



APPLICATIONS

Restoring ductility and tensile strength impacted by absorption of hydrogen during cleaning and plating processes

How Hydrogen Embrittlement Relief (Baking) Works

Hydrogen embrittlement (HE) is the metal's loss of ductility and reduction of load-bearing capability due to the absorption of hydrogen atoms by the metal. Hydrogen embrittlement causes components to crack and fracture at stress points well below the specified tensile strength of the metal.

Hydrogen can enter and diffuse through steel at room temperature, and this can occur during various manufacturing and assembly operations or operational use – any time that the metal comes into contact with atomic hydrogen. Given enough time, the hydrogen atoms migrate to the metal grain boundaries forming bubbles that reduce ductility and strength.

During the plating processes, hydrogen is present in acid pickling baths used to remove oxide scale from the surface of steel and produced at the surface of the metal being coated.

High-strength steels with a tensile strength greater than about 145 ksi (1000 MPa) are the alloys most vulnerable to HE. Usually, parts with hardness levels 39 Rockwell C and higher are susceptible to HE, and HE relief treatment is recommended.

Baking plated components at temperatures between 375 to 430 °F (190 to 220°C) within a few hours of the plating process prevents hydrogen embrittlement. During baking, the hydrogen diffuses out of the metal, restoring ductility and strength.

SPECIFICATIONS ASTM B850

CAPABILITIES & RELATED SERVICES

- Eco Finishing counts with four bake ovens with SpecView oven log graphs to control and monitor HE relief process

PROTECT YOUR COMPONENTS WITH HYDROGEN EMBRITTLEMENT RELIEF

Eco Finishing can help you prevent hydrogen embrittlement.

Contact our Fridley office at (763) 574-1000 or contact us for a risk-free quote at www.ecofinishing.com.