

FISCHERSCOPE® X-RAY XDAL® 237

X-ray fluorescence spectrometer with a programmable X/Y-stage and Z-axis for automated measurements of thin coatings and for materials analysis.



Description

The FISCHERSCOPE®-X-RAY XDAL®237 is a universally applicable energy-dispersive x-ray spectrometer. It constitutes the next step in the development of the proven FISCHERSCOPE X-RAY XDAL. Like its predecessor, it is particularly well suited for non-destructive measurements of very thin coatings and for analyses in automated measurement applications.

To create ideal excitation conditions for every measurement, the XDAL 237 features electrically changeable apertures and primary filters. The modern silicon PIN detector achieves a high analysis accuracy and a good detection sensitivity. The XDAL 237 x-ray spectrometer has an excellent long-term stability, which is reflected in a significantly reduced calibration effort, among other things.

Using the fundamental parameter method, coating systems as well as solid and liquid samples can be analyzed standard-free. It is possible to detect up to 24 elements in the range from aluminum (13) to uranium (92) simultaneously.

The XDAL 237 is predestined for measuring and analyzing very thin coatings, even with very complex compositions or small concentrations. With its fast, programmable X/Y-stage, it is the fitting measuring instrument for automated measurements in quality assurance and production monitoring.

Typical areas of application are:

- Analysis of thin or very thin coatings, e.g., gold and palladium coatings of $\leq 0.1 \mu\text{m}$
- Measurement of functional coatings in the electronics and semiconductor industries
- Determination of complex multi-coating systems
- Automated measurements, e.g., in quality control
- Determination of the lead content in solder

Design

The FISCHERSCOPE X-RAY XDAL 237 is designed as a user-friendly bench-top instrument. It is equipped with a high-precision, programmable X/Y-stage and an electrically driven Z-axis and is thus ideally suited for automated measurements. The sample stage moves out automatically into the loading position, 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 with powerful magnification simplifies the precise determination of the measurement locations and visualizes the running measurement procedure. Fine adjustments can be made directly at the instrument manually or using a joystick - or from the PC using a mouse and the keyboard. The entire operation, the evaluation of the measurement as well as the clear presentation of the measurement data is done on a PC using the powerful and user-friendly WinFTM® Software.

XDAL spectrometers are fully protected instruments with type approval according to the German regulations „Deutsche Röntgenverordnung-RöV“.

General Specifications

Intended use	Energy dispersive x-ray fluorescence spectrometer (EDXRF) to determine thin coatings, small structures, traces and alloys
Element range	Aluminum Al (13) to Uranium U (92) – up to 24 elements simultaneously
Design	Bench-top unit with hood opening upwards X/Y-stage and Z-axis electrically driven and programmable Motor-driven exchangeable apertures and filters Video camera and laser pointer for orienting the sample
Measuring direction	From top to bottom

X-ray source

X-ray source	Micro focus tube with beryllium window
High voltage	Adjustable 30 kV, 40 kV, 50 kV
Apertures (collimators):	4x changeable: Ø 0.1 mm; Ø 0.3 mm; Ø 0.6 mm; slot 0.5 mm x 0.15 mm (others on request)
Primary filter	3x changeable. (Standard equipment: Nickel, Aluminum, free)
Measurement spot	Depending on the measuring distance and on the aperture; the actual measurement spot size is shown in the video image. Smallest measurement spot: approx. Ø 0.15 mm.
Measuring distance	0 ... 80 mm, in the non-calibrated range using the patented DCM method
e.g., for measurements in recesses	0 ... 20 mm, in the calibrated range using the patented DCM method

X-ray detection

X-ray detector	Silicon PIN detector with peltier cooling
Energy resolution	≤ 180 eV (fwhm at Mn-Kα)

Sample orientation

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 of the measurement location Laser pointer to support accurate sample placement
Zoom factor	up to 180x (Optical: 20x .. 45x; Digital: 1x, 2x, 3x, 4x)
Sample stage	Fast, electric motor driven, programmable X/Y-stage
Maximum travel	X/Y-axis: 255 mm x 235 mm; Z-axis: 140 mm
Max. travel speed X/Y	80 mm/s
Repeatability precision X/Y/Z	≤ 0.01 mm (unidirectional)
Usable sample placement area	Width x depth: 300 mm x 350 mm
Max. sample mass	5 kg, with reduced approach travel precision 20 kg
Max. sample height	140 mm

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Electrical data

Line voltage, line frequency	AC 115 V or AC 230 V 50 / 60 Hz
Power consumption	Max. 120 W (without evaluation PC)
Protection class	IP40

Dimensions

Exterior dimensions	Width x depth x height [mm]: 570 x 760 x 650
Weight	Approx. 120 kg
Interior dimensions measurement chamber	Width x depth x height [mm]: 460 x 495 x 146

Environmental Conditions

Temperature: Operation	10°C – 40°C / 50°F – 104°F
Temperature: Storage/Transport	0°C – 50°C / 32°F – 122°F
Humidity of ambient air	≤ 95 %, non-condensing

Evaluation unit

Computer	PC system with extension cards
Software	Fischer WinFTM®

Standards

CE conformity	EN 61010
X-ray standards	DIN ISO 3497 and ASTM B 568
Approval	Fully protected instrument with type approval according to the German regulations „Deutsche Röntgenverordnung-RöV“

Order

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