



Lab Report

Adnane
JAGHMIM

Sept 2018

Gold removal before soldering

IPC J-STD-001G

Compatibility

CMM/DMM contacts

NICOMATIC Statement

IPC-J-STD-001G standard requirement for Class 1, 2 and 3 component, Chapter 4.5 Removal of Component Surface Finishes states the following:

“Certain surface finishes on component terminations or PCB lands may impact the quality of the solder connection.

(...) the PCBs or parts are exempt from the requirements for finish removal stated in “4.5.1” and “4.5.2”, if there is documented objective evidence, available for review, that there are no gold related solder embrittlement issues, or other metallic surface finish solder joint integrity problems, e.g. with Sn or SnBi, associated with the soldering process being used, see IPC-HDBK-001 or IPC-AJ-820 for guidance.”

An external study concerning Gold presence on solder connections for all NICOMATIC standard ranges was made to analyze our connectors.

According to Studies reference³⁴⁵, gold levels greater than 3%_m favor "gold embrittlement" phenomenon creating an intermediate intermetallic phase inducing weakening properties at the Pb-Sn weld. Each measurement consists of an SEM image, a chemical composition spectrum and a composition measurement in %_m for each detected element (Max, Min, Mean, and Standard Deviation).

All the measurements show that the gold levels are lower than 2.65%_m in the interfacial zone between the weld and the pin. Therefore 3%_m is not reached.

One can find measurements details in the laboratory report (RT1824).

Manual soldering and wave soldering processes can be used to solder these connectors without any risk of weakening the solder due to gold presence. For NICOMATIC connectors, gold removal is not necessary before the soldering process.

Gold level in intermetallic phase can also be calculated:

$$wt\%Au = \frac{wtAu}{wtAu + wtSnPb} * 100$$

Where $wt = V * \rho$,
V = volume and ρ = density of the material

“Gold removal is not necessary before the soldering process”

REFERENCES:

¹4.5.1 - Gold Removal (IPC J-STD-001G)

²4.5.2 - Other Metallic Surface Finishes Removal

³Solder Joint Embrittlement Mechanisms, Solutions and Standards, Mike Wolverton, IPC APEX EXPO, 2014

⁴The Need For Gold Removal On Solderable Surfaces, Leo Lambert, EPTAC

⁵Gold Embrittlement of Solder Joints, Ed Hare, 2010, SEM Lab, Inc