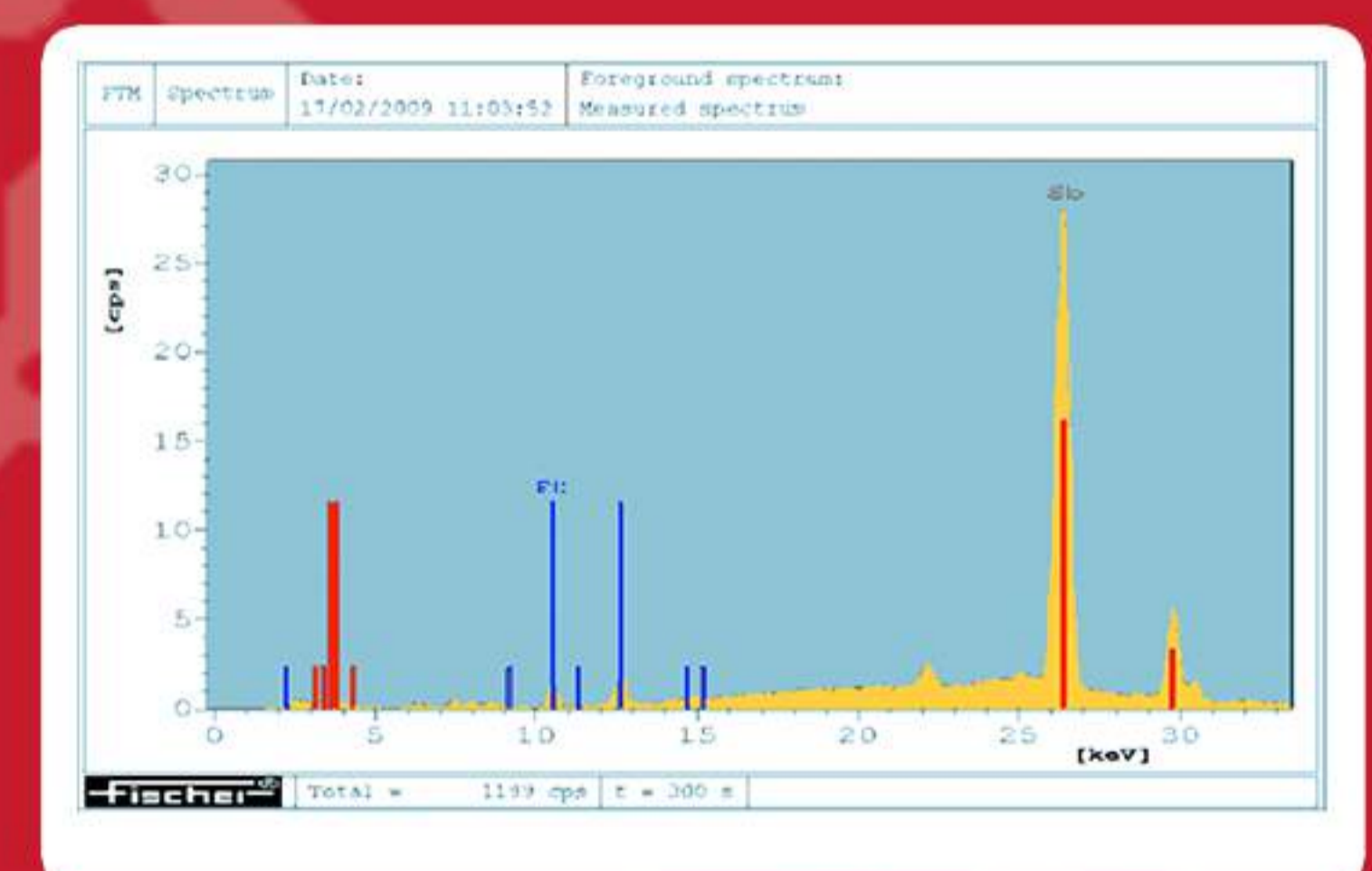
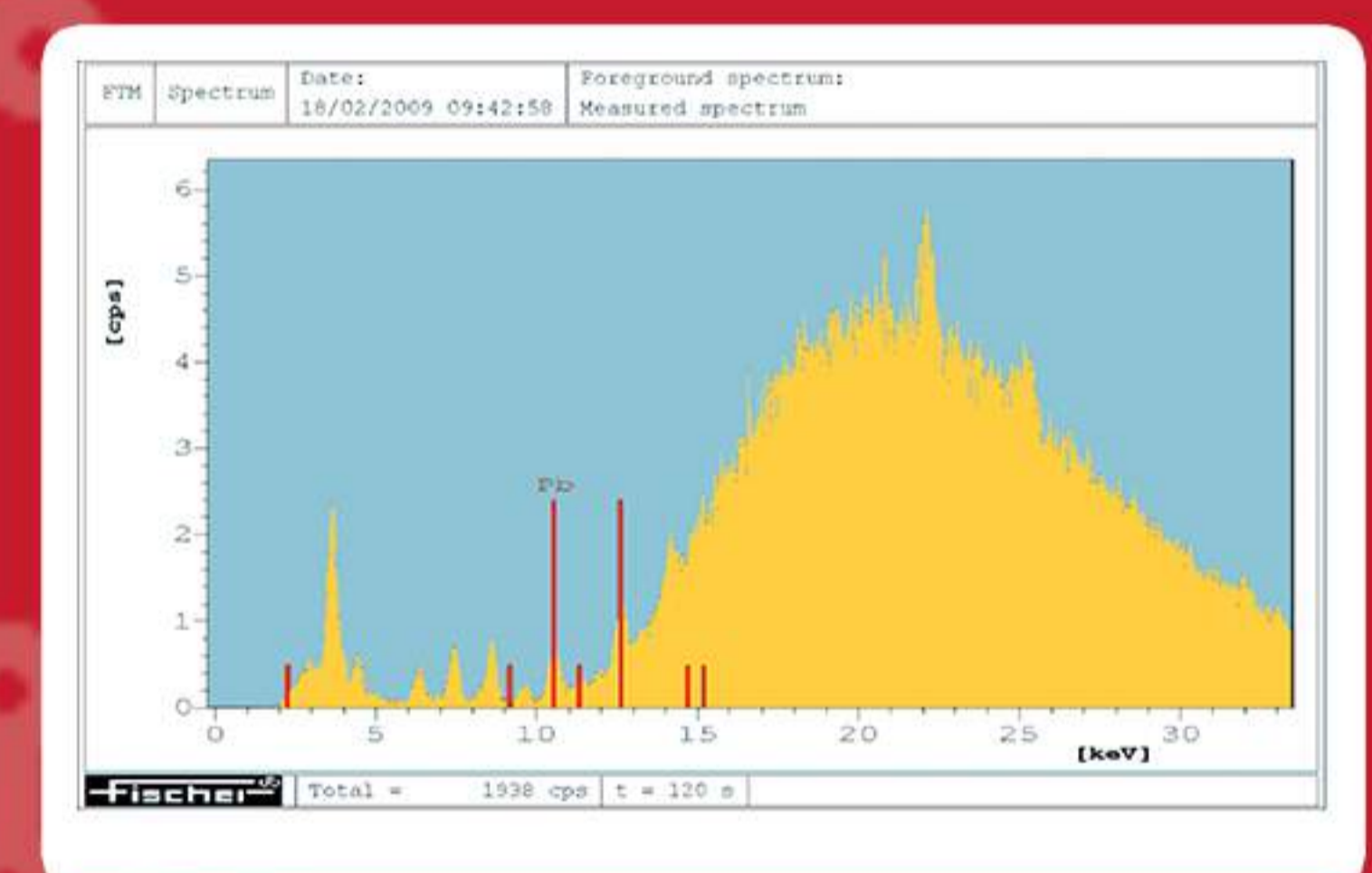
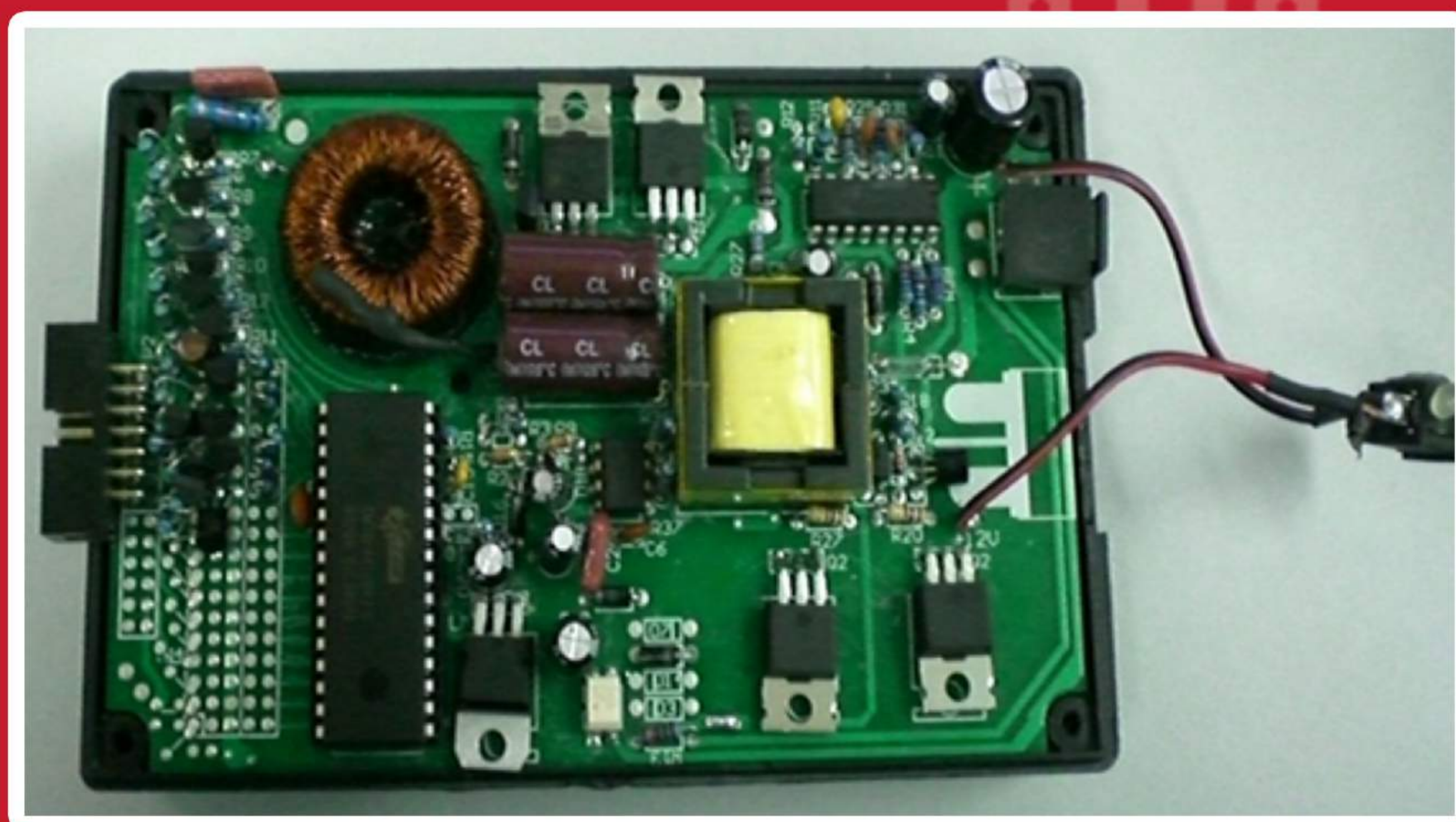
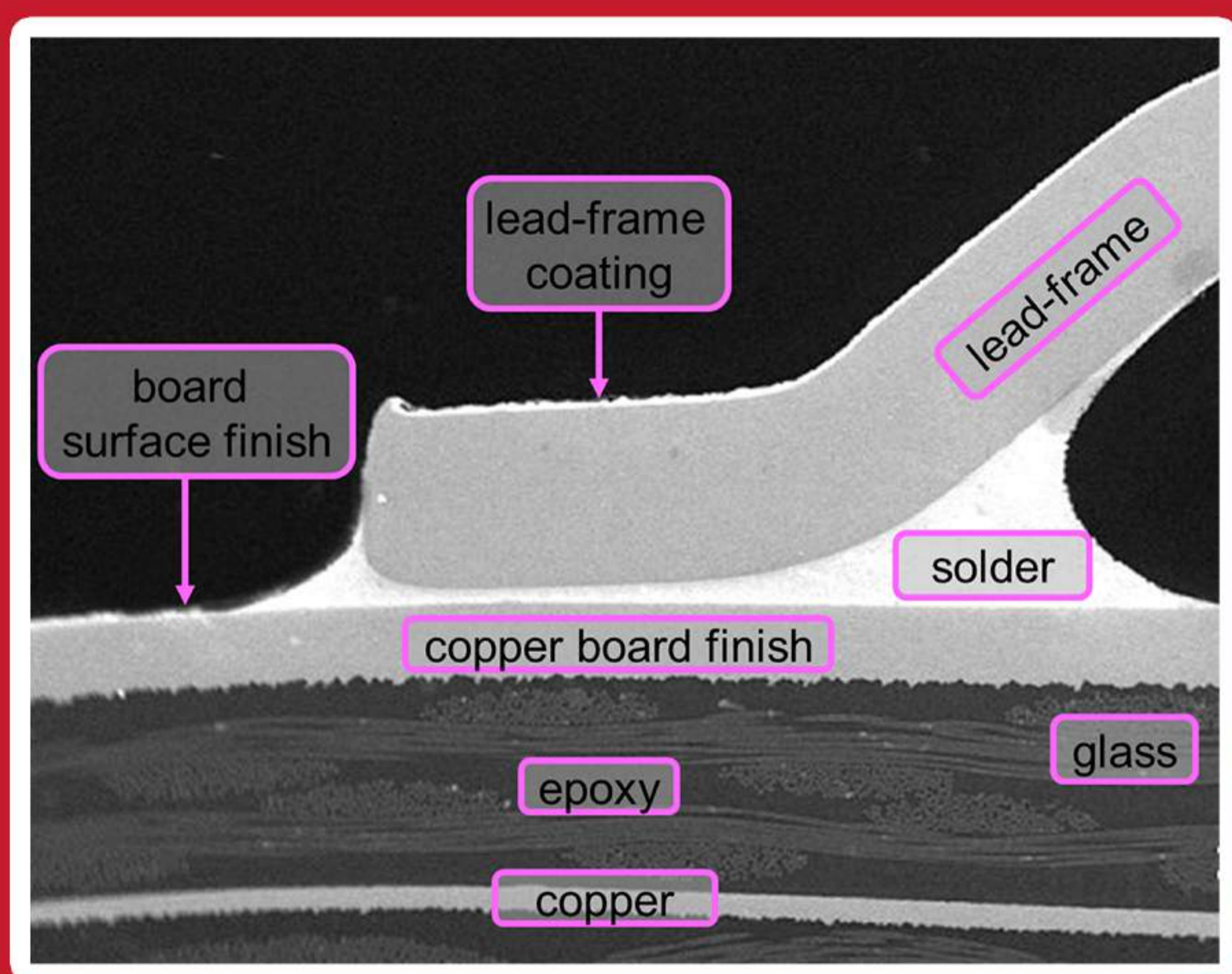


5 REASONS YOU MIGHT NOT BE AS ROHS

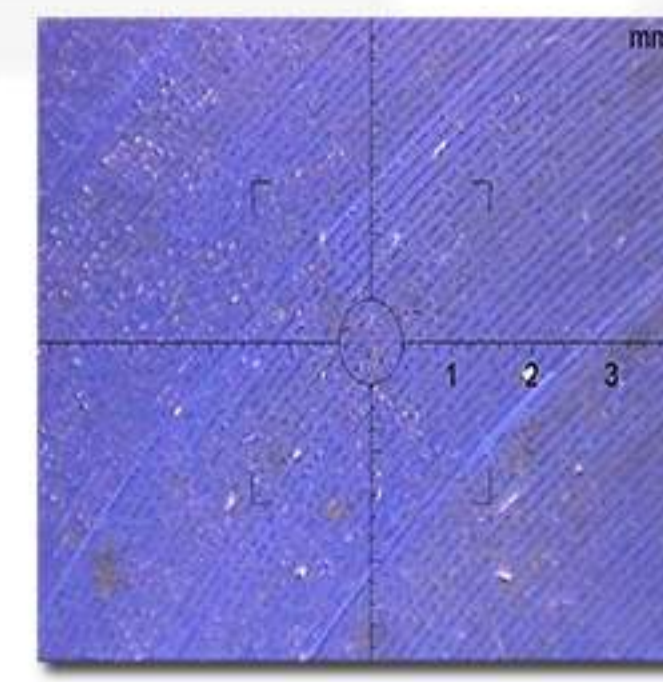
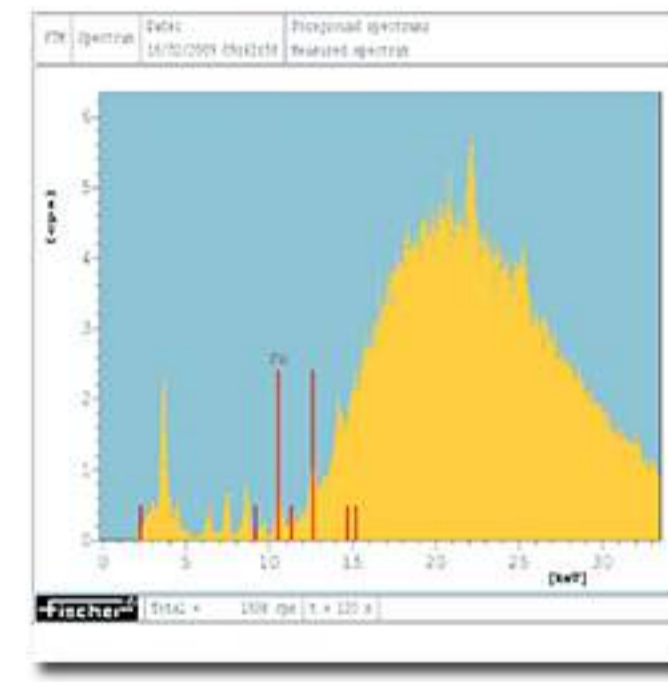
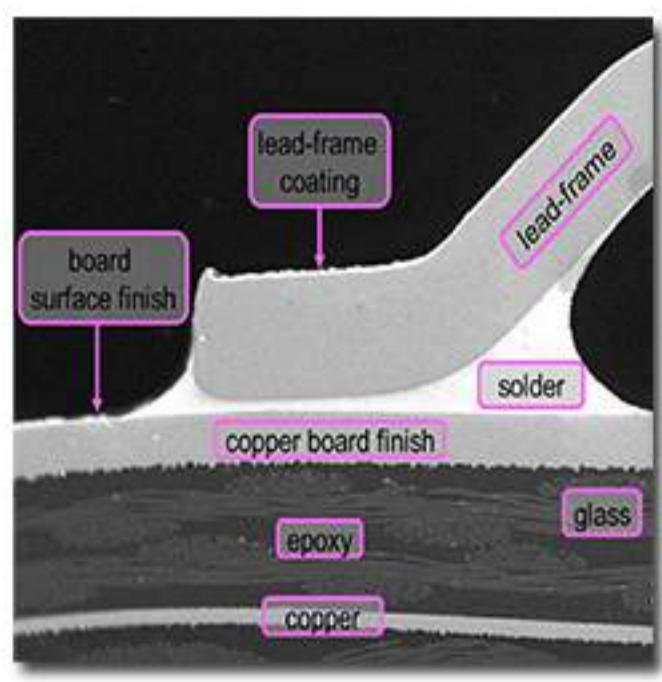
COMPLIANT AS YOU THINK





5 Reasons You Might Not be as RoHS Compliant as You Think

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INTRODUCTION

If you are an assembler of OEM or CEM PCBs, a European electronics product manufacturer selling within the EU, or an importer of manufactured electronic product into the EU, you must be able to demonstrate compliance with the new RoHS Directive, also known as RoHS 2.

Many people believe that they are compliant with RoHS 2 and that they can demonstrate compliance in the event that the NMO (National Measurement Office), who are the enforcers of these regulations in the UK, ask questions.

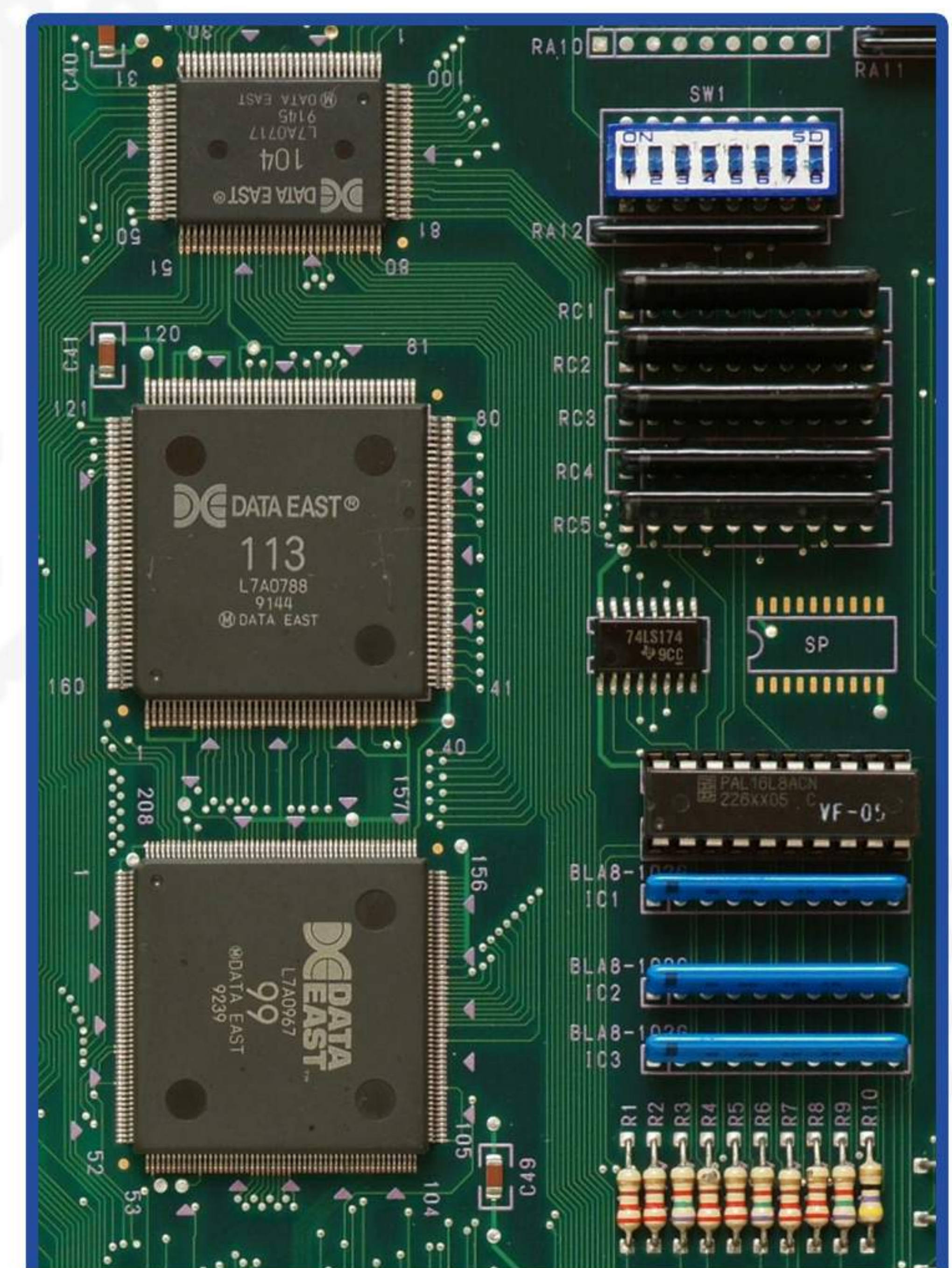
Having carried out ROHS compliance testing on thousands of products for hundreds of different companies, we can confirm that such confidence in compliance is not always justified.

So what are the common situations where ROHS compliance failures occur and how can you ensure you're not caught out by them?

This guide assumes that you have a good understanding of the RoHS regulations. However, if you're not clear about what the obligations of RoHS 2 include, there is more general information at the end of this guide.

5 REASONS YOU MIGHT NOT BE AS ROHS COMPLIANT AS YOU THINK:

1. Misunderstanding the concept of a homogeneous material
2. Insufficient checking of documentation supplied
3. Suppliers failing to track changes in design or production
4. Not recognising the dangers in simple coatings
5. Failing to take into account non-core components





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5 Reasons You Might Not be as RoHS Compliant as You Think

1. MISUNDERSTANDING THE CONCEPT OF A HOMOGENEOUS MATERIAL

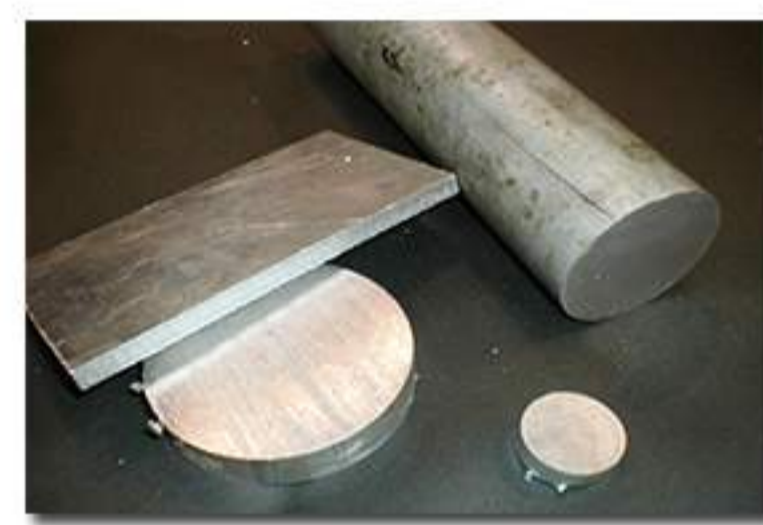
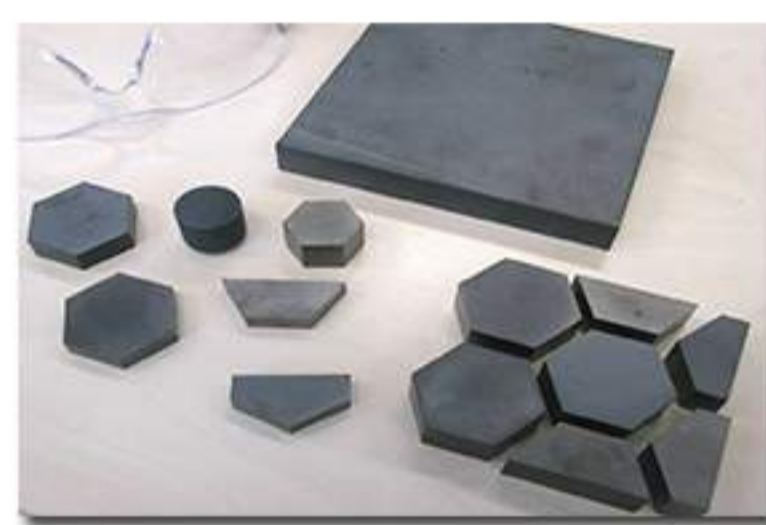
The permitted limits for the banned substances are based on a percentage by weight in a homogeneous material. RoHS compliance failures often occur because of a misunderstanding of what constitutes a 'homogeneous material'.

HERE'S AN EXPLANATION THAT MIGHT HELP TO REDUCE CONFUSION

According to the regulations, a Homogeneous Material is defined as
"A material that cannot be mechanically disjointed into different materials".

The dictionary definition of Homogeneous is *"of uniform composition throughout"*.

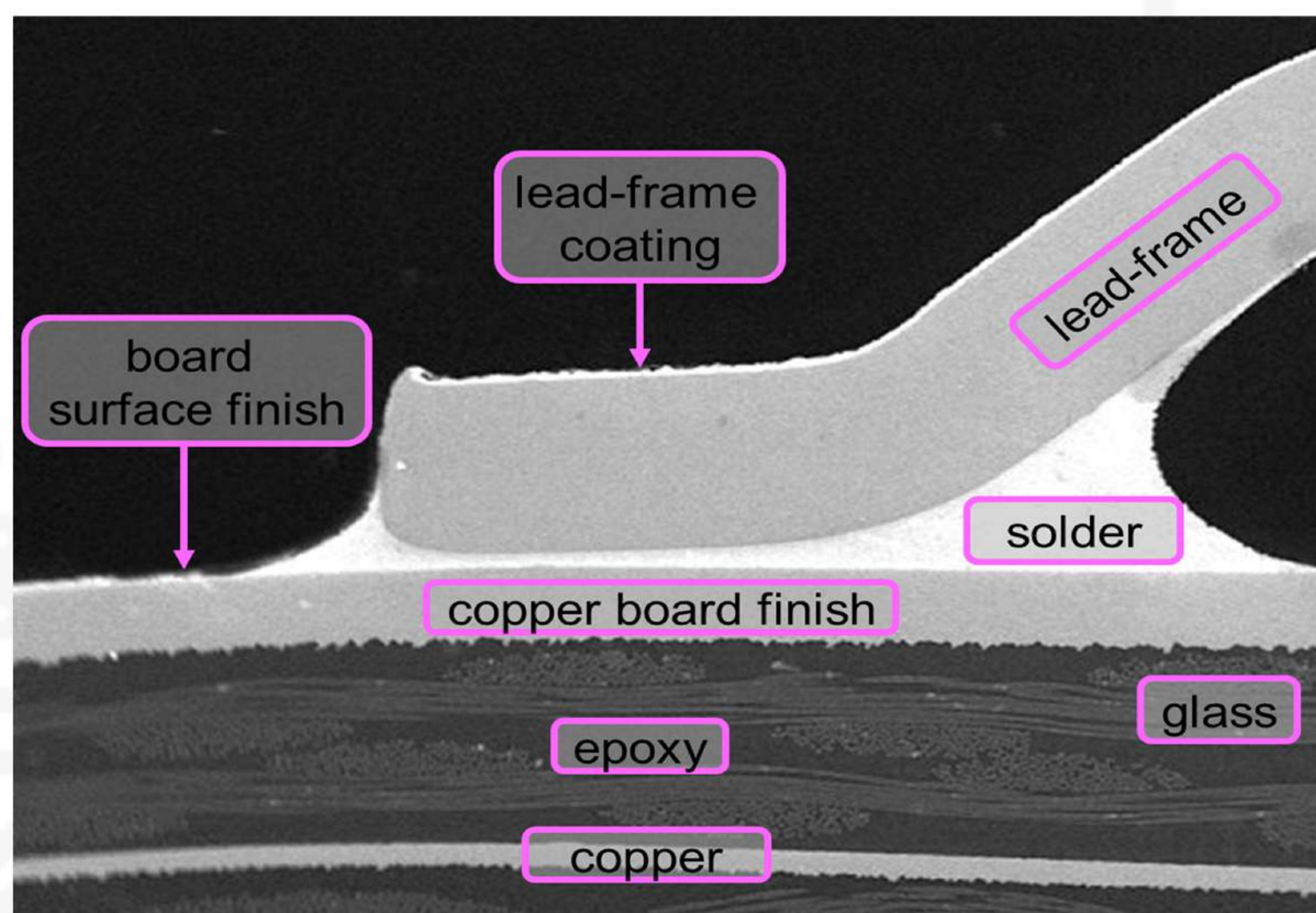
Examples of homogeneous materials are individual types of plastics, ceramics, metals, alloys, paper, board, resins and coatings.



Mechanically disjointed means that materials can be, in principle, separated by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes. In practice, many electronic components are complex and contain several constituent parts which are often difficult to separate.

The diagram below is an example.

Each of the materials on this PCB can be separated by mechanical means and are therefore considered to be 'homogeneous materials', even though they are all bonded together.



ACTION:

TAKE A VERY THOROUGH LOOK AT EACH OF THE PARTS OF YOUR PRODUCT TO IDENTIFY WHERE HOMOGENEOUS MATERIALS MAY EXIST.



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5 Reasons You Might Not be as RoHS Compliant as You Think

2. INSUFFICIENT CHECKING OF THE DOCUMENTATION SUPPLIED

Many companies are over-reliant on their suppliers. Unfortunately, blaming the supplier won't help when your product has to be withdrawn from the market, or your launch date gets put back months until a new compliant product can be manufactured, tested and shipped over.

So what is it that goes wrong?

Simply put, if you ask the wrong question, then you may get the wrong answer.

Asking "Is it RoHS compliant?" is not enough.

Look carefully at the test reports that have been provided. They are not always what they purport to be:

- Be aware that some test reports include references to materials in particular forms, eg polymer pellets. This may not be enough, as when the polymer is compounded, other additives may be added (which can contain Pb for example)
- We have seen instances of test reports that are provided with the product to support compliance, but when you look at the test report in detail, the product actually failed the test!
- Very often we see test reports dated the day after they were requested (often with evidence of 'Tipp-Ex' style amendments). Is it realistic that they actually carried out testing this quickly?
- Watch out too for signs of photocopying, editing, amendments and 'Photoshop' work. If these signs are present you should be careful about believing what's in the report.
- Too often, the test reports are for generic product types, which sometimes actually bear little or no relation to the precise product in question
- Is the date of the report pre-2008? If so, it may not be sufficient for 'due diligence' because of the changes in substances after this date



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5 Reasons You Might Not be as RoHS Compliant as You Think

ACTIONS

HAVE A POLICY/SET OF QUESTIONS SPECIFICALLY FOR YOUR PRODUCTS (DO NOT MAKE THEM GENERIC!)

- How are repair and rework activities separated from production lines?
- Which other products are manufactured on site?
- Is lead solder used anywhere in the factory?
- What stock control procedures exist?

ASK THE QUESTIONS AS SOON AS POSSIBLE.

This is the responsibility either of the buyer or of the engineer when considering a new part or unit.

At a minimum, the following should be requested:

- Declaration of conformity
- Engineering drawings/bill of materials (where not held).
- Written documentation of the manufacturing procedures followed by the supplier and of how notification of any changes in raw materials, design, components or processes are made
- Test reports
- Enough information to create the Technical documentation folder.

ENSURE THAT ALL TEST REPORTS:

- Specify that the testing has been done to the IEC62321 Guidance document
- Define the techniques used
- Refer specifically to the products they are supplying
- Include a picture on the report that looks like what is being supplied
- Show the date the testing was carried out and the date the product tested was manufactured
- Indicate that the product conforms
- Include a statement that no components, raw material suppliers, or manufacturing process changes have occurred since the testing was carried out.



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5 Reasons You Might Not be as RoHS Compliant as You Think

3. SUPPLIERS FAILING TO TRACK CHANGES IN DESIGN OR PRODUCTION

In the last section we identified that Test Reports may not be as reliable as you'd hope.

Next, you'll need to give careful consideration to the product itself and the reliability of the supplier, based not on their reputation, but on their past performance for your business.

- If it is not complex take it apart and have a look. Compare it with the last batch or with the prototype
- Do the parts match the bill of materials and engineering drawing?
- Do the reports received match the separated parts?

The next stage is to ask "What is the risk?"

- This must be defined by you. For example:
 - Does the supplier understand RoHS?
 - How good is the information supplied? Is it correct and relevant?
 - Have any of the products supplied failed testing?
 - Has any conversation led you to question the validity of the supplier?



SOME EXAMPLES:

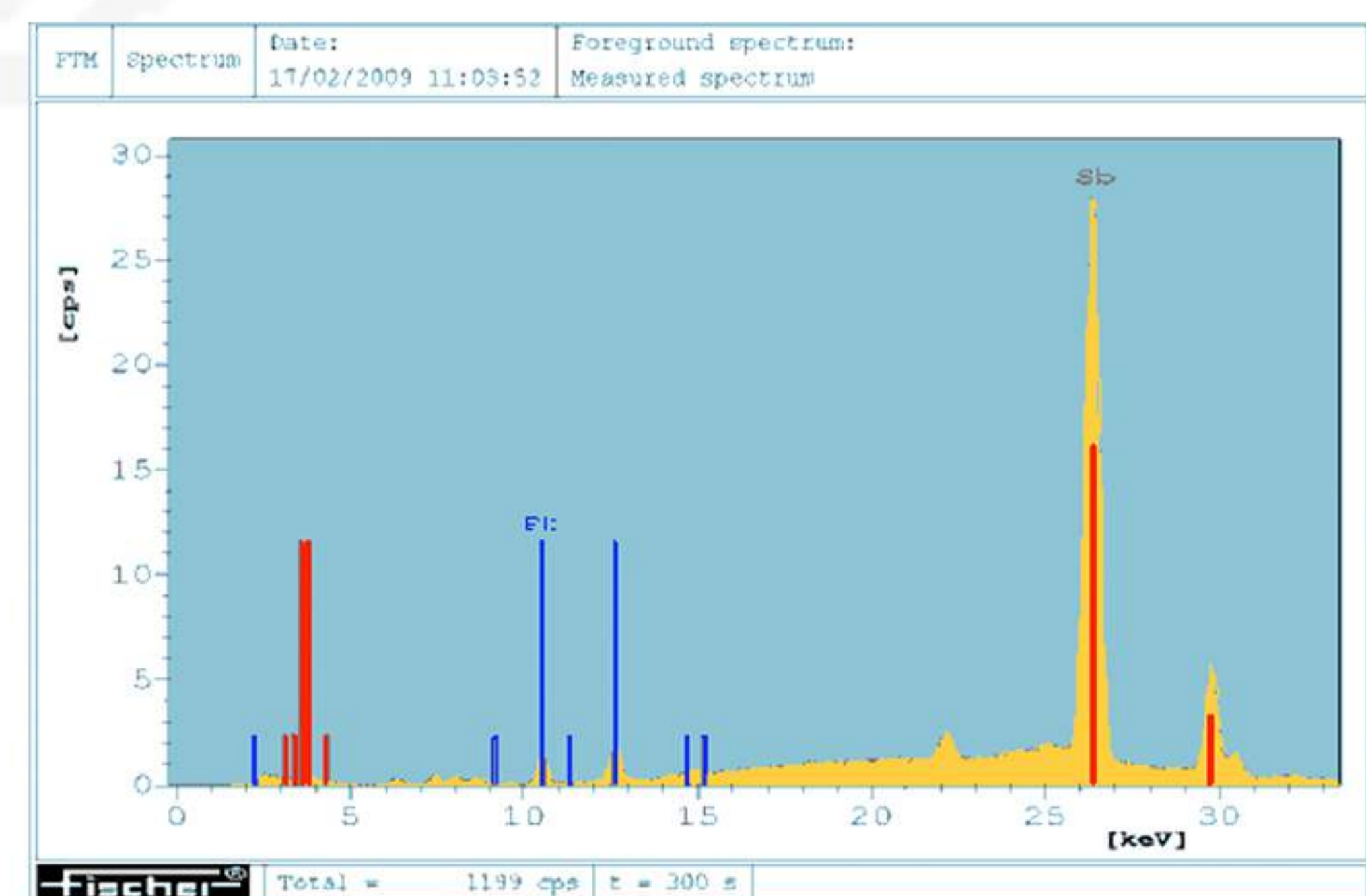
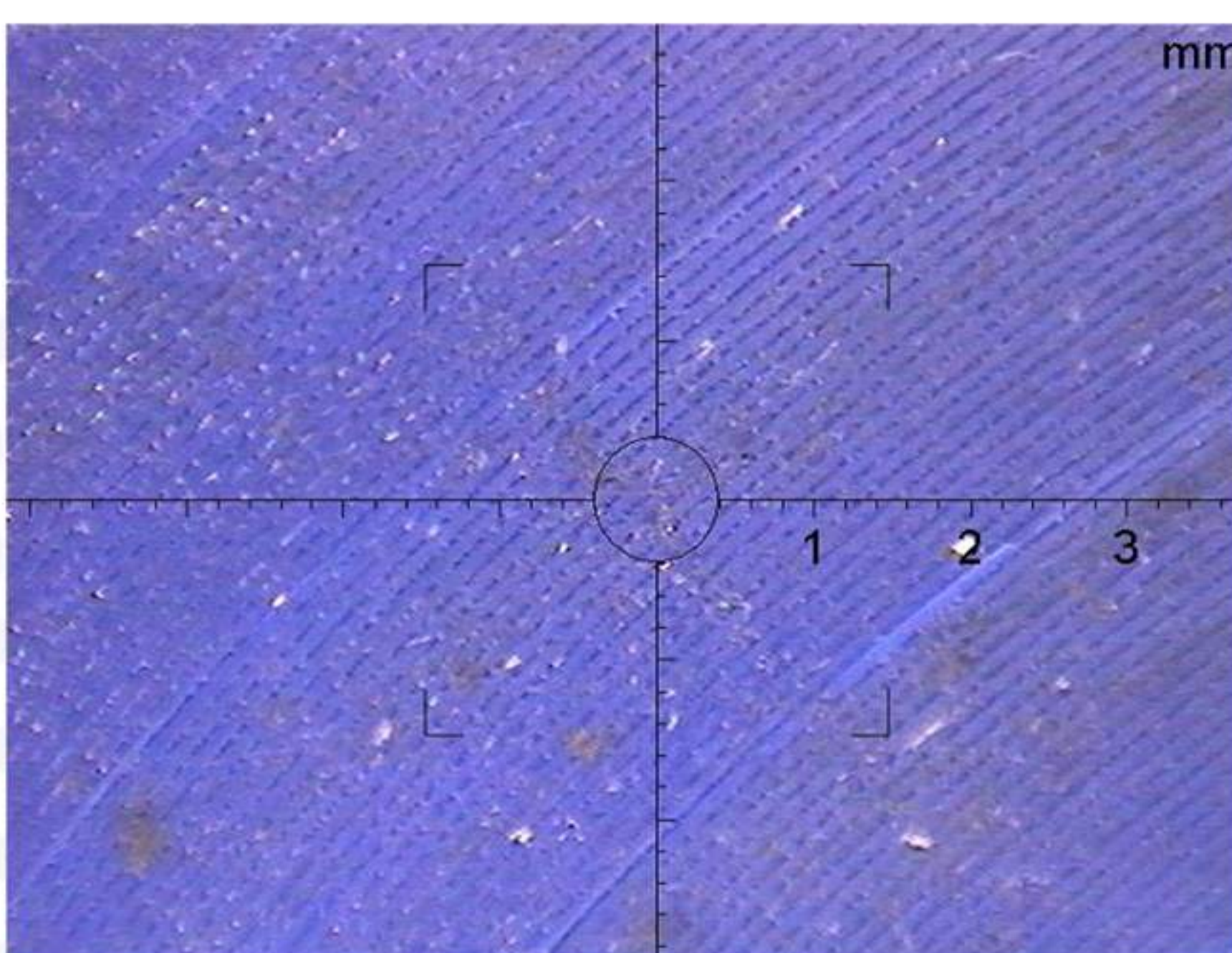
These two PCBs were found within the same type of device, from the same supplier, with supposedly no changes to the device whatsoever, within a six month period!



How do you track changes in components, suppliers and production processes? Does your supplier tell you of such changes and provide evidence to support the product's continued compliance?

Apparently simple changes, such as the move from tin lead solders to lead-free solders, can catch you out. There may have been a move to lead-free for general use, but sometimes due to changes in priorities, breakdowns etc. products sometimes get produced using old production lines or methods, which may use tin-lead soldering.

In the example below, the assembly included some electrical tape, which had been changed compared with the original version, but the new version contained a significant element of lead.





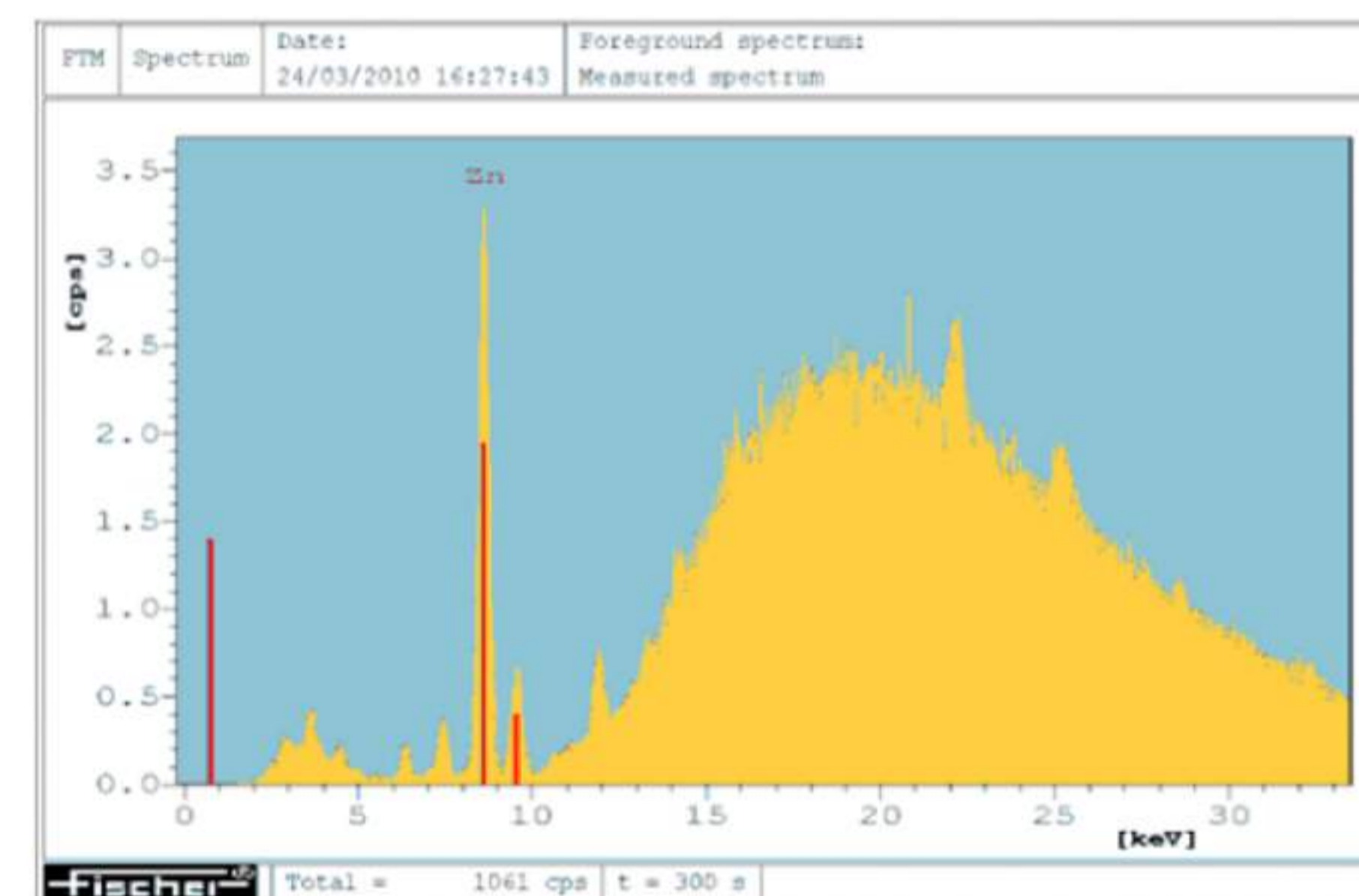
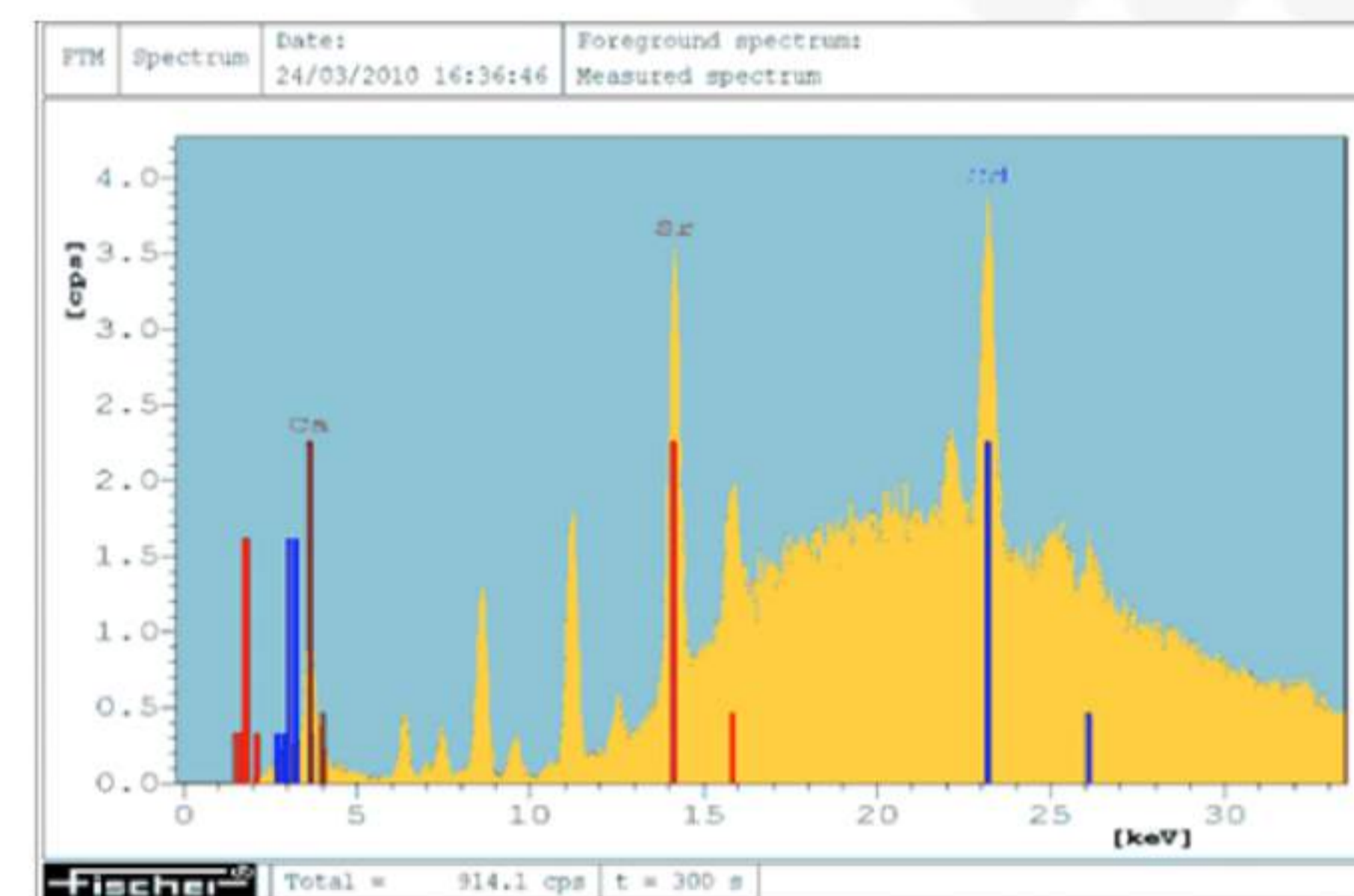
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5 Reasons You Might Not be as RoHS Compliant as You Think

SOME EXAMPLES CONTINUED:

Here's another example:

These were supposedly identical switches. The version on the left had included the I and the O, but they had quickly worn off.



As you can see from the graphs, they contained significantly different elements! In fact the first switch contained cadmium.

ACTIONS:

REVIEW YOUR SUPPLIERS' PROCEDURES VERY CAREFULLY

How do you track changes in components, suppliers and production processes? Does your supplier tell you of such changes and provide evidence to support the product's continued compliance?



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5 Reasons You Might Not be as RoHS Compliant as You Think

4. NOT RECOGNISING THE DANGERS IN SIMPLE COATINGS

Coloured coatings are used for a variety of reasons and they are often overlooked as potential compliance risks.

Typical uses for coatings:

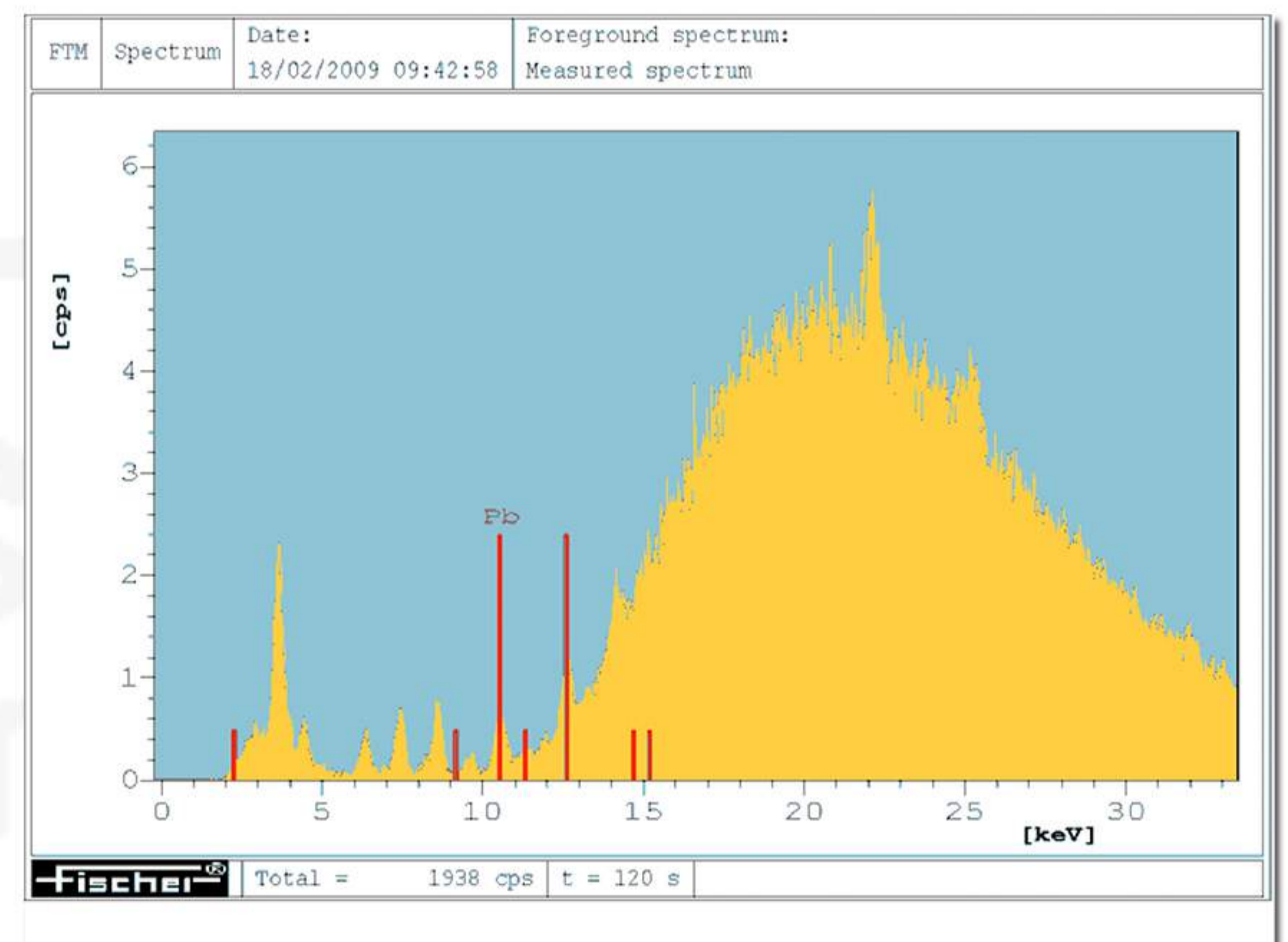
- Decoration on toys
- Product differentiation on housings/casings
- Markers

Colours to watch out for are:

- Red, Orange, Yellow, but some greens can also be problematic

Commonly found elements include:

- Pb, Cd and Cr all found as pigments



ACTIONS:

REVIEW YOUR SUPPLIERS' PROCEDURES VERY CAREFULLY

Look out for coatings on your products, especially those used as markers. Make sure they have been included in test reports.



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5 Reasons You Might Not be as RoHS Compliant as You Think

5. FAILING TO TAKE INTO ACCOUNT NON-CORE COMPONENTS

There are a whole range of other items that can catch you out, yet be seemingly insignificant in terms of the overall product.

Examples include:

- Cable ties and Electrical tape – which can both contain lead (Pb)
- New soldering irons and tips – especially where they have previously been used elsewhere, as they can contaminate your solder joints if they have been pre-tinned with tin-lead solder.
- Labels and stickers – can contain lead and mercury
- Liquids (such as paints, greases, hardener systems and oils) – sometimes contain lead or cadmium as pigments or for colouration.

ACTIONS:

LOOK OUT FOR ANCILLARY ITEMS AND ENSURE THEY HAVE BEEN TESTED TOO



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5 Reasons You Might Not be as RoHS Compliant as You Think

SUMMARY

Here are 5 steps you can take to double-check that your products really are RoHS compliant.

- 1 Take a very thorough look at each of the parts of your product to identify where homogeneous materials may exist.
- 2 Check the documentation provided with the product and especially test reports
- 3 Review your suppliers' procedures in relation to design and manufacturing changes. All changes should be documented and new 'at risk' components tested to ensure compliance
- 4 Review in particular any coatings used
- 5 Consider all the ancillary items used in the product, such as cable ties, labels and liquids

If you are in any doubt, you can ask an independent laboratory to test your products or components.

This can be relatively inexpensive, especially if it is carried out under contract where testing of components is carried out routinely.

NEED HELP?

For more information on RoHS compliance testing options,

Please contact **Mark Dowling** at ITRI Innovation:

Call: **01727 871316**

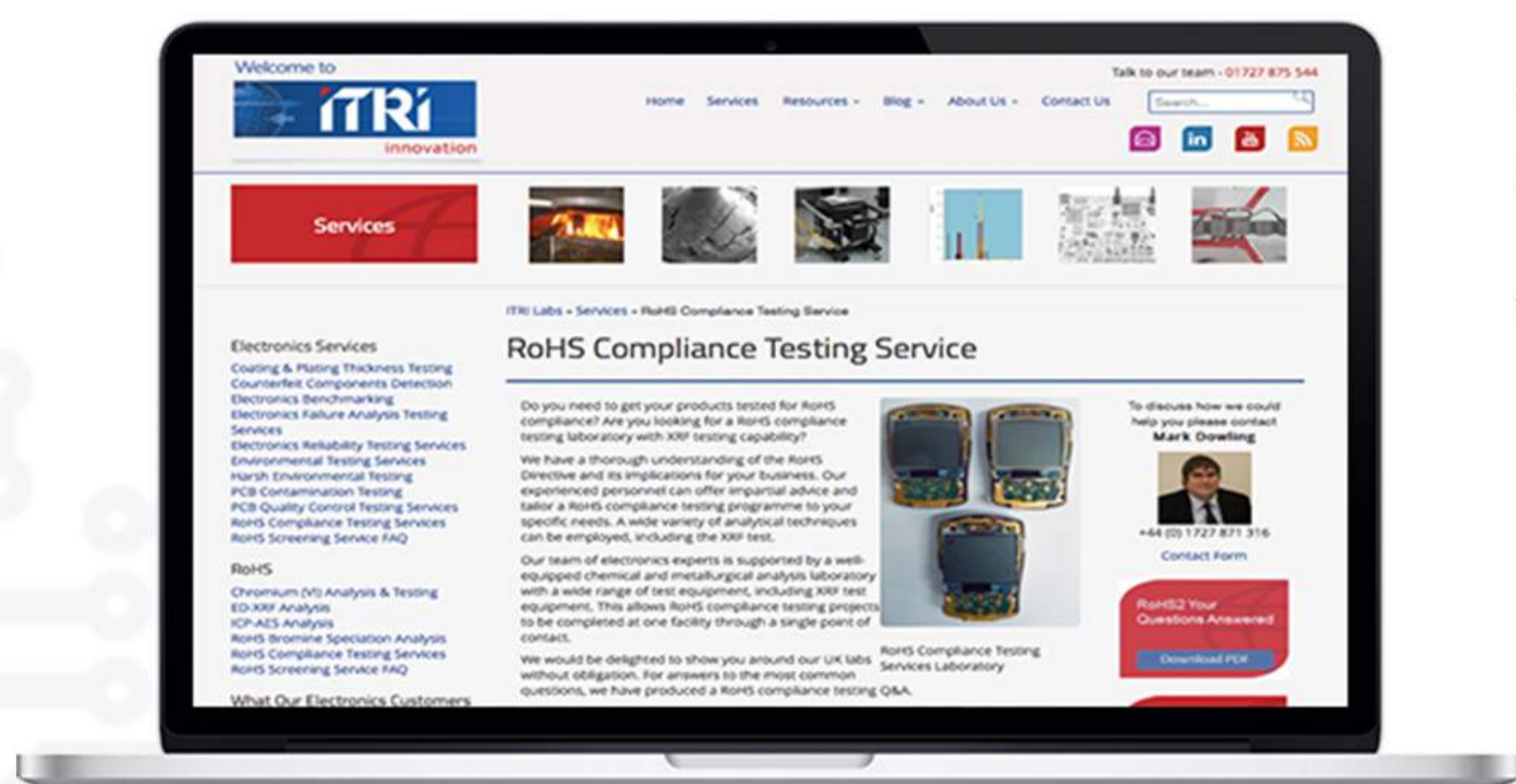
Email him at: mark.dowling@itri.co.uk



Alternatively call **01727 875544**

or visit the ITRI Innovation website at;

www.itrilabs.co.uk/services/rohs-compliance-testing-service/





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5 Reasons You Might Not be as RoHS Compliant as You Think

FURTHER INFORMATION

Background on RoHS Regulations

Directive 2002/95/EC restricts the use of certain hazardous substances in the manufacture of new electrical & electronic equipment (EEE) from 1st July 2006

This directive restricts (with exceptions) the use of six hazardous materials in the manufacture of various types of electronic and electrical equipment. It is closely linked with the Waste Electrical and Electronic Equipment Directive (WEEE) 2002/96/EC which sets collection, recycling and recovery targets for electrical goods and is part of a legislative initiative to solve the problem of huge amounts of toxic e-waste.

Other countries have similar legislation.

The directive applies to equipment as defined by a section of the WEEE directive. The following numeric categories apply:

1. Large household appliances.
2. Small household appliances.
3. IT & Telecommunications equipment (although infrastructure equipment is exempt in some countries)
4. Consumer equipment.
5. Lighting equipment—including light bulbs.
6. Electronic and electrical tools.
7. Toys, leisure, and sports equipment.
8. Medical devices (22nd July 2014)
9. Monitoring and control instruments (22nd July 2014)
10. Automatic dispensers.
11. Semiconductor devices

It does not apply to fixed industrial plant and tools.



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5 Reasons You Might Not be as RoHS Compliant as You Think

FURTHER INFORMATION

Updates to the legislation

- The RoHS 2 directive (2011/65/EU) is an evolution of the original directive and became law on 21 July 2011 and took effect 2 January 2013.
- The CE logo now indicates compliance and RoHS 2 declaration of conformity (DoC) is now required.
- The DoC must include: manufacturer's details (name and address, etc.); essential characteristics the product complies; any European standards and performance data; and a legally binding signature on behalf of the organization
- DECISION No 768/2008/EC on a common framework for the marketing of products. Document on the implementation of RoHS and the defining of a technical document.

New EEE placed on the market shall not contain:

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (CrVI)
- Polybrominated biphenyls (PBB's)
- Polybrominated diphenyl ethers (PBDE's)
- Certain permitted uses where viable alternatives not available

Maximum limits for the RoHS substances defined by the directive

Maximum limits for the restricted substances are as follows:

0.1%:

- Pb
- Hg
- Cr(VI)
- PBB's
- PBDE's*

0.01%:

- Cd

Permitted limits are % by weight in a homogeneous material