

WHISKERS IN CONNECTORS

According to IPC-TM-650-TM 2.6.13



Lab Report

Adnane
JAGHMIM

March 2019

NICOMATIC Statements

In Military or Space environment, electrical components must be highly reliable. One of the most important reliability parameters in connectivity is Whiskers prevention that can cause big failures in final application¹. To prevent failures, it is core to pay attention to the connectors coating components.

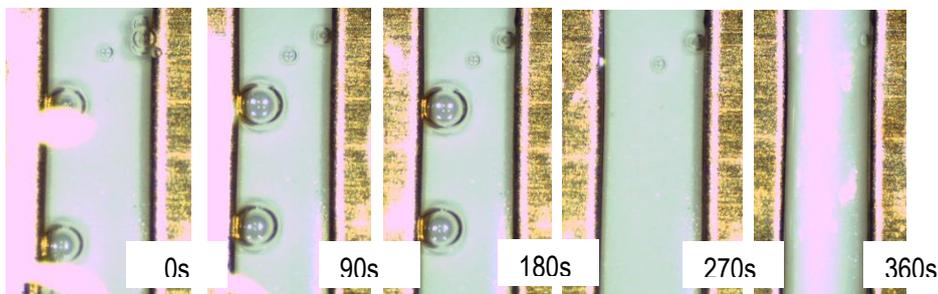
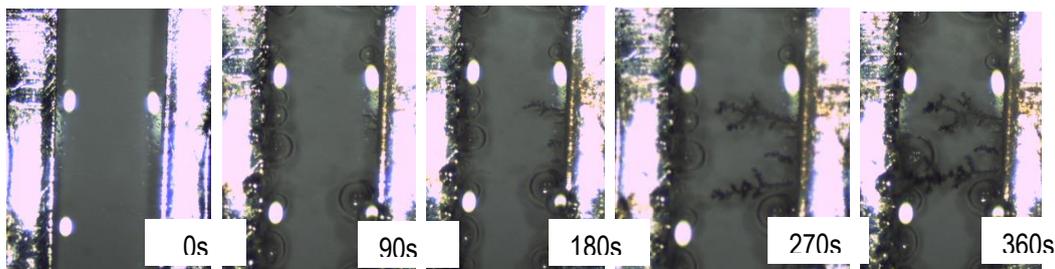
Whiskers are hairy-like crystalline metallurgical phenomena that grow spontaneously from a metallic surface and perpendicular to this one creating a momentary short circuit. They grows under the following specific conditions:

- Compressive stress environment
- Highly humid environment
- Material with low Fungus resistance (i.e. connector Housing)
- Low Voltage between 2 contacts (5-10 V DC)
- Metallic surface favorable to growth (Tin, Zinc, Cadmium ...)
- Surface or space that allows growth

It is known that presence of “Lead” in the plated material (especially in tin plating) greatly diminishes whiskers growth potential. But ROHS Directive introduced in February 2003, prohibited this solution .

Since a long time, NICOMATIC has chosen to use gold plated contacts in their connectors in order to be Whiskers Free. Gold Plating has been the subject of many studies^{2,3,4} that prove its efficiency against Whiskers growth. We decided to prove our compatibility by an additional test.

The tests were made according to IPC-TM-650-TM 2.6.13 standard, to analyze our component predisposition to Whiskers growth.



NICOMATIC Gold Plated contact vs tin plated contact under favorable environment to Whiskers growth

“NICOMATIC Gold Plating prevents from Whiskers growth comparing with Tin Plating”

Reference:

¹ NASA - "Publicly" Reported Failure References

² "Eliminate Whisker Growth on Contacts by Using a Tin Alloy Plate," R.P. Diehl & N.A. Cifaldi, Insulation/Circuits, pp. 37-39, Apr. 1976.

³ "How to Avoid Metallic Growth Problems on Electronic Hardware," Tech Report IPC-TR-476, The Institute for Interconnecting & Packaging Electronic Circuits (IPC), 1977

⁴ "Spontan," S.C. Britton, Trans. Inst. of Metal Finishing, Vol 52, pp. 95-102, Apr. 1974.