



**HOWMET  
AEROSPACE**

# Fluid Products



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With a commitment to excellence and over 60 years of acquired experience, we have earned a reputation as a supplier of top-quality fluid products. Our Ring Locked fitting products incorporate the original "Rosán™ ring-locking principle," designed by Jose Rosán in the 1940's as the first practical answer to the industry's quest for a permanent locking feature that was both simple and dependable.

Today, our parts are used in many commercial, business and military aircraft, engines, auxiliary power units, and tracked vehicles. Most of our fluid products are available in unified and metric sizes, and are manufactured from materials such as titanium, corrosion resistant steel, aluminum alloy, and Inconel®. Tools are available for hole preparation, installation, removal and repair in support of our wide range of fluid products.

**Ring Locked fluid boss adapters** are designed with a captive locking that secures the adapter to the boss which prevents loosening or backing-off under severe vibration, temperature cycling or B-nut installation and removal. While considered semi-permanent, the adapters can quickly and easily be removed and replaced.

Due to their small envelope, these adapters are significantly lighter than hex unions, resulting in weight reduction of the hydraulic package system. Standard tube-end configurations consist of beam seal, flared and flareless. Variations of the standard design include reducers, expanders, and port plugs.

**Ring Locked fluid boss inserts** are used in initial designs or to repair damaged ports. These products are able to provide high-strength surfaces in which unions are installed. A separate locking secures the insert to the boss, thus preventing loosening or backing-off under severe vibration, temperature cycling, or fitting installation and removal.

STANDARD FITTINGS



CONICAL SEALS



RING LOCKED FITTING TOOLS



SPECIAL FLUID PRODUCTS



STANDARD FITTINGS



**Standard fittings** are used throughout the military and commercial aerospace markets. **Straight and shaped fittings** are available in a variety of configurations with both **37° flared** and **24° flareless** tube-ends. Other tube-end configurations include ball-nose, o-ring seal, pipe, bump, and weldable. Port plugs, sleeves, nuts, bushings, caps, and ferrules are available to complement all port configurations. Shaped products include 45° and 90° elbows, tees, crosses, swivels, and other unique configurations that meet special customer needs.

**Conical seals** effectively prevent leakage in critical applications. They eliminate potential problems caused by nicks, scratches, imperfect sealing surfaces or misalignment, as well as non-concentric conditions. The seals are easy to install and are effective in sealing light gases under extreme temperature and pressure conditions. Conical seals are designed to mate with 37° flared and flareless tube-end configurations.

We also design and manufacture a variety of **special fluid products** that meet specific customer design challenges. Some of these products include the characteristic ring-locking principle. Other products such as low profile 90° swivel boss adapter, ripple damper, bulkhead, and Klutch-Klip have been developed over the years.

To insure that we meet all of our customers' needs, we supply a full line of **tools** for the preparation, installation, removal, and repair of our fluid product offerings. We are known for having the widest selection of ergonomically-designed manual, pneumatic, DC electric, and cordless tools to meet all fitting and fastening needs.

RING LOCKED FITTING TOOL KIT





Howmet Fastening Systems [hfs.howmet.com](https://hfs.howmet.com)