

FISCHERSCOPE® X-RAY XDV®-μ PCB

Specific X-Ray Fluorescence Measuring Instrument with a Polycapillary X-Ray Optics for Measurements on Very Small Structures on Printed Circuit Boards and Components



Description

The FISCHERSCOPE X-RAY XDV-μ PCB is a specific x-ray fluorescence measuring instrument with a polycapillary x-ray optics. It has been specially developed for automated measurements and analyses of coating thicknesses and compositions on very small structures on printed circuit boards and components.

Typical fields of application:

- Measurements on very small flat components and structures on printed circuit boards in sizes up to 610 x 610 mm (24 x 24 in)
- Analysis of very thin coatings, e.g., gold/palladium coatings of $\leq 0.1 \mu\text{m}$ (0.004 mils)
- Automated measurements, e.g., in quality control
- With 10 μm option: Measurements with smallest possible measurement spot in combination with a large silicon-drift-detector.
- With vacuum table option: Measurements on flexible printed circuit boards

To create ideal excitation conditions for every measurement, the instrument features electrically changeable primary filters. The modern silicon drift detector achieves high accuracy and good detection sensitivity. Due to the innovative polycapillary x-ray optics, the instrument measures using an extremely small measurement spot yet with a very high excitation intensity.

Outstanding accuracy and long-term stability are characteristics of all FISCHERSCOPE X-RAY systems. The necessity of recalibration is dramatically reduced, saving time and effort.

The fundamental parameter method by FISCHER allows for the analysis of solid specimens and coating systems without calibration.

Design

The FISCHERSCOPE X-RAY XDV-μ PCB is designed as a user-friendly bench-top instrument. It is equipped with a high-precision, programmable XY-stage and an electrically driven Z-axis. With the vacuum fixation option, you can place even difficult to position samples safely on the XY-stage, like flexible printed circuit boards.

A laser pointer serves as a positioning aid and supports the quick alignment of the sample to be measured. A high-resolution color video camera simplifies the precise determination of the measurement spot. The optics is equipped with an autofocus function. In order to focus difficult surfaces, the instrument can project a contrast grid onto the specimen surface.

The entire operation and evaluation of measurements as well as the clear presentation of measurement data is performed on a PC, using the powerful and user-friendly WinFTM® software.

The XDV-μ PCB fulfills DIN ISO 3497 and ASTM B 568.

General Specification

Intended use	Energy dispersive x-ray fluorescence measuring instrument (EDXRF) to measure thin coatings and multi-layer systems on printed circuit boards and components
Element range	Aluminium Al (13) to Uranium U (92) – up to 24 elements simultaneously
Application	Optimal measurement conditions for applications with Au and Pd due to the specific excitation characteristics of the polycapillary optics. For further information contact your FISCHER representative.
Design	Bench-top unit with housing with a slot on the side, XY- and Z-axis electrically driven and programmable, Motor-driven changeable filters
Measuring direction	Top down

X-Ray Source/Detection

X-ray tube	Standard: Micro-focus tungsten tube with beryllium window Optional: Micro-focus tube with molybdenum target and beryllium window
High voltage	Three steps: 10 kV, 30 kV, 50 kV
Primary filter, 4x changeable	Ni 10 µm (0.4 mils); free; Al 1000 µm (40 mils); Al 500 µm (20 mils)
X-ray optics	Polycapillary

Polycapillary Options

	Standard 20 µm non halo-free*	20 µm halo-free*	10 µm halo-free*
Measurement spot, fwhm at Mo-K _α	appr. Ø 20 µm (0.8 mils)	appr. Ø 20 µm (0.8 mils)	appr. Ø 10 µm (0.4 mils)
X-ray detector	Peltier-cooled silicon-drift-detector (SDD)		
Effective detector area	20 mm ² (0.03 in ²)	50 mm ² (0.08 in ²)	50 mm ² (0.08 in ²)
Measuring distance between specimen surface to lower edge of measuring head	fixed, approx. 4 – 5 mm (0.16 – 0.2 in)	fixed, approx. 4 – 5 mm (0.16 – 0.2 in)	fixed, approx. 1.5 – 2 mm (0.06 – 0.08 in)

* For halo-free capillaries, the radiation intensity for all energies of the x-radiation is concentrated on the nominal measurement spot. For capillaries, indicated as non halo-free, radiation intensity with high energies (E > 20 keV) can cover a significantly larger area than the nominal measurement spot.

Sample Stage

	Standard	Table w/ Vacuum Fixation
	Fast, programmable XY-stage	Fast, programmable XY-stage, fixing of specimen with vacuum (e.g. flexible printed circuit boards)
Usable sample placement area	Width x depth: 600 x 600 mm (23.6 x 23.6 in)	
Maximum travel	450 x 300 mm (17.7 x 11.8 in)	
Max. travel speed XY	60 mm/s (2.4 in/s)	
Repeatability precision XY	≤ 5 µm (0.2 mils), direction-independent	
Sample weight / Sample height	5 kg (11 lb) max. / 10 mm (0.4 in) max.	

Electrical data

Power supply	AC 115 V or AC 230 V 50 / 60 Hz
Power consumption	Max. 120 W
Protection class	IP40

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Video Microscope

	High-resolution CCD color camera for optical monitoring of the measurement location, manual focusing and auto-focus, with contrast grid, Crosshairs with a calibrated scale (ruler) and spot-indicator, Adjustable LED illumination, Laser pointer (class 1) to support accurate specimen placement
Zoom factor	Digital: 1x, 2x, 3x, 4x

Dimensions

External dimensions	
Width x depth x height	670 x 885 x 660 mm (26.4 x 34.8 x 25.9 in)
Weight	Approx. 156 kg (344 lb)

Environmental Conditions

Operating temperature	10 °C – 40 °C / 50 °F – 104 °F
Storage/Transport temperature	0 °C – 50 °C / 32 °F – 122 °F
Relative humidity	≤ 95 %

Evaluation unit

Computer	Windows®-PC
Software	Standard: Fischer WinFTM® BASIC incl. PDM®, Optional: Fischer WinFTM® SUPER

Standards

CE approval, X-Ray standards	EN 61010, EN 61326, DIN ISO 3497 and ASTM B 568
Approval	Individual acceptance inspection as a fully protected instrument according to the German regulations „Deutsche Röntgenverordnung-RöV“.

Order	FISCHERSCOPE X-RAY XDV-µ PCB	FISCHERSCOPE X-RAY XDV-µ PCB
	Standard Table	Table w/ Vacuum Fixation
• Meas.spot 20 µm non halo-free	605-040 + 605-941 *	605-929 + 605-941 *
• Meas.spot 20 µm halo-free	605-040 + 605-404 *	605-929 + 605-404 *
• Meas.spot 10 µm halo-free	605-040 + 605-164 *	605-929 + 605-164 *
Option Vacuum Pump	–	605-928 **
Option Meas. Cell for Solution Analysis	603-216 ***	603-216 ***

* always order both numbers together

** complete with accessories

*** not suitable with Option 10 µm halo-free

Special XDV-µ PCB product modification and technical consultation on request

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