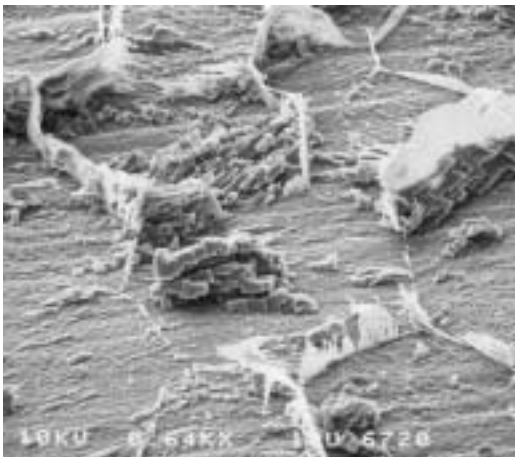


FILIFORM CORROSION PREVENTION

Aluminum anodizing is an effective means of protecting aluminum alloys from atmospheric attack. When exposed to the atmosphere, untreated aluminum naturally forms a clear oxide layer that offers a degree of protection; anodizing is a means of controlling that process and enhancing its effect. Anodizing can be clear or colored, used as a final finish (properly sealed) or as a pretreatment for other finishes such as liquid paint or powder coat.

Filiform corrosion (FFC) is sometimes found on painted or lacquered aluminum surfaces. Its characteristic worm-like pattern is a result of corrosion products left behind by an advancing point of corrosion at the aluminum-coating interface. These corrosion products lift the paint coating from the aluminum surface leaving little damage to the aluminum surface, but a very objectionable visual effect.



This electron micrograph of replicated filiform corrosion shows preferential grain boundary attack.

This type of corrosion is generally associated with exposure to marine and, to a lesser extent, industrial environments—or a combination of both. The removal of surface magnesium oxide and

chemically etching the surface of the aluminum to remove so-called active regions near the surface have been shown to be essential to producing a clean surface for conversion coating and painting, and, thus,

the elimination of FFC. This is exactly what happens in a conventional sulphuric acid anodizing process, where a high temperature degreasing or an acid cleaning process removes the magnesium oxide and a caustic etch pretreatment is used prior to anodizing.

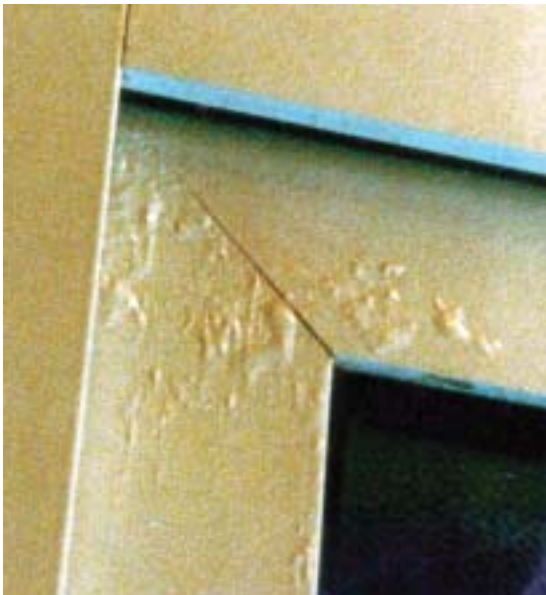


Aluminum that is exposed to the elements can be anodized to enhance the naturally occurring oxide that forms on its surface and to protect the base metal from attack by atmospheric components.

FILIFORM CORROSION PREVENTION

The commonly used chromate conversion pretreatments, used after cleaning, are consistently coming under review because of the toxicity problems associated with disposal of chromium sludges as a resultant waste from rinse waters, and the handling and sawing of the finished product in the factory or on site. Anodizing in sulphuric acid offers an environmentally clean alternative to chromate conversion coatings.

Standards organizations such as Qualicoat and GSB in Europe have accepted anodizing as a pretreatment prior to painting. Qualicoat states that the anodizing



Filiform corrosion often can be found on painted aluminum components located in marine environments. Anodizing, used as a pretreatment prior to painting, may help keep such corrosion from occurring.

conditions must be chosen to produce a film with a thickness of at least 3 μ m (0.12 mil) and not more than 8 μ m

(0.32 mil). For batch anodizing, sulphuric acid at a concentration of 180-200 g/l at 20-30°C (68-86°F), and a current density of 80-200 A/m² (8-10A/ft²) are stipulated as the required anodizing conditions.

When intended for use under paint, anodized aluminum may often be left unsealed. As always, it is best to confer with your anodizer when determining which process parameters to follow.



Aluminum components sited in marine environments are subject to particularly strong atmospheric conditions such as salt spray. Such applications may benefit from the protection of aluminum anodizing.