



EFFECTS OF CONTAMINATION ON ELECTRONIC ASSEMBLES

Contamination of any kind invariably reduces the long, medium and short-term reliability of electronic assemblies in complex interdependent ways.

Since contaminants are commonly hygroscopic in nature, the superficial impedance of insulation materials is inevitably reduced by localised contamination. This effect is particularly harmful when the affected components normally exhibit high impedance at component terminals and as with modern electronics, very close geometrical tolerances (0.64mm) between those terminals are utilised. The addition of new electrical elements created by contamination in the circuit will tend to drain currents, affect alternating voltages and potentially change the designed performance of electronic circuitry.

The next most significant effect of contamination is the potential for “corrosion” on exposed metallic surfaces and contacts. Corrosion on electronic components can manifest itself as “unwanted electrochemical migration”. Electrochemical migration is where a conductor with a positive potential dissolves into positively charged metal ions, which then move in the electrical field towards the negative conductor. The ions again turn into metal at the negative conductor, forming long, tree-shaped dendrites, which will eventually short-circuit the electronics.

Three factors are necessary for electrochemical migration:

- Humidity
- Conductors of different potential (electrical potential present in equipment switched on)
- Contamination (chloride deposits)

Low levels of chloride ions readily derive from fingerprints, saliva, perspiration, skin flakes, respiration, etchants, the fluxes utilised in soldering processes, plastics used for die attachment, moulding compounds, or more directly from the ambient operating environment. This is considered to be normal and forms part of the original equipment manufacturers determination of the service life of any given item of electronic equipment. However, in the case of a contamination incident the risk of corrosion is greatly increased by increasing the concentration of chloride ions to unwelcome and potentially harmful levels, especially those left in an uncontrolled atmosphere after contamination.

Laboratory analysis of the professional decontamination methods used by Regenisys Ltd has proved that chloride contamination can be consistently reduced to below the minimum levels specified in MIL-STD-2000A for newly manufactured electronics.

MAXIMISE THE POTENTIAL FOR A SUCCESSFUL OUTCOME

- Disconnect electrical equipment from **ALL** power sources (this includes removing batteries from portable equipment), **DO NOT** operate anything.
- Open windows and use fans to remove smoke, take steps to prevent the further spread of smoke and other contaminants into adjacent areas containing clean equipment.
- Remove portable equipment to a clean, humidity controlled area, protect fixed equipment with plastic drop-cloths and run dehumidifiers beneath the shelter.
- **Contact a specialist electronics decontamination and recovery provider as soon as possible!**

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