

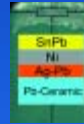
Non-destructive Analysis of Hazardous Substances in Electrical and Electronic Equipment



Testing and verifying conformity to RoHS and WEEE



Verifying the reliability of electronics through materials analysis and coating thickness measurements



Analysis of multi-layer electronic components



General materials testing
Analysis of Plating Bath Solutions

RoHS Test Protocol (example) Sample: Printed circuit board

Material: Polymer

Test Result

	Pb ppm	Hg ppm	Cd ppm	Cr ppm	Br ppm
Concentrations	N.d.	N.d.	N.d.	N.d.	66341
RoHS Status	BL	BL	BL	BL	X

BL: Below Limit¹⁾

OL: Over Limit¹⁾

X: Inconclusive¹⁾-> further investigations necessary

¹⁾ According to IEC 62321

RoHS screening of a printed circuit board using a FISCHERSCOPE® X-RAY XDV®-SD



Legal Regulations

The EU Directives WEEE and RoHS restrict the use of certain hazardous substances in electrical and electronic equipment below specified limits.

The limit for lead (Pb), mercury (Hg), hexavalent chromium (Cr VI), polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) is 1000 ppm, for Cadmium (Cd) it is 100 ppm.

The Meas. Instrument Manufacturer

HELMUT FISCHER has been developing, manufacturing and distributing X-ray fluorescence instruments for coating thickness measurement and materials analysis for 25 years. To date, thousands of these instruments are used at customer's sites

worldwide. They are capable of meeting even the most difficult measurement challenges.

Advantages of Measurements Using X-Ray Fluorescence

No elaborate sample preparation

Specimens are simply placed in the measuring chamber.

Operation without particular previous knowledge

Prepared measurement applications start at the push of a button.

Short Measuring Times

Depending on the respective samples, typical measuring times are 50 – 300 sec..

RoHS Screening

The draft EN 62321 (corresponds to IEC 62321) recommends X-ray fluorescence measuring instruments for RoHS screening. The FISCHERSCOPE® X-RAY instruments feature special program sequences that select the appropriate measuring application for the user easily and quickly. The measurement results can be used to determine whether the content of RoHS-restricted substances is below or above the limit values or whether a sample must be evaluated using alternative analysis methods. For most samples, additional elaborate analyses will not be required. This translates into significant time and cost savings.

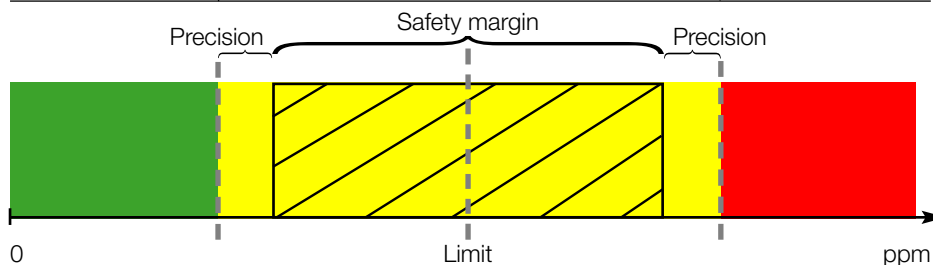
A measurement provides direct results of the Pb, Hg and Cd concentrations. For Cr and Br, the total content is measured, for Cr, this is done independent of the chemical oxidation state. If the total content is below the respective limit, it is safe to say that Cr VI or PBB and PBDE are below the limit value as well. Additional analysis methods to determine the Cr VI, PBB or PBDE content are required if the limit value is exceeded.

Calibrated Measurements

The calibration using suitable reference materials is performed at the factory. This avoids calibration efforts at the customer's site. At the same time, this ensures that all instrument settings are adjusted optimally for the RoHS applications.

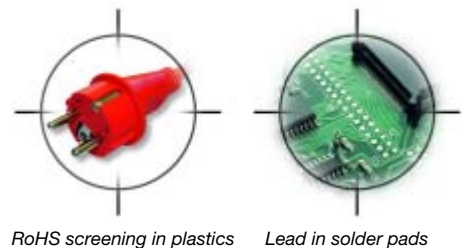
Screening procedure according to IEC 62321: The RoHS status of each analysis result is assigned to one of three classifications.

Below limit (BL)	« Inconclusive » (X), further investigations necessary	Over limit (OL)
Safely below the RoHS limit	Safety margin ($\pm 30\%$ or $\pm 50\%$ of the RoHS limit) and the instrument precision (3 σ).	Safely above the RoHS limit



FISCHERSCOPE® X-RAY models with a semiconductor detector

<p>XDV®-SD</p>	<p>XAN®-DPP</p>
XY travel range: 250 mm x 250 mm	XY travel range: –
Standard collimator set ø 0.1 mm; ø 0.3 mm; ø 1 mm; ø 3 mm and many optional collimator sets	Standard collimator set ø 0.2 mm; ø 0.6 mm; ø 1 mm; ø 2 mm –



RoHS screening in plastics

Lead in solder pads