

# TECH SHEET

## PEM® - REF/ C/L TO EDGE

### SUBJECT: MINIMUM DISTANCE HOLE-CENTERLINE-TO-EDGE

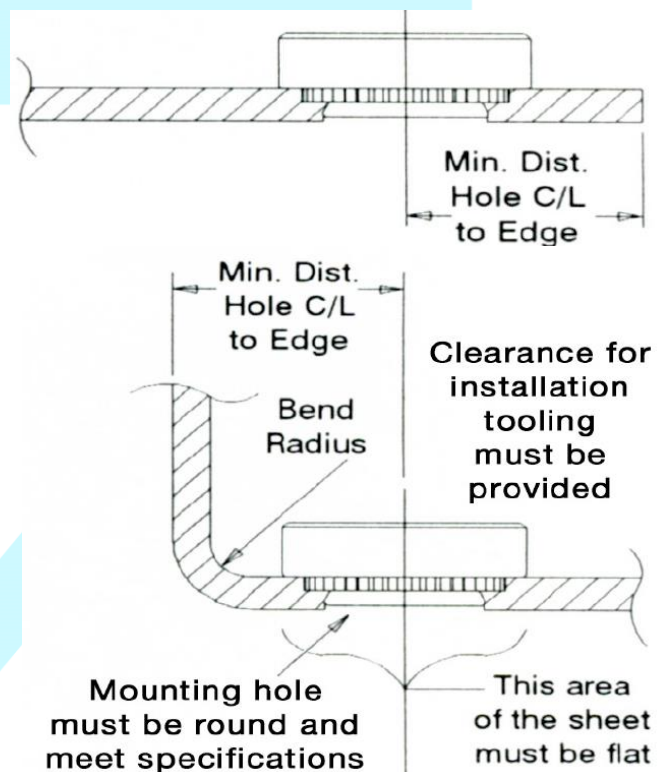
The term “minimum distance hole-centerline-to-edge” is defined as the minimum distance the mounting hole centerline may be to one edge of a panel to still allow the proper clinching of a fastener into the sheet. When a fastener is close to more than one edge, the published performance data for the fastener will no longer be applicable.

When the hole-centerline-to-edge distance does not meet the minimum required, visible bulging of the edge of the panel may occur with installation. Bulging of the edge of a panel indicates a possible problem with the clinched fastener. Bulging is a result of the clinch feature not being completely filled since the material that was meant to flow into the clinch feature is now moving away from the fastener, displacing the edge material.

While a support against the edge of the panel during fastener installation may prevent bulging and help to better clinch the fastener, achieving 100% of our catalog value cannot be guaranteed. In any case, testing of the fastener in the panel is recommended to determine what performance range can be expected.

Furthermore, while added sheet thickness does have a limited positive effect on the performance, no sheet thickness is large enough to guarantee 100% of our catalog values once the minimum centerline-to-edge distance has been violated.

Another aspect concerning proper performance occurs when the fastener is installed close to a bend rather than an edge. Three factors must be considered when one is installing a fastener close to a bend. The first is that all holes should be punched after bending to prevent the hole from becoming out-of-round and therefore outside our catalog specified values. Secondly (see drawing to right), our self-clinching fasteners are designed to be installed into flat sheets. The fastener must be located outside the bend radius, so that the sheet is flat. Once the first two criteria are met, the fastener may be installed as close to the bend as the installation tooling will allow.



The process becomes slightly more complicated in the case of multi-sided close-to-edge applications. All minimum centerline to edge distances given in catalog bulletins apply to one edge only. If this distance is applied on multiple sides as shown here and the edges are not supported during installation there will be significant panel distortion as shown by the dotted lines. This distortion will reduce the amount of panel material and may significantly reduce the holding power of the clinch feature.

Finally another important aspect that can affect the clinched fasteners' performance is the spacing in the case of multiple fasteners.

Multiple fasteners installed must be spaced far enough apart to avoid distorting each other's holes. Failures seen can include sheet distortion and "oil canning". When determining the distance between two or more fasteners, you can calculate the distance by the formula, C/L to edge +  $\frac{1}{2}$  the diameter of the second mounting hole.

