



Fastening Prepainted Sheet Steel Roofing and Siding

Introduction

Sheet steel roofing and siding (cladding) is available in a wide variety of profiles, colours and paint systems. The modern prepainted systems used on Canadian-made products will provide decades of beautiful performance before there are any visible signs of deterioration of the paint surface. However, an important component of the cladding system is the fastener used to attach it to the structure. This fastener is not simply a screw; it is part of the roof or wall assembly and should be expected to provide the same long-term performance. This performance is not simply the capacity to safely hold the cladding in place, but also to match the colour and durability of the paint system.

The selection of the correct screw for the job is the first step in the creation of a cladding system that will provide long-term performance. The next step is the installation. Installing screws in sheet steel cladding is commonplace and can be done very efficiently. The tool manufacturers have developed a wide range of options for installing fasteners into any type of substrate. Selecting the most appropriate tool will help the installation process. Unfortunately it is possible to damage the paint coating on the screw during installation, as shown in the photo below.



Effect of Installation Tool Type on Screw Head

A research project was carried out for the CSSBI to investigate the performance of commonly available tools used to install screws attaching sheet steel cladding to a wood frame. The objective was to assess the preferred tool for maintaining the painted screw head during installation. This study was neither an assessment of different finishes (i.e. powder paint, wet paint or organic paint) nor an assessment of different tool brands. This study only looked at the effect the different tool mechanisms (i.e. rotation, hammer, impact or a combination) had on the screw during the installation process.

Five types of tools were tested:

- 1 - Electrical screw driver with depth adjustable nosepiece
- 2 - Battery driven hammer drill
- 3 - Battery driven screw driver with adjustable torque control
- 4 - Electrical screw drill/driver
- 5 - Battery driven impact driver

The following tests were performed:

- 1 - Installation proficiency (speed) of tools
- 2 - Impact (damage) by tools on rust protection – Accelerated
- 3 - Impact (damage) by tools on rust protection – Normal
- 4 - Rust protection of screws never installed

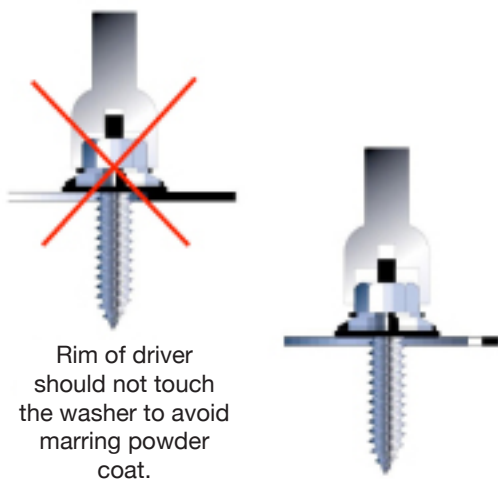
The real-life problem is to find the right balance between the potential damage inflicted on the painted screw head and the installation speed. The evaluation of the test data was based on a 70/30 weighting of minimizing damage and reducing installation time respectively. Using this selection criterion the first choices were the electrical screw driver with depth adjustable nose piece and the electrical screw drill/driver. The poorest choices were the hammer drill and impact driver.

No matter the evaluation criteria, the impact driver was always significantly the worst performer. The impact forces acting on the screw head will damage the screw surface and lead to early corrosion. While the tests were done on painted screw heads, the same conclusions would apply to unpainted and nylon head screws as well.

Recommended Tools and Installation Methods

Drivers

Fasteners for prepainted sheet steel roofing and siding will have a hexagonal shaped head. The installation tool incorporates a driver that matches the size and shape of the screw head. Often these drivers include a recessed magnet to hold the screw in place during installation. The act of driving the screw through the sheet steel will release steel filings that can accumulate on the driver magnet. These filings need to be removed on a regular basis so that screw head fits snugly into the driver socket. Drivers will also wear out with use and should be replaced after driving 5,000 screws.



Screw Gun Speed

Whether using a self-drilling or self-tapping screw, the screw gun speed (RPM) is important. Slower screw gun speeds will improve the drilling performance by reducing the heat that is generated during the drilling process. For fastening sheet steel cladding in metal-to-metal or metal-to-wood conditions with carbon steel screws **the maximum RPM recommended is 2500**. Slower speeds may be advisable for drilling into thicker steel members or with stainless steel screws. The screw manufacturer should be consulted.

Tightening the Fastener

Exposed fasteners for sheet steel cladding systems will include a washer under the head to make a water-tight seal. It is important that the fasteners be tightened correctly to obtain the optimum seal. Make sure the washer is compressed, but not so much that it is squeezed out the sides of the screw head. The screw manufacturer should be consulted.



Conclusion

The installers of sheet steel cladding need to consider their choice of screw gun and the effect it can have on the long-term performance of the screw head coating. The objective is to create a long-lasting roof or wall assembly, and this includes the fasteners. Help maintain the integrity of the fasteners by using a screw drill/driver and not a tool that drives the screw by impacting it. Also be cognizant of the best installation speed and properly compressing the washer.

For More Information

For more information on selecting the appropriate fastener for your project, contact one of CSSBI screw manufacturer members. For more information on prepainted sheet steel cladding, or to obtain other CSSBI publications, contact the CSSBI at the address shown below or visit the website at www.cssbi.ca