

# FISCHERSCOPE® X-RAY XDAL® 237

X-Ray Fluorescence Measuring Instrument with a Programmable XY-Stage and Z-Axis for Automated Measurements of thin Coatings and for Material Analysis



## Description

The FISCHERSCOPE X-RAY XDAL 237 is universally applicable energy dispersive x-ray fluorescence measuring instrument. It is especially well suited for non-destructive measurements and analysing very thin coatings, even with very complex compositions or small concentrations as well as automated measurement tasks.

With the fast, programmable XY-stage, it is the fitting measuring instrument for automated measurements in quality assurance and production monitoring.

Typical fields of application:

- Analysis of very thin coatings of  $\leq 0.1 \mu\text{m}$  (0.004 mils)
- Measurements of functional coatings in the electronics and semiconductor industries, e.g. on lead frames, connectors or printed circuit boards
- Determination of complex multi-coating systems
- Automated measurements, e.g., in quality control
- Determination of the lead content in solder
- With Option SDD: Determination of the phosphorous content in NiP coatings

To create ideal excitation conditions for every measurement, the instruments feature electrically changeable apertures and primary filters.

The modern silicon PIN detector achieves a high accuracy and a good detection sensitivity. For even higher demands, the instrument can be equipped with a silicon drift detector (SDD). This will result in higher resolution for light elements.

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

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

## Design

The FISCHERSCOPE X-RAY XDAL 237 is designed as user-friendly bench-top instrument. It is equipped with a high-precision, programmable XY-stage and an electrically driven Z-axis. A gap in the housing allows for measurements on large flat specimens, which do not fit in the measuring chamber, e.g. large printed circuit 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 colour 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 FISCHERSCOPE XDAL 237 fulfills DIN ISO 3497 and ASTM B 568. It is a fully protected instrument with type approval according to the German regulations „Deutsche Röntgenverordnung-RöV“

## General Specification

Intended use	Energy dispersive x-ray fluorescence measuring instrument (EDXRF) to determine thin coatings, trace elements and alloys
Design	Bench-top unit with hood opening upwards XY-stage and Z-axis electrically driven and programmable Motor-driven changeable apertures and filters Video camera and laser pointer (class 1) for orienting the sample
Measuring direction	Top down

## X-Ray Source

X-ray tube	Micro-focus tungsten tube with beryllium window
High voltage	Three steps: 10 kV, 30 kV, 50 kV
Apertures (Collimators)	4x changeable: Ø 0.1 mm (3.9 mils), Ø 0.3 mm (11.8 mils), Ø 0.6 mm (23.6 mils), slot 0.5 x 0.15 mm (19.7 x 5.9 mils), others on request
Primary filter	3x changeable (Standard configuration: Nickel, Aluminum, no filter)
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 (5.9 mils) with aperture 0.1 mm (3.9 mils)

## X-Ray Detection

	Standard	Option SDD
X-ray detector	Silicon PIN detector with peltier cooling	Silicon drift detector (SDD) with peltier cooling
Resolution (fwhm for Mn-K $\alpha$ )	≤ 200 eV	≤ 160 eV
Element range	Sulfur S (16) to Uranium U (92)	Aluminium Al (13) to Uranium U (92)
Measuring distance	0 ... 80 mm (0 ... 3.2 in) Distance compensation with patented DCM method for simplified measurements at varying distances. For particular applications or for higher demands on accuracy an additional calibration might be necessary.	

## Sample Alignment

Video microscope	High-resolution CCD colour 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 sample placement
Zoom factor	Digital 1x, 2x, 3x, 4x

## Electrical Data

Power source	AC 115 V or AC 230 V 50 / 60 Hz
Power consumption	max. 120 W, without evaluation PC
Protection class	IP40

## Dimensions

External dimensions	Width x depth x height [mm]: 570 x 760 x 650 mm, [in]: 22 x 30 x 26
Interior dimensions measurement chamber	Width x depth x height [mm]: 460 x 495 x 146 mm, [in]: 18 x 19.5 x 5.7
Weight	approx. 115 kg (52 lb)

## Sample Stage

Design	Programmable, motor-driven XY-stage
Maximum travel	X/Y-axis: 255 x 235 mm (10 x 9 in); Z-axis: 140 mm (5 in)
Max. travel speed	80 mm/s (3.2 in/s)
Repeatability precision XY	≤ 0.01 mm (0.4 mils), direction-independent
Usable sample placement area	Width x depth [mm]: 300 x 350 mm, [in]: 12 x 14
Max. sample weight	5 kg, with reduced approach travel precision 20 kg
Max. sample height	140 mm (5.5 in)

## 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 with extension cards
Software	Standard: Fischer WinFTM® BASIC inklusive PDM® Optional: Fischer WinFTM® SUPER

## Standards

CE approval	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

### FISCHERSCOPE X-RAY XDAL 237

- Standard (PIN detector) 604-348
  - Option SDD 605-567
- Special XDAL product modification and technical consultation on request

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