



The ISF[®] Process Reduces Dynamic Corrosion Fatigue

Problem

Corrosion resistance is of prime importance for the materials used in the aerospace industry, which often operate in corrosive environments. It is well known that material subjected to cyclic load far below the ultimate tensile stress can fail, a process called fatigue. If the metal is simultaneously exposed to a corrosive environment, the failure can take place at even lower loads and shorter time.



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Solution

ISF[®] processed parts have an increased cycle life when subjected to dynamic corrosion fatigue of martensitic stainless steel by

- Reducing the surface area
- Eliminating surface tensile stresses
- Enriching the chromium oxide content of the surface

Test

Martensitic Stainless steel specimens, which the ISF[®] processed to an R2 <2.5 μm . where compared to reference specimens, which were hand polished in the longitudinal to an R2 of 4.0 μm . The Specimens were tested to a runout of 5×10^7 cycles by reverse bending with a mean stress of 250 MPa and bending frequency of 50 Hz.

Medium	Stress (MPa) Hand Polished	Stress (MPa) ISF [®] Processed	Stress Percent Increase from ISF [®] Process
Air	250 \pm 385	250 \pm 445	16
Water	250 \pm 250	250 \pm 370	48
22% NaCl, 80° C pH 7 (sea water 3.5% NaCl)	250 \pm 250	250 \pm 195	117

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All sites are ISO 9001:2015 and AS9100:2016 Rev D certified

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