

Samtec Compliant Pin Termination Specifications

Samtec offers compliant pin leads, also known in the connector industry as press-fit leads, on select product series. (See Figure 1) The connector is terminated, or processed, by pressing it onto the printed circuit board (PCB). Such a lead is designed to create a gas tight interference fit with a properly sized plated-through-hole (PTH). This enables low temperature, solder-less processing for the connector. All Samtec compliant pin leads are “eye of the needle” geometries. Eye of the needle geometries have been utilized for over 30 years. Special tooling is required to terminate the connector, and it is referenced on the specific Samtec product’s Print.

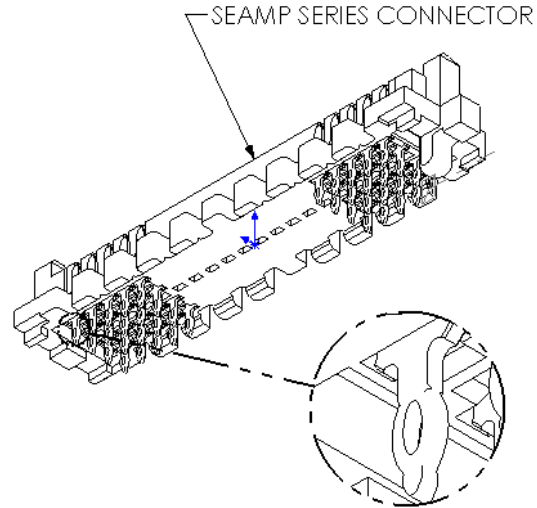


Figure 1

Samtec compliant pin products are designed to work with a minimum thickness PCB. The minimum thickness is defined in the Product Specification or on the Footprint Drawing for that specific Samtec product. In the absence of a documented minimum PCB thickness, the default minimum PCB thickness is .062”.

It is not necessary for the “eye” to be centered in the PCB, only that it be seated to a certain depth. (See Figure 2) PCB thicknesses greater than the minimum are allowed as long as the PTH construction tolerances are held in the region in which the compliant geometry operates.

SECTION OF SEAMP IN 0.062" PTH

SECTION OF SEAMP IN 0.125" PTH

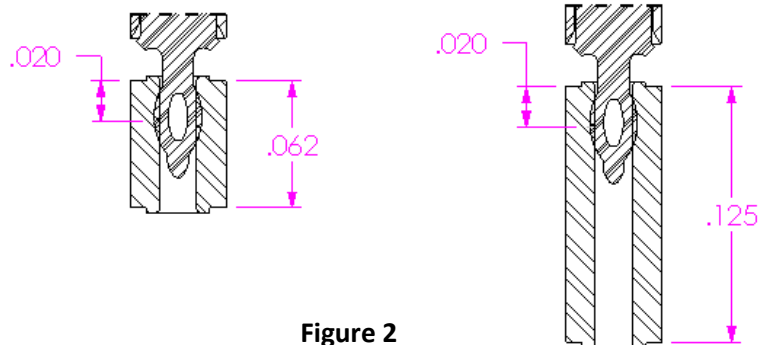
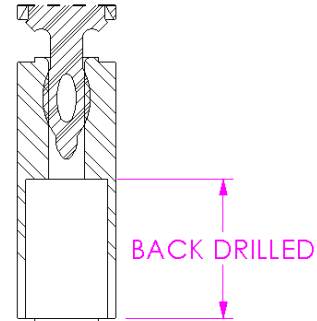
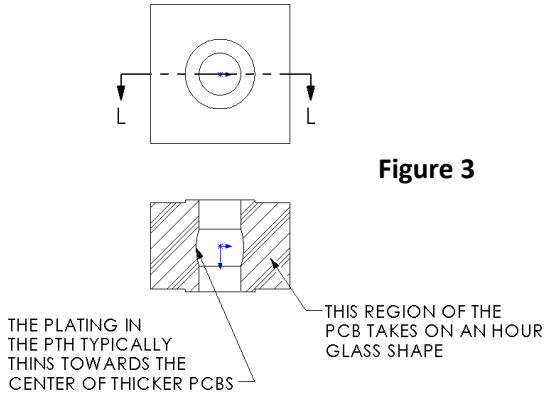
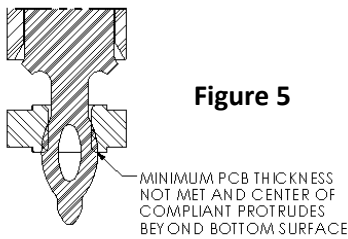


Figure 2

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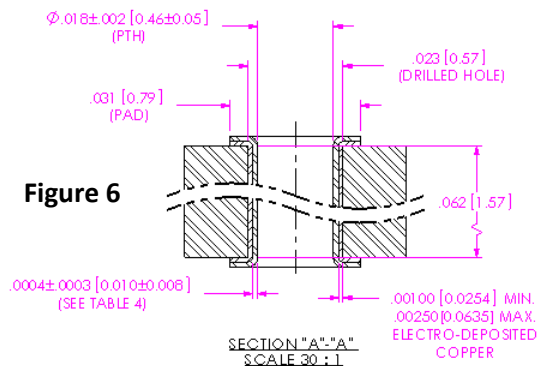


Care must be taken with thicker PCBs to ensure that “hour glassing” does not occur in the region of operation. (See Figure 3) Back drilling, a practice to control capacitive coupling, is acceptable with compliant pin products, and it further illustrates the point of maintaining hole construction tolerances only in the region of operation. (See Figure 4)



It is possible for compliant pin products to be over inserted in PCBs that fail to meet the minimum PCB thickness criteria. The product should not be used when the center of the compliant region extends past the PCB bottom surface. (See Figure 5)

Strict adherence to PTH construction data is recommended to ensure proper termination and function of the compliant region. Figure 6 is an example of such data for Samtec’s SEARAY™ SEAMP Series. Minimum PCB requirements can be a result of excessively high compliant loads that generate stress levels that can fracture a PCB. This can occur even though the thickness allows proper positioning of the eye of the needle in the PCB.



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The connector is properly terminated when the standoffs are flush to 0.005" above the PCB. (See Figure 7) The PCB and connector assembly should be inspected from the back side of the PCB to ensure that the pin has properly entered the PCB and not buckled. IPC-A-610D Section 4.3.2 further defines acceptance criteria for proper compliant pin termination.

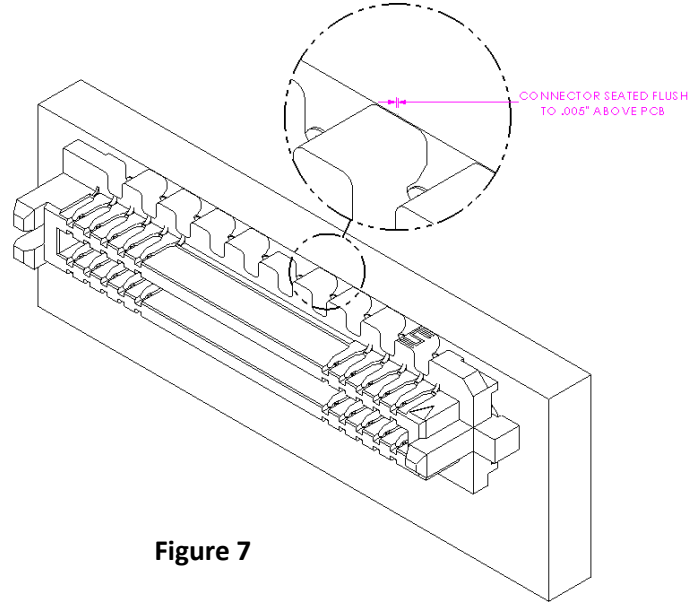


Figure 7

Tail protrusion from the back side of the PCB is not necessary. There are instances where tail protrusion facilitates electrical inspection, especially bed of nails testing. (See Figure 8) This testing can still be completed by probing the PTH or plugging a harness into the connector.

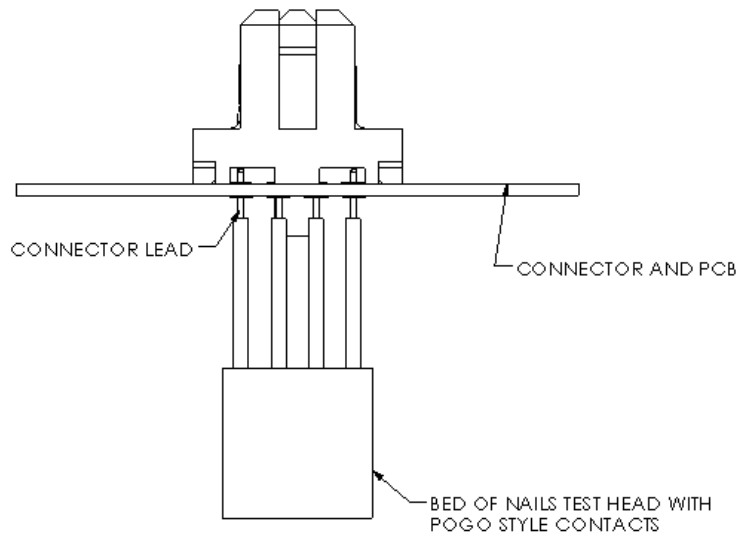
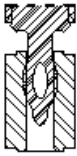


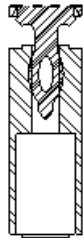
Figure 8

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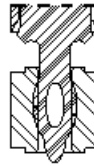
The following illustrations summarize correct and incorrect positioning of compliant pin leads in the PCB.



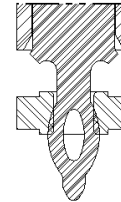
Good



Good



Good



Bad

For more information, contact Samtec's Interconnect Processing Group at ipg@samtec.com.