Data Sheet

FISCHERSCOPE® X-RAY XDAL® 620
FISCHERSCOPE® X-RAY XDAL® 650

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

FISCHERSCOPE® X-RAY XDAL® 620/650

Description

The FISCHERSCOPE® X-RAY XDAL® 620 and 650 instruments are universally applicable energy dispersive X-ray measuring instruments. They are especially well suited for non-destructive measurements and analyzing very thin coatings, even with very complex compositions or small concentrations as well as automated measurement tasks. Typical fields of application:

- Analysis of very thin coatings of ≤ 0.1 µm (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
- Determination of the phosphorous content in NiP coatings
- Meets the requirements of IPC specifications IPC-4552, IPC-4556, IPC-4553A and IPC-4554
- The larger detector in the FISCHERSCOPE® X-RAY XDAL® 650 allows even higher count rates for maximum precision and shorter measurement times

To create ideal excitation conditions for every measurement, the instruments feature electrically changeable apertures and primary filters. The modern silicon drift detector (SDD) achieves a high accuracy of analysis and a good detection sensitivity. 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 specimens and coating systems without calibration.

Design

The FISCHERSCOPE® X-RAY XDAL® 620 and 650 instruments are designed as user-friendly bench-top instruments. They are equipped with a high-precision, programmable XY-stage and an electrically driven Z-axis. A gap in the housing (C-slot) allows for measurements on large flat specimens, which do not fit into the measuring chamber, e.g. large printed circuit boards. The sample stage moves into the loading position automatically, when the protective hood is opened.

Both instruments can be equipped with the *automatic door opening* option. This allows you to open and close the measuring chamber door at the push of a button or by software command, thus automating or simplifying your processes. However, you can also open and close the door manually.

A laser pointer serves as a positioning aid and supports the quick alignment of the sample to be measured.

The overview camera and the detailed camera with zoom and crosshairs make it extremely easy to quickly align the sample and precisely define the measuring position.

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 FISIQ® X software.

Both instruments fulfill DIN ISO 3497, ASTM B 568, IPC-4552, IPC-4556, IPC-4553A, IPC-4554 and ISO 23345.

Electrical data

Power source	AC 100 – 240 V ±10 % / 47 – 63 Hz, max. 220 VA, without evaluation PC
Standby power consumption	< 0.5 W

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, second video camera for ultra-fast generation of an overview image, optional automatic door opening
Measuring direction	Top down

X-Ray Source

X-ray tube	50 W micro-focus with beryllium window and tungsten anode Other anode materials on request
High voltage	Three steps: 10 kV, 30 kV, 50 kV; max. anode current: 1 mA
Apertures (Collimators)	4x changeable: Standard: Ø 0.1 mm (3.9 mils), Ø 0.3 mm (11.8 mils), Ø 0,5 mm (19.7 mils), slot 0.5 x 0.15 mm (19.7 x 5.9 mils) others on request, min. 0,025 x 0,025 mm* (1 x 1 mil)*, max. Ø 0,5 mm (19.7 mils)
Primary filter	6x changeable: Ni 10 µm (0.39 mils), no filter, Al 100 µm (3.9 mils), Al 500 µm (19.7 mils), Al 1000 µm (39 mils), Mylar 100 µm (3.9 mils)
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 0.05 mm* (2 mils*) with aperture 0.025 x 0.025 mm* (1 x 1 mil*)

* The measuring time is significantly longer with very small apertures. For maximum precision with a short measuring time, we recommend a FISCHERSCOPE® with a polycapillary lens.

X-Ray Detection	FISCHERSCOPE® X-RAY XDAL® 620	FISCHERSCOPE® X-RAY XDAL® 650
X-ray detector	Silicon drift detector (SDD) with effective detection area of 20 mm^2 and peltier cooling	Silicon drift detector (SDD) with effective detection area of 50 mm^2 and peltier cooling
Resolution (fwhm for Mn-Kα)	≤ 135 eV	≤ 140 eV
Element range	Aluminum Al (13) to Uranium U (92)	
Measuring distance	Continuously adjustable 0 ... 140 mm (0 ... 5.5 in), Distance compensation 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	13 MP color detail camera for optical monitoring of the measurement location along the primary beam axis, 5 MP color camera for ultra-fast generation of an overview image, manual focusing and ultra-fast auto-focus (< 2.5 seconds on Cu), crosshairs with a calibrated scale (ruler) and spot-indicator, adjustable LED illumination, laser pointer (class 1) to support accurate sample placement
Specimen lighting	Multi-zone LED lighting from different directions for optimum illumination of all sample surfaces (matt, glossy, reflective)

Dimensions

External dimensions	Width x depth x height [mm]: 660 x 834 x 664, [in]: 26 x 32.8 x 26.1
Interior dimensions measurement chamber	Width x depth x height [mm]: 500 x 500 x 147, [in]: 19.7 x 19.7 x 5.8 Maximum dimensions of the specimen if every point on the surface is to be approached: Width x depth x height [mm]: 250 x 250 x 140, [in]: 9.8 x 9.8 x 5.5
Weight	Approx. 120 kg (265 lbs)

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Sample Stage

Design	Programmable, motorized XY-stage
Maximum travel	X/Y-axis: 250 x 300 mm (9.8 x 11.8 in), Z-axis: 140 mm (5.5 in)
Max. travel speed	X/Y-axis: 70 mm/s (2.7 in/s), Z-axis: 30 mm/s (1.2 in/s)
Repeatability precision XY	Approx. 2 µm (0.08 mils) unidirectional Approx. 8.5 µm (0.33 mils) direction-independent
Usable sample placement area	Width x depth: 300 x 350 mm (11.8 x 13.8 in), with *table extension* option width x depth: 620 x 530 mm (24.4 x 21 in)
Max. sample weight	5 kg (11 lb), with reduced approach travel precision 20 kg (44 lb)
Max. sample height	140 mm (5.5 in), protruding parts on large, flat samples that do not fit into the measuring chamber, e.g. on large printed circuit boards (C-slot) may have a maximum height of 10 mm (0.4 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 (optional)

Computer, Software	Windows® PC, FISIQ® X

Standards

CE approval	EN 61010, EN 61326
X-Ray standards	DIN ISO 3497, ASTM B 568, IPC-4552, IPC-4556, IPC-4553A, IPC-4554, ISO 23345
Approval	Individual acceptance inspection as a fully protected instrument according to German radiation protection law A Fischer radiation protection certificate is supplied.

Order

FISCHERSCOPE® X-RAY XDAL® 620	
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Table extension option	To extend the support surface for the specimen to width x depth: 620 x 530 mm (24.4 x 20.9 in)
Automatic door opening option	For opening and closing the measuring chamber door at the touch of a button or via software
Evaluation unit option	Windows® PC with pre-installed FISIQ® X software

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Special XDAL® product modification and technical consultation on request

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