



Designing Parts for Linear Vibration Welding

General Description

This bulletin provides guidelines to aid the designer during the initial concept and design of a new product. All designs should be used for *guidelines purposes only*, since the specifics of your application may require variations. If you have questions or need assistance in designing your parts, contact your local sales representative or technical consultant.

Primary Factors Influencing Joint Design

All of the following basic questions must be answered prior to the design stage to gain a total understanding of what the weld joint must do:

- What type of material(s) is to be used? Does it contain a filler?
- What is the overall part size and configuration including tolerances?
- What are the final requirements of the part?
 - Is a structural weld desired? If so, what load forces does it need to resist?
 - Is a leak-tight seal required? If so, to what pressure?
 - Does the assembly require a visually attractive appearance?
 - Is visual flash or loose particulate objectionable inside and/or outside?
 - Any other requirements?

Key Design Considerations

The following points need to be addressed when designing parts for vibration welding:

- There must be enough clearance between the two parts for the vibration motion (0.080" [2.0mm] total, ± 0.040 " [1.0 mm] off centerline).
- The weld bead or tongue should be equal to the nominal wall thickness for unfilled materials, and at least 1.25X the nominal wall thickness for filled materials, depending on weld strength requirements.
- The part walls must be stiff enough to prevent flexure or bending during welding. In many cases this may require adding flanges.

Figure 1, a tongue and groove design with grip tabs, is the ideal vibration welding joint. It securely holds the flange in the tooling, aligns the mating parts to each other before welding, applies the weld force directly over the weld area, and hides flash both internally and externally. The grip tab need not be continuous. A raised tongue is provided on one part to provide material to melt and flow in the joint during vibration. In reality, material is displaced from both parts during welding, but convention usually adds weld material only to the tongue.

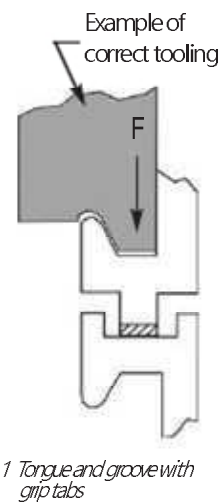


Figure 2 shows a flange with grip tabs, and has all the features of the joint in Figure 1 except it does not contain flash. Narrower flanges may be possible and the fit between the two parts is not as critical.

Figure 3 shows a variation of the tongue and groove joint that is used when a shallow or flat cover is to be

