

# NEWSLETTER

## LPD Lab Services

TEL: +44 (0)1254 676 074

One-Stop Shop for Industrial Process Problem Solving, Consulting and Routine Analysis

Welcome to our March newsletter update – 2019 edition.

Stay at the forefront of cutting-edge problem solving, material evaluation and analytical development with updates on our staff, techniques, capabilities and applications.

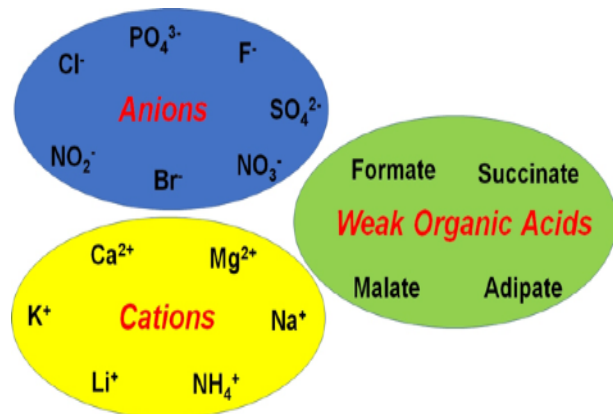
## Requiring Ionic Contamination and Cleanliness Investigations?

Ionic Contamination is an issue that affects a wide range of industries and is typically defined as the presence of anions, cations and weak organic acids (WOAs). Example of these species are illustrated in the right hand diagram as grouped analytes.

LPD Lab Services combines ion chromatography (IC) analysis, standard methods and experienced staff to detect and quantify ionic contamination for a wide range of customers and industries.

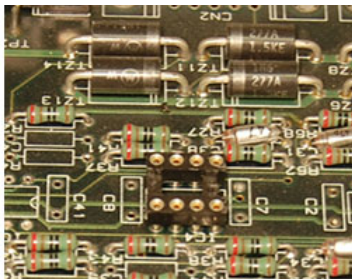
Some examples of industries where ionic contamination is a particular issue are:

- Printed circuit board manufacturing where ionic residues can lead to corrosion of components and hence premature failure in service.
- Component manufacture where the corrosion of components could lead to serious quality concerns i.e. aerospace, automotive and nuclear industries.
- Corrosion failures in hot and cold-water pipes and recirculated closed coolant systems for the construction and insurance loss adjustment industries.
- Assessment of potential damage created by acidic smoke damage in fires.



## Printed Circuit Boards

Approximately 15% of PCB failures occur due to contamination. Ionic contamination can arise from the bare circuit board or from the chemicals used during soldering of components onto the board.



## 1) Ionic Residue

Ionic contamination can be described as the residue containing molecules or atoms which are conductive when in solution. Some of the most common sources of ionic residue include:

- Plating chemistries
- Flux activators
- Perspiration
- Ionic surfactants
- Ethanolamines

LPD Lab Services has extensive experience of testing PCBs for ionic contamination for anionic and cationic residue using the standard methodology detailed in IPC-TM-650 2.3.28.

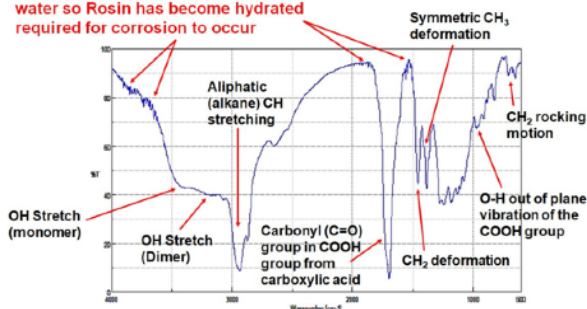
Samples are washed in mixture of water and IPA heated. The wash solution is then analysed ion chromatography for the presence anions, cations and WOAs. Depending on the size of the component, it is possible to detect contamination of 0.2ug/cm<sup>2</sup> (1ug/in<sup>2</sup>). Higher sensitivities are possible if required.



## 2) Non-Ionic Residue

Baseline noise suggests presence of water so Rosin has become hydrated required for corrosion to occur

FTIR Spectrum Identifying Rosin



Non-ionic contamination can also occur in the manufacture of PCB's and are described as residues that are not conductive and are usually organic species that can remain on the surface after flux fabrication or assembly. These include rosin, oils, grease and can be analysed and identified using FTIR, GC and GC-MS at LPD Lab Services.

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## Assessment of Smoke Damage

Modern materials can produce a wide range of acidic species when burning and the corrosive effect on equipment exposed to smoke from most modern fires is well known. When combined with humidity generated during or after a fire, this can lead to significant damage to property and equipment, particularly electrical equipment.



To assess the risk, LPD Lab Services can supply wipes that can be used to swab areas of concern. These can then be returned to LPD where the presence and quantification of acidic ions can then be assessed.

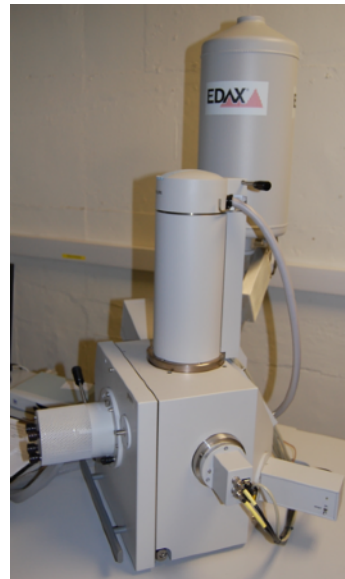
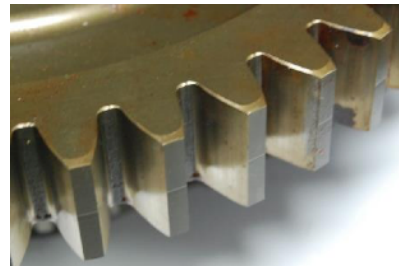
In addition to ion chromatography, LPD Lab Services can use other techniques to assist in the detection and identification of surface contaminants as well as perform materials investigations relating to electrical component and board failure.

LPD Lab Services have a range of services utilising simple techniques such as pH, conductivity, through to more sophisticated analysis such as Scanning Electron Microscopy (SEM) with EDX.

To understand more about our technical services and analytical testing capability please visit our website <https://www.lpdlabservices.co.uk>, or you could call us on 01254 676074 and discuss the problem/technique. Alternatively, you could arrange to meet the team and see the laboratory located in Blackburn, Lancashire.

## Component Manufacture

Similar to PCBs, there are some mechanical components where ionic chemicals are either used or are contaminants resulting from the manufacturing process. Typical examples include aluminium castings, engine components or central heating boilers. Manufactures may be asked by their customers to provide evidence that their cleaning processes have removed ionic contaminants.



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