



TECHNICAL BULLETIN

STRESS CORROSION CRACKING

Stress corrosion cracking (SCC) -- The fracture of a metal in a corrosive environment.

Austenitic stainless steel belts are susceptible to a phenomenon known as "Stress Corrosion Cracking" under certain conditions. In particular, applications involving chlorine at an elevated temperature such as steamers are most damaging. The conditions required for SCC in stainless steels are:

1. Tensile stress
2. A specific damaging environment
3. Metallurgic condition
4. Time

1. **Tensile stress** -- can result from the fabrication of the material or applied stresses to the material in operation. This would most commonly be caused from high tension in the system.
2. **An SCC in an aqueous chloride environment** -- is the most prevalent type of damaging environment. Chloride-induced SCC is caused by a combination of five factors:
Concentration of chloride Oxygen pH > 2
Elevated temperature (>140°F) Time

3. **Metallurgic condition** -- Austenitic stainless steels are most susceptible to SCC unless they have been Heat-treated or stress-relieved.
4. **Time** -- the longer the belt has been exposed to the above conditions, the more quickly SCC occurs.

Stress-corrosion cracking occurs in the area of the belt, which is usually under the greatest amount of tension. SCC is characterized by fractures along the granular structure of the metal. Also, a distinguishable brownish tint is generally evident.

Significant concentrations of chlorine in either the water supply or the product or both can also have a damaging effect on the belt. This is most likely to occur in steaming applications, particularly in fish processing.

Ashworth recommends the following preventative steps be taken to avoid premature belt failure due to Stress Corrosion Cracking:

1. Careful selection of belts materials in particular the overlay Omni-Grid belts. Further resistance can be obtained by selecting other grades of Austenitic stainless steels for the belt construction. *Contact Ashworth Bros. for assistance.*
 - **Note that this is a symptomatic treatment and not a "cure" for stress corrosion cracking but will result in improved belt life**
2. Reduce the amount of chlorine in the water supply and/or the cleaning solution. If possible, filter the water and use a different cleaning solution to reduce amount of chlorine coming into contact with the belt.
3. Reduce the amount of tension in the system. The area of the belt that is most susceptible to stress corrosion cracking is usually under the greatest amount of tension.
4. Ensure that steps have been taken to keep tension low, such as:
 - Increasing the overdrive of a spiral system
 - Decreasing the amount of weight in the take-up loop
 - Maintaining a thorough cleaning and lubrication schedule

For further reference, see:

Corrosion Source Book, Seymour K. Coburn, Consulting Editor, 1984

Materials Handbook, 9th Ed., Vol. 3: Properties & Selection: Stainless Steels, Tool Materials and Special-Purpose Metals, ASM, 1980.

Copyright © Ashworth Bros., Inc. - All rights reserved. This document may not be reproduced in whole or in part without the express written consent of Ashworth Bros., Inc.

Ashworth Bros., Inc. provides this information only as a service to our customers and does not warrant the accuracy or applicability of the information contained herein.

Ashworth Jonge Poerink bv
Borne, The Netherlands
Tel: +31-74-265-6565
Fax: +31-74-266-1134
Email: ashworth@ashworth.nl

Ashworth Bros., Inc.
Winchester, VA U.S.A.
Phone: 540-662-3494
Fax: 800-532-1730
Email: ashworth@ashworth.com
Website: www.ashworth.com

Ashworth Europe Ltd.
Kingswinford, United Kingdom
Tel: +44-1384-355000
Fax: +44-1384-355001
Email: ashworth.europe@ukgateway.net