

## FISCHERSCOPE® X-RAY XDV®-μ PCB

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



## Description

The FISCHERSCOPE X-RAY XDV-μ PCB is a specific x-ray fluorescence measuring instrument with a polycapillary x-ray optics. It has been specially developed for automated measurements and analyses of coating thicknesses and compositions on very small structures on printed circuit boards and components.

Typical fields of application:

- Measurements on very small flat components and structures on printed circuit boards in sizes up to 610 x 610 mm (24 x 24 in)
- Analysis of very thin coatings, e.g., gold/palladium coatings of  $\leq 0.1 \mu\text{m}$  (0.004 mils)
- Automated measurements, e.g., in quality control
- With 10  $\mu\text{m}$  option: Measurements with smallest possible measurement spot in combination with a large silicon-drift-detector.
- With vacuum table option: Measurements on flexible printed circuit boards

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.

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.

## Design

The FISCHERSCOPE X-RAY XDV-μ PCB 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 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 optics is equipped with an autofocus function. In order to focus difficult surfaces, the instrument can project a contrast grid onto the specimen surface.

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 XDV-μ PCB 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 multi-layer systems on printed circuit boards and components                                             |
| Element range       | Aluminium Al (13) to Uranium U (92) – up to 24 elements simultaneously                                                                                                                                  |
| Application         | Optimal measurement conditions for applications with Au and Pd due to the specific excitation characteristics of the polycapillary optics. For further information contact your FISCHER representative. |
| Design              | Bench-top unit with housing with a slot on the side, XY- 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 tungsten tube with beryllium window<br>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 Halo-free*                    |
|-----------------------------------------------------------------------------|---------------------------------------------|--------------------------------------------|--------------------------------------------|
| Measurement spot, fwhm at Mo-K <sub>α</sub>                                 | 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 <sup>2</sup> (0.03 in <sup>2</sup> )  | 50 mm <sup>2</sup> (0.08 in <sup>2</sup> ) | 50 mm <sup>2</sup> (0.08 in <sup>2</sup> ) |
| Measuring distance between specimen surface to lower edge of measuring head | fixed, approx. 4 – 5 mm (0.16 – 0.2 in)     | fixed, approx. 4 – 5 mm (0.16 – 0.2 in)    | fixed, approx. 1.5 – 2 mm (0.06 – 0.08 in) |

\* 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.

## Sample Stage

|                              | Standard                                     | Option Vacuum Table                                                                                |
|------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------|
|                              | Fast, programmable XY-stage                  | Fast, programmable XY-stage, fixing of specimen (e.g. flexible printed circuit boards) with vacuum |
| Usable sample placement area | Width x depth: 600 x 600 mm (23.6 x 23.6 in) |                                                                                                    |
| Maximum travel               | 450 x 300 mm (17.7 x 11.8 in)                |                                                                                                    |
| Max. travel speed XY         | 60 mm/s (2.4 in/s)                           |                                                                                                    |
| Repeatability precision XY   | ≤ 5 µm (0.2 mils), direction-independent     |                                                                                                    |
| Max. sample weight           | 5 kg (11 lb)                                 |                                                                                                    |
| Max. sample height           | 10 mm (0.4 in)                               |                                                                                                    |

## Electrical data

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

## Video Microscope

|             |                                                                                                                                                                                                                                                                                                     |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | High-resolution CCD color camera for optical monitoring of the measurement location, manual focusing and auto-focus, with contrast grid, Crosshairs with a calibrated scale (ruler) and spot-indicator, Adjustable LED illumination, Laser pointer (class 1) to support accurate specimen placement |
| Zoom factor | Digital: 1x, 2x, 3x, 4x                                                                                                                                                                                                                                                                             |

## Dimensions

|                        |                                            |
|------------------------|--------------------------------------------|
| External dimensions    |                                            |
| Width x depth x height | 670 x 885 x 660 mm (26.4 x 34.8 x 25.9 in) |
| Weight                 | Approx. 156 kg (344 lb)                    |

## 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                                                                       |
| Software | Standard: Fischer WinFTM® BASIC including PDM®<br>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 the German regulations „Deutsche Röntgenverordnung-RöV“. |

## Order

|                                                                              |         |                                                    |
|------------------------------------------------------------------------------|---------|----------------------------------------------------|
| FISCHERSCOPE X-RAY XDV-µ PCB                                                 | 605-040 |                                                    |
| FISCHERSCOPE X-RAY XDV-µ PCB                                                 |         |                                                    |
| Option Vacuum Table                                                          | 605-929 |                                                    |
| Option Vacuum Pump                                                           | 609-928 | Complete with accessories, for Option Vacuum Table |
| Option 20 µm halo-free                                                       | 605-404 |                                                    |
| Option 10 µm halo-free                                                       | 605-405 |                                                    |
| Option Measuring Cell for                                                    |         |                                                    |
| Solution Analysis                                                            | 603-216 | Not suitable with Option 10 µm halo-free           |
| Special XDV-µ PCB product modification and technical consultation on request |         |                                                    |

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