SAFEGUARDS
SGS CONSUMER TESTING SERVICES

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# CORROSION OF METAL ACCESSORIES USED ON APPAREL AND FOOTWEAR

Corrosion is the destruction of metal materials resulting from chemical or electrochemical reactions with the environment. The surface nature of a material is the factor having the greatest influence on its susceptibility to corrosion. Since it is on the surface that the protective inactive film is formed; a non porous oxidic coating, cracks and roughness inhibit the formation of a continuous inactive film. Environmental factors may also change the porosity and/or the continuous nature of the film.

Metal trims commonly used in the fashion industry are buckles, eyelets, rivets, buttons, or snaps. The appearance change due to the corrosion on metal trims is the main concern of the consumer. Corrosion will affect the aesthetic properties of a product, may cause staining on the adjacent fabric or material, and may affect the function of the metal trim, e.g. buckle, metal hook. It is unacceptable for a metal trim to become corroded in a short period of time.

**Below are some of the factors affecting corrosion.**

- Temperature,
- Time of wetness (the length of time the metal surface is covered by a film of water),
- Humidity,
- Presence of Air Pollutants e.g. gas fume, sulphur dioxide,
- Presence of electrolytes.

**Assessing the corrosion resistance properties of the metal trim**

Below are common testing methods used by the apparel and footwear industry:

| Test standard | ISO 22775:2004 Footwear test methods for accessories: Metallic accessories – Corrosion resistance Method 1 (sulphide tarnishing) | ISO 22775:2004 Footwear test methods for accessories: Metallic accessories – Corrosion resistance Method 2 (salt water corrosion) | ISO 9227:2006 Corrosion test in artificial atmospheres: Salt spray tests | ASTM B117:2009 Standard Practice for Operating Salt Spray (Fog) Apparatus |
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| Test Principle | To determine the propensity of a metal surface to change visually due to contamination by corrosion due to atmospheric pollution (Method 1 sulphide tarnishing) | To determine the propensity of a metal surface to change visually due to contamination by corrosion due to the action of salt water (Method 2 salt water corrosion) | For assessment of the corrosion resistance of metallic materials, with or without permanent or temporary corrosion protection. The salt spray test is particularly useful for detecting discontinuities such as pores, and other defects in certain metallic, anodic oxide and conversion coatings. | Provide a controlled corrosive environment which has been utilized to produce relative corrosion resistance information for specimens of metals and coated metals exposed in a given test chamber |
| Evaluation | Signs of discoloration | Signs of corrosion and the staining on cotton lawn | Appearance change | Appearance change |
| Application | Metallic accessories for footwear and also it is applicable for apparel metallic accessories | | Exterior Metal parts e.g. metal trim on outdoor equipment like tent | |

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