

## Copper Sulfate Passivation Test

The enclosed solution and the following procedure conforms to the ASTM A967, ASTM A380, ASTM F1089, AMS 2700, and MIL-STD-753 standards.

The copper sulfate test is intended to test the effectiveness of stainless steel passivation. It can also be used to determine if there is a need for passivation. The purpose of the copper sulfate test is to determine the presence of free iron which is usually induced onto the surface of a part during fabrication with steel components. The principle of the test is based on an oxidation-reduction reaction which causes the dissolved copper ions to deposit or plate out onto the free iron particles.

This test is recommended for the detection of free iron on the surface of austenitic stainless steels in the 200 and 300 series, precipitation hardened stainless steels, and ferritic 400 series stainless steels having a minimum of 16 % chromium. This test is not recommended for martensitic 400 series stainless steels or ferritic 400 series stainless steels with less than 16 % chromium because these steels will typically give a positive indication irrespective of the presence or absence of anodic surface contaminants. This test is also not recommended for laser marked areas.

The test solution is applied to the surface of the sample representing the lot of passivated parts, applying additional solution if needed to keep the surface wet for a period of at least 6 minutes. At the end of this period, the surface shall be carefully rinsed and dried with care taken not to disturb copper deposits if present. The test sample shall not exhibit copper deposits visible to the naked eye.

A copper color on the metal surface (brown or pinkish, like a penny) indicates that surface iron was still present and is considered a test failure. If no reaction occurs it is considered a test pass.

For best results, allow a few hours after passivation before testing. The copper sulfate test may not necessarily display a positive indication of iron on unpassivated parts. A failure state can be readily observed by using the copper sulfate solution on a piece of carbon steel.