



I typically see issues with the fastening of the metal deck with powder-actuated fasteners (PAFs). The Issues stem from the **Manufacturer of steel joists and how the steel flange is constructed, and other times it is the actual installation of the fastening system to the steel substrate.** Many times, I see PAFs not fully engaged into the steel deck, on an angle, or too close to the edge of the steel. I have also seen the wrong PAFs used into thicker structural steel. This bulletin will discuss lessons learned and what is the correct installation of the PAFs per manufacturer installation instructions.

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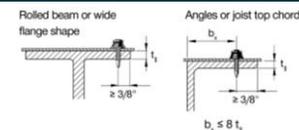


Figure 7: Edge Distance Recommendations

Deck should be marked to correctly locate the steel substrate & PAFs

## Lessons learned for proper fastening of PAFs

- ❑ **ALWAYS REVIEW INSTALLATION PROCEDURES** from the manufacturer prior to the installation for each fastener type.
- ❑ Verify that each installer using the PAF machine has an updated certification card (one year).
- ❑ When installing through multiple layers of metal deck, it is important that all the layers be tight against one another prior to the PAF installation. There should not be a visible gap between layers or between steel.
- ❑ Review the proper location for the fastener at the steel beams and flanges ( $\geq 3/8"$  from edge)
- ❑ The depth of the fasteners should follow the diagrams to the right, per the manufacturer installation instructions. (The red plastic should "Flower")
- ❑ Prior to the start of installation, the installer should test the power adjustment of the unit for each type of fastener. Using the correct power cartridge is critical.
- ❑ Rolled top flanges (vs angles) of the joist will create difficulty for the installer because the steel is on a slight angle and is harder steel. PAFs tend to move or bounce when installed.



Properly driven fastener

A flowering of the top hat seen from top and side views indicates a proper driven X-HSN24 fastener.

- ❑ **Contact the Quality Department to discuss the manufacturer for the joists to determine if there is an issue with the construction of the joist and using PAF systems for fastening. When this is the case, The Quality Department recommends using a different form of attachment, such as puddle welds or screws.**
- ❑ Discuss having the deck installer mark the location of the joists. Getting the pin in the correct location is critical for a proper installation and reduce the likelihood of re-shooting the deck.
- ❑ Discuss making sure that the gun is perpendicular to the deck for proper installation. When the gun is on an angle, the pin will skip and be installed on an angle and/or not fully engage into the steel.
- ❑ The pins have a maximum and minimum steel thickness associated with their use. Always double check the thickness prior to the installation for each type of PAF.
- ❑ Make sure that we perform a Quality Pre-installation meeting with the installing contractor's Foreman and the Hilti Representative, going over the proper installation methods.
- ❑ **The Quality Department recommends a first work in place review by our team and the Hilti Representative. This will not only produce a better installation overall, this will serve as a mock-up for new tradesman.**

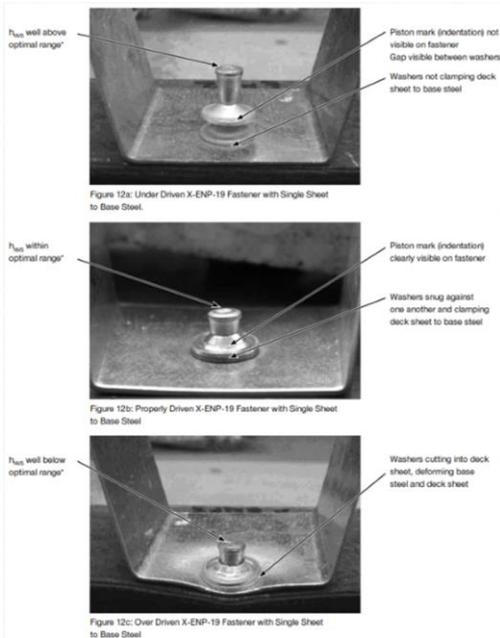


Figure 12a: Under Driven X-EMP-19 Fastener with Single Sheet to Base Steel.

Figure 12b: Properly Driven X-EMP-19 Fastener with Single Sheet to Base Steel.

Figure 12c: Over Driven X-EMP-19 Fastener with Single Sheet to Base Steel.

### Example of Hilti X-EMP-19 installation

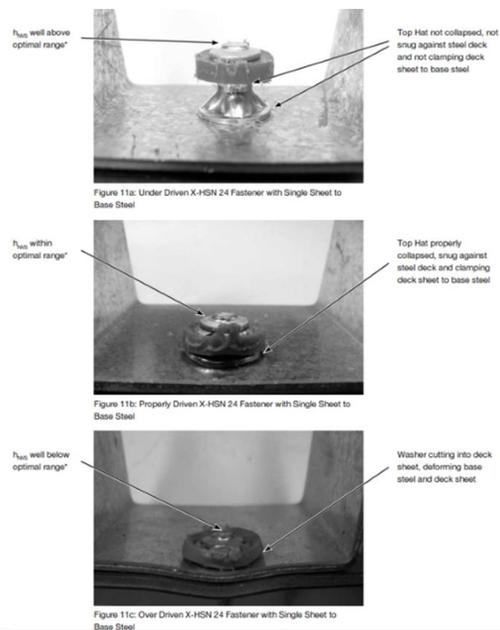


Figure 11a: Under Driven X-HSN 24 Fastener with Single Sheet to Base Steel.

Figure 11b: Properly Driven X-HSN 24 Fastener with Single Sheet to Base Steel.

Figure 11c: Over Driven X-HSN 24 Fastener with Single Sheet to Base Steel.

### Example of Hilti HSN-24 installation



Joist angle top cord is extruded – this is easier to install the PAF and is the ideal joint (Vulcraft, Can Am, or Sim.)



Joist angle top cord is bent – this is very difficult to install the PAF and is a concern that should be avoided with using PAFs (New Millennium or Sim.)



Incorrect installation **On an angle and not flowered**



Incorrect installation **Not fully engaged or flowered**