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SELF-DRILLING SCREWS TECHNICAL GUIDE

A **self-tapping screw** is a screw which can tap its own hole as it is driven into the material.

Common features are the screw thread covering the whole length of the screw from tip to head and a pronounced thread hard enough for the intended substrate, often case-hardened

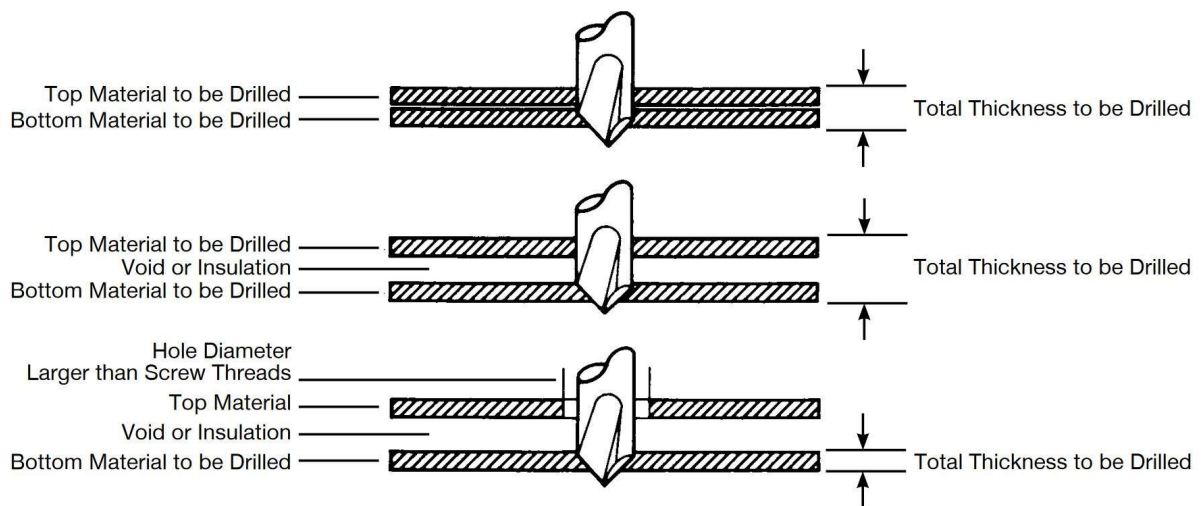
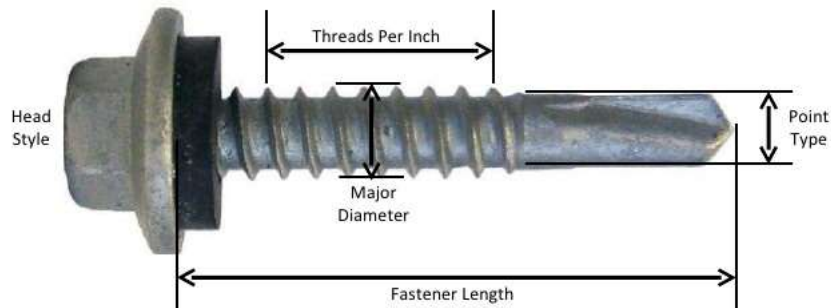
A Self-Drilling Screw *is* a Self-Tapping Screw with the added feature of a **drill point**. The drill point looks a lot like the point of a drill. It will drill a hole and form the mating threads in one operation.

Some self-tapping screws are also **self-drilling**, which means that, in addition to the tap-like flute in the leading threads, there is also a preliminary drill-like fluted tip that looks much like the tip of a centre drill. These screws combine a drilling action and the fastener installation itself into only one driving motion (instead of separate drilling, tapping, and installing motions); they are thus very efficient in a variety of hard-substrate applications, from assembly lines to roofing.

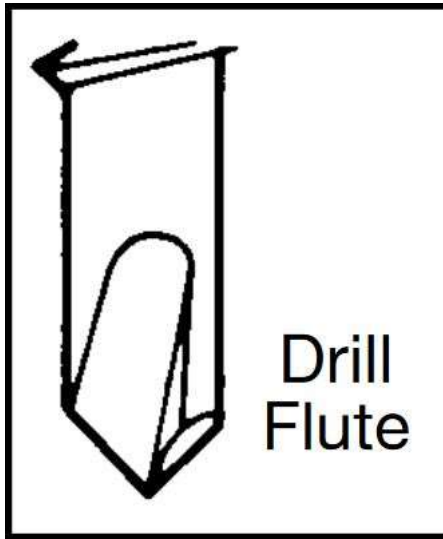
There are various types of Self-Drilling screws available suitable for a number of applications.

Head Styles – Hex Head, Pan head, CSK head, Truss Head, Wafer head etc.

Fastener/Screw Terminology

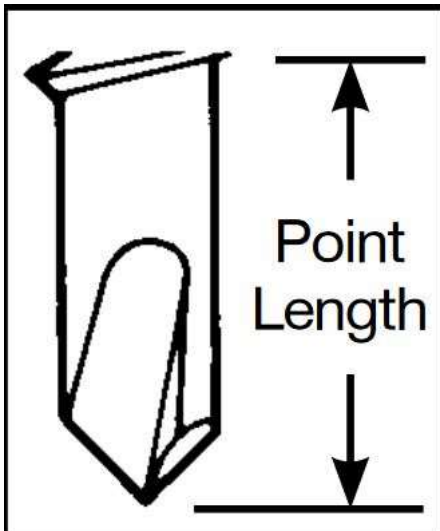


DRILL POINT SELECTION



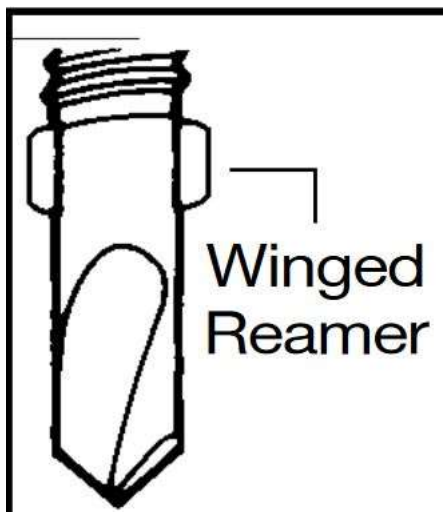
Drill Flute

The length of the drill flute determines the metal thickness that can be drilled. The flute itself provides a channel for chip removal during drilling action. If it becomes completely embedded in material, drill chips will be trapped in the flute and cutting action will cease. This will cause the point to burn up or break.



Point Length

The unthreaded section from the point to the first thread should be long enough to assure the drilling action is complete before the first thread engages the drilled metal. Screw threads advance at a rate of up to ten times faster than the drill flute can remove metal. All drilling therefore should be complete before threads begin to form.



Drilling Through Wood to Metal.

If your application calls for drilling through wood over 1/2" thick, a clearance hole is required. Select a fastener with breakaway wings for this type of job. The wings will ream a clearance hole and break-off when they contact metal surface (minimum metal thickness 0.06") to be drilled.

Thread Selection

Thread Length.

Always choose a fastener with sufficient threads to fully engage in the base metal. For attachments to 1/4" base steel, a self-drilling screw should have at least 1/4" of threads. It is helpful, but not critical, that the threads also engage in the material being fastened. The head of the fastener provides the bearing force for the material being fastened, while the threads provide the clamping force in the base material.

Thread Pitch.

The thickness of material being fastened and diameter of the screw determine the type of thread pitch to be used. In general, the thinner the fastened materials, the fewer the number of threads. The thicker the material, the greater the number of threads. This principle is due to two primary methods of thread engagement/holding power: Clamping and Threading.

In light gauge metal, the materials are actually being clamped together by the upper and lower threads.

Thinner base material requires a coarser thread pitch to assure proper clamping. The thicker the material, the finer the threads must be. In very thick metal (3/8" to 1/2" thick), a fine thread is advisable. This will allow the thread to tap into the base material with less installation torque than a coarse thread.

Head Style Selection



Hex Washer Head:

The Hex head provides a reliable driving surface for Hex sockets that enable machine installation.

Washer face provides a bearing surface for the driving sockets.



Phillips Pan Head:

Conventional head for general applications and provides low profile fastening.



Phillips CSK Head:

Used primarily in wood to countersink and seat flush without splintering the wood.



Phillips Wafer Head:

Large Slim head provides the bearing surface necessary to seat flush in soft materials.



Phillips Bugle Head:

Used primarily for fastening drywall, plywood or insulation board to steel studs.

Sealing Criteria

Sealing washer screws offer weather resistant fastenings where moisture or condensation is a factor. The washer helps seal the hole to help prevent moisture from dripping into the fastener threads from the fastened material side, reducing corrosive build-up.

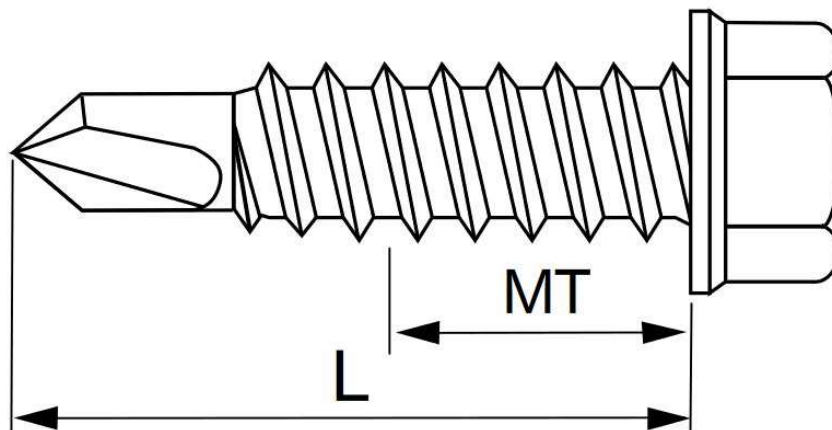
Length Selection.

Length of the screw (L)

Depending on the screwhead, there are two different ways to measure the overall length of a screw. For Hex, PAN and Wafer head screws, the overall length is measured from the bottom of the washer under the head to the point of the screw. For CSK and Bugle head screws, the overall length is measured from the top of the head to the point of the screw.

Maximum Total Thickness (MT)

The maximum total thickness (MT) for all screws is the length of the threads reduced by the first three threads (protruding past the back-side of the base material).



See drawings above and below.

The maximum total thickness (MT) describes the maximum thickness of all attachments to be fastened plus the base material.

