FISCHERSCOPE® X-RAY XDV®-µ LD

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 LD (Long Distance) is a universally applicable energy dispersive x-ray fluorescence 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 components and structures such as printed circuit boards, contacts or lead frames
- Analysis of very thin coatings, e.g., gold coatings of ≤ 0.1 μm (0.004 mils)
- Measurements 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 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. The polycapillary x-ray optics is dimensioned so that it enables for a longer measuring distance. This allows for measurements on parts with complex geometries, e.g. on assembled printed circuit boards.

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.

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

**Design**

The FISCHERSCOPE X-RAY XDV-μ LD 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. 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 X-RAY XDV-μ 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
Sulfur S (16) to Uranium U (92) – up to 24 elements simultaneously

Design
Bench-top unit with 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

Measurement spot, fwhm at Mo-Kα
approx. Ø 60 μm (2.4 mils)

Measuring distance between specimen surface to lower edge of measuring head
fixed, appr. 14 mm (0.6 in), min. 12 mm (0.5 in)

X-ray detector
Silicon Drift Detector (SDD), peltier-cooled

Effective detector area
20 mm² (0.03 in²)

Video Microscope

High-resolution CCD colour camera for optical monitoring of the measurement location, 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 Stages

<table>
<thead>
<tr>
<th>Standard</th>
<th>Option Supporting Plate PCB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast, programmable XY-stage with pop-out function</td>
<td>Fast, programmable XY-stage with pop-out function and large placement area for measurements on PCBs</td>
</tr>
</tbody>
</table>

Usable sample placement area
Width x depth [mm]: 370 x 320, [in]: 14.6 x 12.6

Usable maximum travel
X/Y-axis: 250 x 220 mm (9.8 x 8.7 in)
Z-axis: 140 mm (5.5 in)

Max. travel speed X/Y
60 mm/s (2.4 in/s)

Repeatability precision X/Y
direction-independent: ≤ 5 μm (0.2 mils) max., ≤ 2 μm (0.08 mils) typ.

Max. sample weight
5 kg (11 lb), with reduced approach travel precision 20 kg (44 lb)

Max. sample height
135 mm (5.3 in)
## Electrical Data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main voltage, mains frequency</td>
<td>AC 115 V or AC 230 V 50 / 60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>Max. 120 W</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP40</td>
</tr>
</tbody>
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## Dimensions

- **External dimensions**
  - Width x depth x height [mm]: 660 x 835 x 720 mm, [in]: 26 x 33 x 28.3
  - Weight: approx. 135 kg (297 lb)

- **Interior dimensions**
  - Measurement chamber: Width x depth x height [mm]: 580 x 560 x 145 mm, [in]: 22.8 x 22 x 5.7

## 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 including PDM®
  - Optional: Fischer WinFTM® SUPER

## Standards

- **CE approval**: EN 61010, EN 61326
- **X-Ray standards**: DIN ISO 3497 and ASTM B 568
- **Approval**: Individual acceptance inspection as a fully protected instrument according to German radiation protection law

## Order

- **FISCHERSCOPE X-RAY XDV-µ LD**: 605-531
- **Option Supporting Plate PCB**: 604-984
  - Special XDV-µ product modification and technical consultation on request

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