Surface Engineering Items with Faying Surfaces, Inserts and Attachments

Revision 2 – 3 Oct 2026

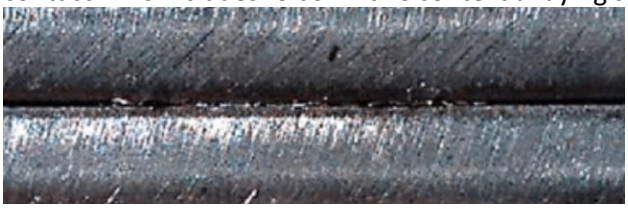
Introduction

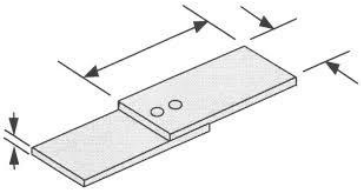
This technical brief is intended to highlight some considerations when designing metallic product which requires some sort of surface treatment that includes liquid immersion. Finishes like electroplating, electroless plating, anodising and chemical conversion coatings are covered by this topic.

The term 'finish' in the context of surface engineering includes surface treatment, coating, plating and conversion which changes (enhances) the surface characteristics functionally and / or visually.

Faying Surfaces

Faying surfaces are the contacting surfaces or faces of two similar or dissimilar materials placed in tight contact. This includes folds. In this context a faying surface is made prior to surface treatment.



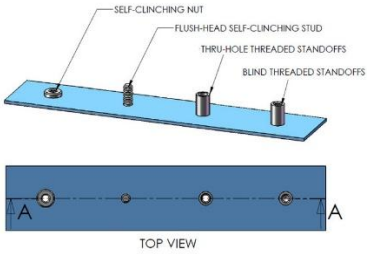


Faying surfaces must be avoided in designs that require immersion surface treatments such as anodising, electroplating and chemical conversion coatings unless a complete welded seal can be applied. There are significant risks of severe corrosion between the faying surfaces where corrosive cleaning and processing liquid can become entrapped by capillary action between the surfaces during processing. Corrosion products like salts and precipitate can leach from the faying surface overtime, usually when the product has been delivered to the end customer.

In the event a design is manufactured with faying surfaces that requires subsequent surface treatment, special cleaning and processing such as solvent wipe by local application (non-immersion) should be considered rather than immersion processing.

Inserts and Attachments

Inserts and other types of attachments that form a surface to surface push fit must be designed to be fitted after any surface treatment to avoid the same liquid entrapment issue as above.



Plating thicknesses must be considered that may affect push fitted inserts. In addition to the entrapment issue, dissimilar metals can cause problems during treatment. For example, Steel or Copper alloy inserts in an Aluminium alloy part that goes through immersion chemical conversion coating will inhibit the coating in the local area due to galvanic coupling. Zinc plated inserts fitted prior to treatment will be damaged by cleaning chemistry designed for Aluminium etc.

Preventive Action

Best preventive action is by design planning with a Design Failure Mode Effect Analysis (DFMEA) in place.