

# TECHNICAL BULLETIN



## Proper Tools for Fastening Metal Panels

### Overview:

This technical bulletin is intended to be a guide to proper fastening of metal panels to wood or metal frame buildings. The selection of the proper tools for the fastening of metal roofing panels is critical for ease of installation, proper watertightness, and the integrity of the connection.

### Discussion:

In any type of metal panel fastening application, screw guns with an adjustable clutch and/or a depth sensing nosepiece are the recommended tools of choice to maintain integrity of the panel and building. This will assure that fasteners are installed at the optimum level. Often panels can be pre-drilled to prevent “walking” of the drill point across the surface of the panel. One should select a tool with the appropriate RPM for the application as noted in this Technical Bulletin.

### Accessories:

Drive sockets with a recessed magnet and internal lobular hex design can help to reduce damage to paint on the fastener head, reduce wobble and increase socket life. (Figure 1)

Care should be taken to remove metal chips that accumulate in the magnet socket so that the hex of the screw is embedded completely into the socket.

Make sure the head of the fastener is fully encapsulated into the hex drive socket. (Figure 2) This will eliminate wobble of the screw, improve drilling performance and minimize damage to the head of the screw. Also, any drill filings need to be removed from the panels immediately to prevent rust stain.

Installers are encouraged to check the fastener product specifications for additional information on correct tool use.



Figure 1

Damaged Fastener  
Head

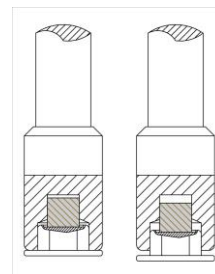


Figure 2

Correct and Incorrect  
Fastener Head Engagement

## **Tightening the Fasteners:**

It is critical to install fasteners so that the sealing washer performs at its optimal level to prevent leaks. Care should be taken when tightening the screws for sealing of the EPDM washer.



(Note: this image is for general consideration. The fastener manufacturer should be consulted for recommended tightening guidance)

## **Tools Not Recommended:**

**Impact drivers are not recommended for fastening metal panels or composite panels used for roof and/or wall system installation.** These tools can also cause damage to the drill points, break screws, chip painted surfaces, and strip threads on Type 300 stainless steel screws. Overdriven screws also damage the EPDM sealing washer and could potentially be the source of water leaks.



Paint damage from an impact driver

**High speed screw-guns with RPM greater than 2500 should not be used with fasteners attaching metal panels to framing systems.** When the drill point of the screw is rotating and cutting the substrate, friction is created which generates heat. Excess heat can damage the hard surface of the screw and cause the point to “burn-up”. Slower speed screw-guns used with less pressure during drilling will, minimize the amount of friction, heat, and damage to the drill point. High RPM tools can also cause over-driving, damaging the fastener head and lead to premature corrosion.

## **Tools Recommended and Screw Gun Speeds:**

### **Metal to Metal Application**

When fastening metal panels to metal framing the total thickness of materials being used must be determined. Whether a self-drilling or self-tapping fastener is used, proper selection of the RPM is important. Slower screw gun speeds will improve the drilling performance by reducing the heat that is generated during the screw drilling process.

The following screw gun speeds are recommended to assure fasteners optimally perform. Use variable speed screw guns for best performance.

**(Carbon steel or 410 Stainless Steel Fasteners)**

<u>Steel Thickness</u>	<u>Screw-gun RPM</u>
Less than 1/4"	2,500 RPM Maximum
1/4" to 1/2"	2,000 RPM Maximum

**(304 Stainless Steel Fasteners)**

<u>Steel Thickness</u>	<u>Screw-gun RPM</u>
All thicknesses	2,000 RPM (max) for self-drilling
All thicknesses	1,000 RPM for self-tapping

**Metal to Wood Application**

In this application, a variable speed screw gun (0-2500 RPM) is recommended for fastening metal panels.

**Conclusions:**

Use of the wrong tool or a driver with excessive RPM can lead to fastener damage and problems. Among these are damage to fastener heads, over-driving, scratches, dents, leaks, and damage to paint finishes leading to premature corrosion. Overdriven fasteners can also restrict metal panel movement due to thermal movement causing panel deflection and/or distortion known as "oil canning".

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