

IFI

# AN INTRODUCTION TO RIVETS

RIVETS

Riveting has several attractive features which encourage its use in a broad variety of assembly applications. Generally its support stems from its high installation rates which may exceed one thousand installations per hour. Coupled with this characteristic are others such as high assurance or dependability and relative simplicity of product design which encourages its adoption for automated assembly at relatively low cost. Supporting these products are excellent choices of installation equipment and machinery which provide good reliability and ease of use.

The rivet is primarily used in shear designs which is one reason they are widely used in many aircraft assembly applications. Generally the rivet, when installed (set), is not stressed in tension. Thus, in many applications which are designed in shear, the material of the rivet, its hardness, and its diameter must be carefully examined. Other important design and/or application issues relate to head configuration, length, spacing, edge distance, hole size, and accessibility. A good resource for further guidance may be found in the Appendix of the Society of Automotive Engineers Standard SAE J492 — Rivets and Riveting and the IFI Technical Reference Guide for Blind Fasteners.

## Small Solid Rivets

In metric sizes ranging from 1 mm thru 12 mm, three basic head styles are offered as standard. These include: flat; round, and countersunk head designs. Solid rivets are generally used for maximum strength.

## Blind Rivets

These products comprise a family which is fully compatible with the needs of high speed automated assembly. The product family name is derived from its unique installation characteristic which allows for only single side access installation. Typically the rivet consists of two components: the rivet body or sleeve and the rivet setting mandrel. When this mandrel is pulled it creates an upset on the blind end of the rivet while simultaneously expanding the rivet body into the hole, joining the component parts of the assembly. Refer to Fig. 1.

Common head styles include the dome head, large flange head, and countersunk head. Four body styles are standard including open end, closed end, split end and slotted shank. The core may be semi-filled, filled or hollow. The two basic product types are the pull mandrel

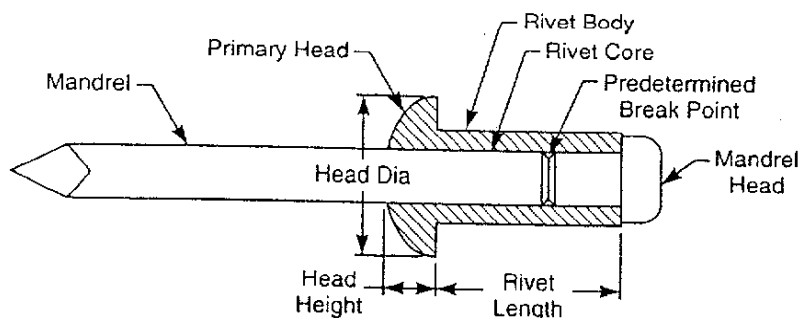


Fig. 1 Blind Rivet Elements

and the drive pin which have distinct actions during the setting operation. In setting the pull mandrel, the axial pulling action causes the mandrel head to upset the rivet body forming a blind head. In the drive pin setting operation, the pin is forced into the rivet body until the pin is flush with the top of the rivet head. This action flares or spreads the end of the rivet body forming a blind head.

Variables for consideration in the application of blind rivets include:

- joint type, configuration, thickness and material
- hole size

- tool access
- rivet size, material and spacing
- tightness of clinch
- hole type

A number of practical tips and suggestions are currently included in a Technical Reference Guide prepared by the IFI.

This section includes the metric standards for these products as developed by IFI. It is expected that these standards will serve as the basis for ASME standards development by its Standards Committee B18, specifically its Subcommittee 30.