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FUNDAMENTALS OF PROPER FASTENER INSTALLATION

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Agenda

- Fundamentals of proper fastener installation
  - Proper Installation vs Improper installation
- Using the right fastener for the application
  - Different Substrates
  - Fastener Geometries
  - Torque to Seat/Strip out
  - Pull Out/ Pull Over
  - 'Back Out'
- Selection of proper tools
  - Screw Gun/Driver
  - Sockets

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What is a fastener?

- By Definition:
  - "hardware device that mechanically joins or affixes two or more objects together" (wikipedia-Fastener)

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Problems

- Strip out of fastener
- Fastener head snap off - Torsion/ Shear failure
- Incorrect Setting Depth- Washer compression
- Back Out
- Fastener Corrosion

- Bottom Line - Improper installation can lead to water damage, panel failure, and lead to call backs.

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Incorrect Installation Pictures

Fasteners that leaked due to poor thread and washer design

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Fastener Back Out

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Steps to ensure proper installation

- Identifying the substrate the fastener will be screwed into
- Selecting the proper fastener and length
- Choose the right screw gun to use for installation
- Inspect the drive bit that will be used
- Set the depth stop mechanism to correct setting
- Install the fastener

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Substrates

- Solid Decking
  - OSB
  - Plywood
- Open Framing
  - Dimensional Lumber
- Performance differences based on Pull-Out, Torque to Seat/Strip.

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Pull-Out

- The ability of a fastener's threaded connection to remain intact and resist tensile loads.
- Dependant on thread pattern, thickness, and type of substrate.
- Less then 1" of solid wood may increase potential for sealing or connection failure due to lack of adequate wood fibers to hold fastener.

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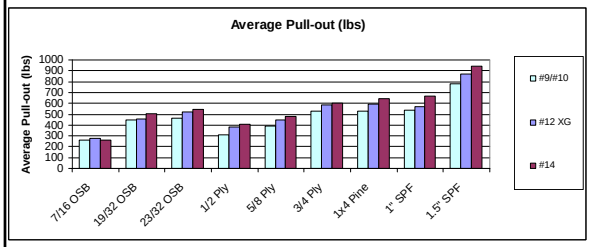

*Ultimate values listed are the result of laboratory testing and may vary depending on specific wood density variations.

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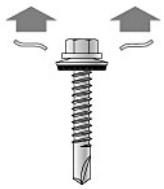
Pull-Over

- The ability of the fastener to resist the pulling of the fastened sheet material over the head of the fastener due to gravity, wind or other loads.
- Related to the strength and diameter of the washer and strength and thickness of the metal panel.



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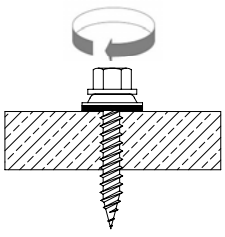
Torque to Strip Out

- What is it?
- Why is it critical?



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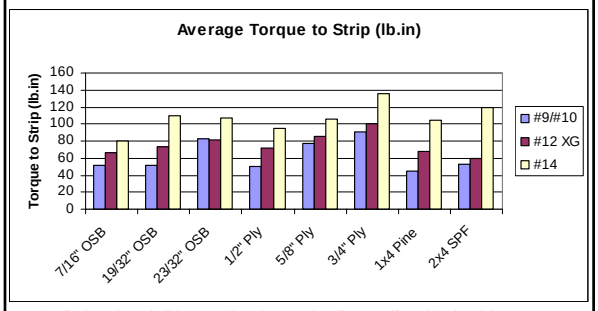

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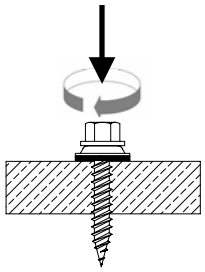
Dynamic Strip Out

- What is it?
- Why is it critical?



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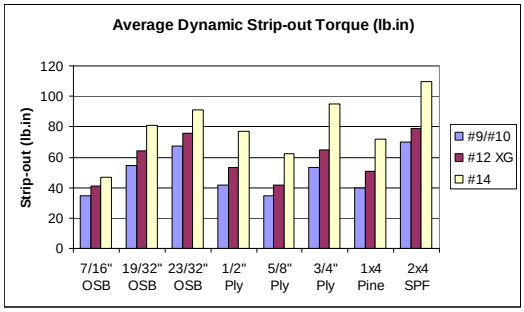

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'Back Out'

- Expansion/Contraction of panels
- How to reduce fastener back out.

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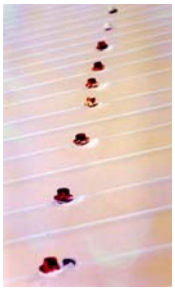
Corrosion



Coastal area

Carbon steel fasteners after 8 months

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Designs to reduce corrosion

- Stainless Steel Capped Fasteners
- Zinc Aluminum Capped
- Bi-Metal Fasteners
  - 300 Series Stainless steel fastener with carbon steel point

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Screw Guns

- Impact
- Corded/Cordless
- Drywall (high RPM)

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Impact

- Lightweight and Compact Design
- Installs fasteners with a combination of bit rotation and concussive blows
- Typically rated in BPM (Blows per minute) not RPM.
- Not Recommended
  - Installation can be very hard on paint finish, increased bit wear.

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Drywall Gun

- Typically used for attaching fasteners into Drywall
- Screw guns generally have a higher RPM setting
  - 0-4000 RPM
  - 0-6000 RPM
- Used in the market by some due to the higher RPM's, which are believed to help with installation times.
- NOT RECOMMENDED!
  - Installation with these types of guns can cause fasteners to strip-out and cause weather tightness problems.

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Standard Drill/Drive Gun

- Many variations of this gun in the market.
- Guns are rated in RPM's
- Typical speeds are:
  - 0-600 RPM
  - 0-2000 RPM
  - 0-2500 RPM
- Generally have a clutch mechanism or depth sensing nose piece

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Sockets

- Replace worn drivers
  - Worn drivers can cause extra clearance between the fasteners hex faces and the interior hex walls of the driver which can lead to fastener wobble.
  - Worn drivers on internal bits can cause damage to the internal drive of the fastener or prevent installation of the fastener.
- Remove metal shavings from magnet
  - Metal shavings and debris can cause damage to fastener coating during installation or improper seating in the driver.
  - Use sealant in hex driver and remove rapidly to clear shavings from magnet

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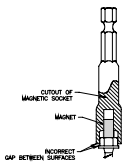
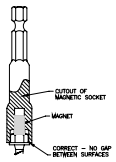
Magnet Depth

- Improper
  - Magnet set to low
- Proper
  - Magnet rest on washer of Fastener





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Lobular Design

- Installation Benefits
  - Drives on Hex Flat, not Corner
  - Forgiving on paint
  - Easy insertion & removal

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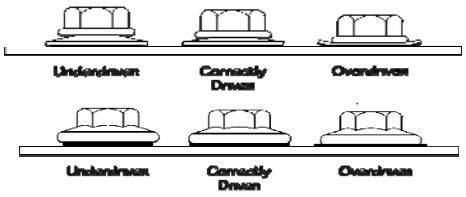
Washer Compression / Style



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Questions???