of 0.060" and thicker.	
Wood screw thread design – Single or double thread	Designed to attach pre-finished sheet metal to wooden girt or purlin. (No pre-drilling required.)	

Self-Drilling Fasteners		
Self-Drill Point #1 – 1/4-14 x 7/8"	Provides panel to panel installation - drilling range .024" to .095"	
Self-Drill Point #2 – #10-16 x L	Provides panel to light structure installation up to 0.18" thick - drilling range 0.090" to 0.110"	
Self-Drill Point #3 – #12-14 x L	Provides panel to structure installation up to .187" thick - drilling range .036" to .210"	
Self-Drill Point #3 – 1/4-14 x L	Provides panel to structure installation from .110" to .250" thick material.	
Self-Drill Point #4 – #12-24 x L	Provides panel to structure installation from .125" to .250" thick material.	
Self-Drill Point #4.5 – #12-24 x L	Provides panel to structure installation from .125" to .375" thick	
Self-Drill Point #5 – #12-24 x L	Fastening sheet metal to hot rolled steel - drilling range .250" to .500"	
Self-Drill Point #2 – Stitch-lap point #18-9 x L	Stitch or repair screw for applications requiring high shear values.	

Washers used with Fasteners		
Dish Bonded Washer	The galvanized dish-shaped washer backing is vulcanized together with an EPDM bonded washer to form one piece. The dish shape provides low profile, waterproof, and leak-proof installation.	
Hi-Domed Washer	Two piece separate metal and EPDM washer resists over-torque and shields EPDM from ozone and ultra-violet light.	
Flow Cone Washer	The bell shaped washer backing is vulcanized together with an EPDM bonded washer to form one piece. The design provides for leak proof installations.	
Integral Washer System	Washer assembled to a large flange hex washer head prevents washer from being squeezed out.	

Specialty Products		
#17 Diameter	Used as a repair fastener for stripped-out #14 diameter holes in light gauge or panel sidelaps.	
Thermal Expansion Fasteners #12 Diameter	Wings drill expansion hole allowing for 0.100" thermal expansion in PVC, FRP, polycarbonate or fibre cement panels.	
Expansion Grommets	Used for securing sidelaps of translucent/fiberglass panels.	
Expansion Fasteners	Used for attaching materials to masonry surfaces.	
Concrete Fasteners	Used for attaching materials to masonry surfaces.	
Rivets	Used for securing flashing to pre-finished steel sheet metals.	
Colour Caps for 5/16", 3/8", 9/16" A.F. Screws	Snap on polyethylene colour caps with double round configuration matches panel colours and minimizes shadows	

Fastener Application

Along with the definitions of the various parts of a fastener, it is necessary to categorize the application under which these fasteners will be used and the appropriate type of fasteners for the condition. It is not the intent to name fastener manufacturers, but to indicate the type of fastener that is best suited for the job.

- Securing sub-girt strapping to a masonry wall:** Sheet steel cladding should never be secured directly to a masonry wall. Steel sub-girts should be secured to the wall, shimming as necessary to provide a smooth flat surface onto which the cladding elements can be secured. Suggested fasteners for this application include:
 - Expansion Fasteners.
 - Concrete (Masonry) Threaded Fasteners.
 - Plastic Plug and Screw.
- Securing the liner sheet and sub-girts to wood supports:** The wood supports should be of sufficient size and spacing as to support the liner and wall cladding system and all applied loads associated with insulated sheet steel wall cladding. Suggested fasteners for this application include:
 - #10 or #14 wood screw.
 - #14 Type A.
- Securing the liner sheet and sub-girts to a structural steel support:** This is a common application where the supporting girts are fabricated from hot rolled angles or channels. Suggested fasteners for this application include:
 - 1/4-14 x L Type 'B' fasteners - pre-drilled hole required.
 - #12-24 x L Self-drilling #5 point - 0.250" to 0.500" thick.
 - #14-14 x L Self-drilling #3 point - 0.110" to 0.250" thick.
- Securing the liner sheet and sub-girts to a cold rolled steel structural support:** This is a common application where the supporting girts are fabricated from cold rolled C and Z sections. Suggested fasteners for this type of application include:
 - 1/4-14 x L Type 'AB' fasteners - pre-drilled hole required - maximum structure 3/16" thick.
 - #12-14 x L Self-drilling #3 point - maximum structure 0.210" thick.
 - #14-14 x L Self-drilling #3 point - maximum structure 0.250" thick.

5. **Liner sheet sidelap stitch screws:** Used to secure the sidelaps of the liner sheet from opening under wind pressure loads. This also secures the liner sheet sidelap and helps to maintain the air/vapour barrier created with the sealed sidelap of the liner sheet. Suggested fasteners for this application include:

- a) #14-10 x L Type 'A' with sealing washer - pre-drilled top-sheet.
- b) 1/4-14 x L Type 'AB' with sealing washer - pre-drilled top-sheet.
- c) 1/4-14 x 7/8" Special lap stitch self-drilling screw - with sealing washer.
- d) #18-9 x L Special lap stitch self-drilling screw - with sealing washer.

6. **Cladding sheets to steel sub-girts:** This is separated into two categories - exposed and concealed fastener profile applications:

Exposed Fasteners:

- a) 1/4-14 x L Type 'AB' liquid painted or powder-coated colour matched to panel colour.
- b) 1/4-14 x L Type 'AB' nylon injection molded head - colour matched to panel colour.
- c) 1/4-14 x L Type 'AB' zinc alloy cast head or stainless steel, liquid painted or powder coated to match panel colour.
- d) #12-14 x L Self-drill #3 liquid painted or powder-coated to match panel colour.
- e) #12-14 x L Self-drill #3 nylon injection molded head - colour matched to panel colour.
- f) #12-14 x L Self-drill #3 zinc alloy cast head, stainless steel cap, or 410 stainless steel.
- g) 1/4-14 x L Self-drill #3 nylon injection molded head - colour matched to panel colour.
- h) 1/4-14 x L Self-drill #3 zinc alloy cast head, stainless steel cap, or 410 stainless steel.
- i) 1/4-14 x L Self-drill #3 liquid painted or powder-coated colour matched to panel colour.

Concealed Fasteners:

- a) 1/4-14 x L Type 'AB',
- b) #12-14 x L Self-drill #3,
- c) 1/4-14 x L Self-drill #3,
- d) #12-14 x L low profile (pancake head) Self-drill #3.

7. **Cladding sheet sidelap stitch screws:** Again this is separated into exposed or concealed fastener profile applications:

Exposed Fasteners:

- a) 1/4-14 x L Type 'AB' liquid painted or powder-coated to match panel colour.
- b) 1/4-14 x L Type 'AB' nylon injection molded head - colour matched to panel colour.
- c) 1/4-14 x L Type 'AB' stainless steel, liquid painted or powder coated to match panel colour.
- d) 1/4-14 x 7/8" Self-drill stitch lap fastener - pre-painted or powder-coated to match panel colour.
- e) 1/4-14 x 7/8" Self-drill stitch lap fastener - nylon injection molded head - colour matched to panel colour.
- f) 1/4-14 x 7/8" Self-drill stitch lap fastener - zinc alloy cast head.
- g) 1/4-14 x 7/8" Self-drill stitch lap fastener - stainless steel, liquid painted or powder coated to match panel colour.
- h) #18-9 x L Self-drill stitch lap fastener - stainless steel, liquid painted or powder coated to match panel colour.

8. Securing trims to cladding:

- a) 1/8" rivet - liquid painted or powder-coated to match panel colour.
- b) 1/4-14 x L Type 'AB' liquid painted or powder-coated to match panel colour.
- c) 1/4-14 x L Type 'AB' nylon injection molded head - colour matched to panel colour.
- d) 1/4-14 x L Type 'AB' zinc alloy cast head.
- e) 1/4-14 x 7/8" Self-drill stitch lap fastener - pre-painted or powder-coated to match panel colour.
- f) 1/4-14 x 7/8" Self-drill stitch lap fastener - nylon injection molded head - colour matched to panel colour.
- g) 1/4-14 x 7/8" Self-drill stitch lap fastener - zinc alloy cast head, stainless steel cap or A10 stainless steel.
- h) 1/4-14 x 7/8" Self-drill stitch lap fastener - stainless steel, liquid painted or powder coated to match panel colour.
- i) #18-9 x L Self-drill stitch lap fastener - stainless steel, liquid painted or powder coated to match panel colour.

9. **Structural standing seam roof panels:** The clips anchoring these roof systems are installed with fasteners specified by the roofing system manufacturer.

Additional Factors to Consider

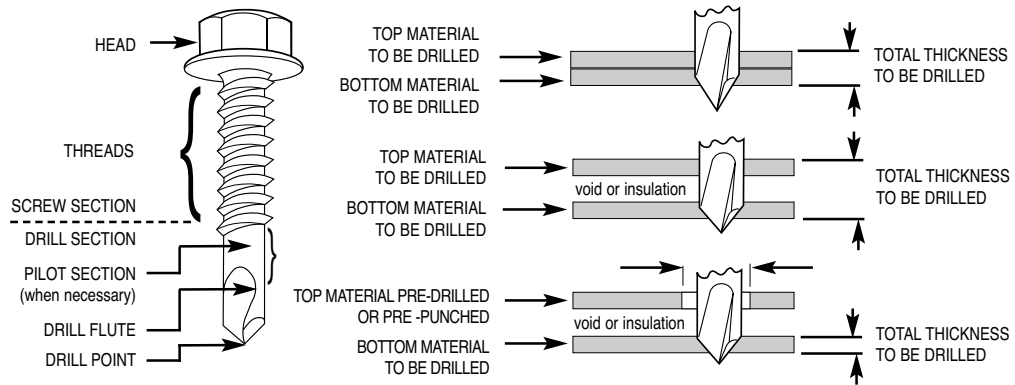
The Environment: Corrosive areas in various parts of Canada affect the life of the fastener's protective coating. A fastener's coating may last 10 - 15 years in mid-Western Canada, but may only last 3 - 5 years in areas of Southern Ontario where sulphur dioxide is present in the atmosphere. Coastal installations have a salt spray corrosion environment, while places such as Hamilton, Ontario have a heavy industrial corrosion environment and require a corresponding heavy anti-corrosion coating or all stainless steel fasteners.

The Application:

1. Define your application - what materials are you fastening together?
2. Measure the combined thickness of all the materials (including voids) you will be drilling through.
3. It is important to use a proper screw gun with sufficient amperage and adjustable torque clutch to prevent over-driving.
4. If you're using self-tapping screws, use the proper drill bit for the application and set the proper speed on the screw gun.
5. If you're using self-drilling fasteners, refer to that measurement on Appendix "A" to select the proper drill point, (for self-drilling style fasteners), for the thickness of the material to be drilled.
6. The total thickness of material must be drilled through before the threads begin to engage. Remember: threads drive faster than the drill point can drill the hole.

The Supplier:

1. Fastener manufacturers in Canada are Associate Members of the Canadian Sheet Steel Building Institute. They provide fasteners and accessories that meet or exceed the market requirements and standards.
2. Typically fasteners are identified by their respective head markings of each manufacturer.
3. Typically fastener manufacturers have lot numbers noted on the packaging for traceability and quality control purposes, and the Canadian Sheet Steel Building Institute encourages this.



Appendix A

DRILLING CAPACITIES		
Shank Diameter	Drill Point	Material Thickness (in.)
1/4	1	.024 - .095
6	2	.036 - .100
8	2	.036 - .100
10	2	.090 - .110
12	2	.050 - .140
14	2	.060 - .120
18	2	.060 - .120
8	3	.100 - .140
10	3	.110 - .175
12	3	.090 - .210
14	3	.110 - .250
12	4	.125 - .250
1/4	4	.125 - .250
12	4.5	.145 - .375
12	5	.250 - .500
1/4	5	.250 - .500

SCREW DIAMETERS	
Thread Diameter	Decimal Equivalent (in.)
#6	.140
#7	.150
#8	.160
#9	.180
#10	.190
#11	.200
#12	.210
#13	.230
#14	.240
1/4	.250
#17	.286
#18	.304

SUGGESTED DRILL SIZES							
#14 Type A		1/4" Type B		1/4" Type AB		#17 Type AB	
Steel Thickness (in.)	Hole Size (in.)	Steel Thickness (in.)	Hole Size (in.)	Steel Thickness (in.)	Hole Size (in.)	Steel Thickness (in.)	Hole Size (in.)
0.018	5/32	3/6"	#2	0.018	5/32	0.018	3/16
0.024	5/32	thru to		0.024	5/32	0.024	3/16
0.030	3/16	3/8"	#1	0.030	3/16	0.030	3/16
0.036	3/16	Over 3/8"		0.036	3/16	0.036	1/4
0.048	3/16			0.048	3/16	0.048	1/4
0.060	#7			0.060	#8	0.060	1/4
0.075	#8			0.075	#7	0.075	1/4
				0.105	#7	0.105	17/64
				0.135	#2	0.135	17/64
				0.135 thru to 3/16"	#1		

NOTE: All test results and suggestions are based on laboratory tests. Specific job site conditions should be taken into consideration when specifying the proper fastener. Because applications vary, no liability is assumed for the use of this information.