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Hi-Rel By Design

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Design & Process Guidelines

GUIDE# 6

Common Flanged Feedthrus Present an Application Challenge

The typical method used with soldering flanged feedthrus is to place a preform under the head. When the solder flows, the feedthru settles or is pressed against the housing and the thickness of solder left under the head is nearly zero. The excess solder for the most part flows down between the barrel of the feedthru and the housing bore. Some solder may move outward to form a fillet between the edge of the head and the housing c'bore or a corner fillet if not counter- bored.

Upon temperature change, the thin solder layer between the head and the bottom of the c'bore is insufficiently flexible to absorb any radial strain between the feedthru and the housing and will crack.

If a good fillet develops at the outer edge of the feedthru head over 360° of the head, some leak integrity may be derived but is dependent on a very thin joint and will be questionable for long-term thermal cyclic life.

The solder that flows down the barrel will typically not achieve a hermetic seal. The tolerances commonly used on the feedthru barrel and the bore diameter provide such a variation in the volume of solder required to insure a seal that a 360° seal is usually not achieved. Even if the parts are designed to tighter tolerances, it is not likely that consistently tight joints can be achieved. Use of a thicker preform does not necessarily solve the problem since the direction of flow (up or down) is not easily predictable. Without a centering feature, the solder joint thickness will vary greatly over the circumference. The solder will seek the gap of optimum capillary and starve the remainder of the joint.

The resulting solder joint with less than complete fill is blind and not inspectable, except by x-ray techniques. Rework is messy, costly and frequently ineffective.

In conclusion, esthetically pleasing solder joints may be achieved but the product will experience high failure rates and low reliability. For the reasons listed above, SHP does not recommend the use of common externally flanged feedthrus where hermetic reliability is important.