FISCHERSCOPE® X-RAY XDV®-µ

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

Description

The FISCHERSCOPE X-RAY XDV-µ is a universally applicable energy-dispersive x-ray measuring instrument. It is particularly well suited for non-destructive analyses and measurements of coating thicknesses on very small components and structures, even with complex coating systems.

Typical fields of application:

- Measurements on very small flat components and structures such as printed circuit boards, contacts or lead frames
- Analysis of very thin coatings, e.g., gold/palladium coatings of ≤ 0.1 µm (0.004 mils)
- Measurement of functional coatings in the electronics and semiconductor industries
- Determination of complex multi-coating systems
- Automated measurements, e.g., in quality control

To create ideal excitation conditions for every measurement, the instrument features electrically changeable apertures and 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.

For measurements on large printed circuit boards, the instrument can be equipped with a larger sample stage.

Design

The FISCHERSCOPE X-RAY XDV-µ 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. The housing features a slot in the side allowing for the measurement of even large components, e.g., pc-boards. The sample stage moves into the loading position automatically, when the protective hood is opened.

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 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 X-RAY XDV-µ instrument 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 coating systems on very small flat structures
Element range	Aluminum Al (13) to Uranium U (92) – up to 24 elements simultaneously
Design	Bench-top unit with hood opening upwards and housing with a slot on the side X/Y- 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 tube with tungsten target and 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

	Standard Non halo-free*	**Option 20 µm Halo-free***	**Option 10 µm Non 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)

* 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.

Video Microscope

	High-resolution CCD color camera for optical monitoring of the measurement location along the primary beam axis, manual focusing and auto-focus, Crosshairs with a calibrated scale (ruler) and spot-indicator, Adjustable LED illumination, Laser pointer (class 1) to support accurate specimen placement
Zoom factor	Up to 1080x (Optical: 30x, 90x, 270x; Digital: 1x, 2x, 3x, 4x)

Sample Stage	**Standard**	**Option Supporting Plate PCB**
	Fast, programmable XY-stage with pop-out function	Fast, programmable XY-stage with pop-out function and large placement area for measurements on PCBs
Usable sample placement area	Width x depth: 370 mm x 320 mm (14.6 in x 12.6 in)	Width x depth: 620 mm x 530 mm (24.4 in x 20.9 in)
Usable maximum travel	X/Y-axis: 250 mm x 220 mm (9.8 in x 8.7 in) Z-axis: 140 mm (5.5 in)	
Max. travel speed X/Y	60 mm/s (0.2 ft/s)	
Repeatability precision X/Y	unidirectional: ≤ 5 µm (0.2 mils) max., ≤ 2 µm (0.08 mils) typ.	
Max. sample weight	5 kg (11 lb), with reduced precision max. 20 kg (44 lb)	
Max. sample height	135 mm (5.3 in)	

Electrical data

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

Dimensions

External dimensions	Width x depth x height: 660 x 835 x 720 mm (26 x 33 x 28.3 in)
Weight	Approx. 135 kg (297 lb)
Interior dimensions of chamber	Width x depth x height: 580 x 560 x 145 mm (22.8 x 22 x 5.7 in)

Environmental Conditions

Operating temperature	20 °C – 25 °C / 68 °F – 77 °F
Storage/Transport temperature	0 °C – 50 °C / 32 °F – 122 °F
Admissible air humidity	≤ 95 %, non-condensing

Evaluation unit

Computer	Windows®-PC with extension cards
Software	Standard: Fischer WinFTM® BASIC including PDM® Optional: Fischer WinFTM® SUPER

Standards

CE approval	EN 61010
X-Ray standards	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	604-259
Option 20 µm halo-free	605-404
Option 10 µm	605-405
Option Supporting Plate PCB	604-984
	Special XDV product modification and XDV technical consultation on request

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