



## FISCHERSCOPE® X-RAY SERIES

X-ray fluorescence for coating thickness measurement and material analysis

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**We help you focus on what really matters –  
your products.**

Sometimes, the smallest details determine success. As structures shrink but the demands on them grow, rigorous quality control takes on a whole new level of importance.

Whether for coating thickness measurement or material analysis, Fischer is your partner of choice for precise and absolutely reliable measurement technology. With our X-ray systems, we offer highly efficient solutions to make your work as easy as possible.

**Measuring Made Easy®**







## X-ray fluorescence analysis: The standard for countless requirements

X-ray fluorescence analysis is not only firmly established in the laboratory but is also commonly used for everyday tasks in industry. It's clean, non-contact, non-destructive and fast. And it works for all elements of technical relevance. The method is based on the phenomenon that atoms, when excited by primary X-rays, release energy in the form of element-specific fluorescence radiation. The spectrum of the emitted radiation provides information about the makeup of the sample. This enables both analysis of the material composition and measurement of a coating's thickness.

As a premium supplier and leader in technology, Helmut Fischer attaches great importance to top-quality components. This is why the company develops and produces most of the parts for the FISCHERSCOPE® X-RAY devices itself. This also applies to device components like digital pulse processors or polycapillaries. Of the latter, Fischer is one of only two producers worldwide. And of course, we also program our WinFTM® software in-house.

# WinFTM® – User-friendliness first

**The WinFTM® software is the mathematical heart of all FISCHERSCOPE® X-RAY instruments. It takes the data from the measured X-ray spectra and converts it into parameters for layer thickness measurement and material analysis. And Fischer offers many extras.**

Whether it's for incoming goods inspections, quality control or research in the lab – for a diverse range of measurement technology demands, the Fischerscope X-RAY devices and the software that drives them are up to the task: WinFTM® provides just the applications and functions you need for efficient evaluation and professional documentation of your measurement data.

## Customer-specific measuring programs

For routine measurement tasks, pre-programmed measurement sequences that can be launched with just a few clicks are already available in the software. Furthermore, excitation parameters such as voltage and filter settings can be fine-tuned manually to achieve optimal results for each application. With WinFTM® it's even possible to use different excitations within a single measurement.

On request, Fischer can program macros for your specific applications. Complete inspection plans, say for production control, can be integrated into a simple operating procedure. This enables even non-technical personnel to carry out complex measurements.

## Automated measuring sequences

In many cases, measurements can be automated. This simultaneously increases efficiency and saves time. With WinFTM®'s image recognition function, the device goes about finding its preset measuring positions automatically. This enables it to work fully independently for hours.

## Statistical process control

In addition to statistical functions that calculate common parameters such as mean value and standard deviation, WinFTM® also offers tools for statistical process control. The measurement results can thus be displayed and logged as SPC control charts.

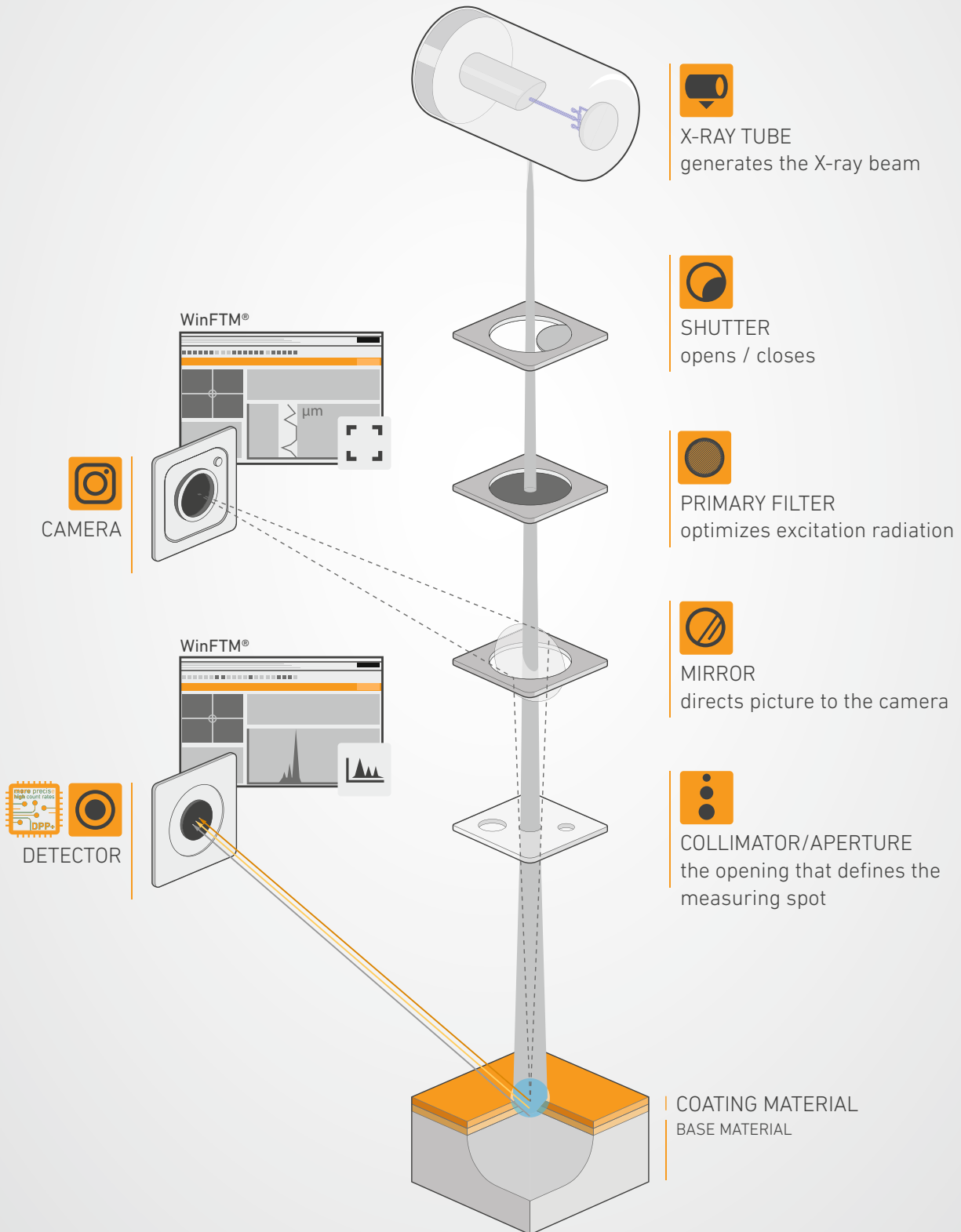
WinFTM® also does comprehensive error calculation, so determining measurement uncertainties is easy. For further processing, the data can be simply exported to higher-level quality management systems.

- Universal software for coating thickness measurement, as well as material and bath analysis
- Pre-defined measuring routines for standard tasks
- Programming of measuring sequences
- Convenient calibration functions
- Image recognition function
- Automated measuring processes
- Standard-free measurement based on fundamental parameter analysis
- Statistical functions with SPC
- Export of data to quality management systems
- Documentation of data and measurement settings in individual protocols



**Simply precise:** With standard-free fundamental parameter analysis, you can start measuring without time-consuming instrument calibration.

# A brief explanation: Anatomy of the X-Ray instrument







**X-ray tube:** Generates the primary X-ray radiation. More advanced models have a high-resolution microfocus tube. Devices thus equipped allow for smaller measuring spots.



**Shutter:** Integrated into the beam path, the shutter is a safety device that keeps the primary radiation from entering the measuring chamber. The system is unlocked only for the duration of the measurement, and only when the lid is closed. This prevents the risk of harm to the operator.



**Primary filter:** Depending on the filter used, the excitation conditions can be adjusted for different measuring tasks.



**Camera/Mirror:** The mirror directs the image to the camera. This allows the positioning of the measuring spot to be monitored.



**Collimator/Aperture:** Restricts the diameter of the primary beam, ensuring that a measuring spot of defined size is excited. With smaller collimators the majority of the primary radiation is shielded from the sample. Polycapillaries, on the other hand, focus the entire X-ray radiation onto a tiny surface, allowing for short measuring times even with small measuring spots.



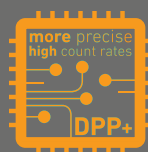
**Detector:** The type and resolution determines the measuring tasks for which the device is suitable. Fischer offers three different types of detectors:

**Proportional counter tube:** This detector for simple measuring tasks is ideal for measuring thicker layers with small measuring spots.

**Silicon PIN diode (PIN):** A mid-range detector that can be used for both material analysis and coating thickness measurement.

**Silicon drift detector (SDD):** The strength of this modern semiconductor detector lies in its ability to measure very thin films and perform trace analyses in the ppm range.

**Digital pulse processor (DPP):** The in-house developed Fischer DPP is a high-tech component that processes very high pulse and counting rates. It amplifies the events recorded by the detector. Together with the detector, the DPP is responsible for very high stability and energy resolution. Regardless of the number of pulses per second.



# FISCHERSCOPE® X-RAY XUL® / XULM®



The robust devices of the FISCHERSCOPE® X-RAY XUL® and XULM® series are designed for smooth and intuitive handling. Although they're compact, they offer plenty of space – for samples up to 17 cm in height. A recess in the housing (C-slot) allows for measurements on larger flat samples, e.g. overhanging printed circuit boards.

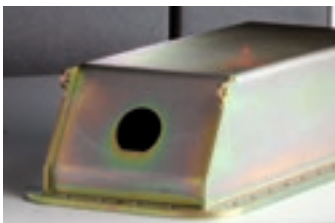


Connectors (XULM®)

## Entry-level models with a focus on speed

The instruments of the FISCHERSCOPE® X-RAY XUL® and XULM® series are the right solution for fast determination of coating thickness in electroplating, where a large number of samples must pass through quality control as swiftly as possible.

For this reason, the XUL series is designed to enable bulky samples to be positioned manually in the measurement chamber. An optionally available manual XY-stage facilitates the exact alignment of small parts. An intuitive control panel on the front of the unit further simplifies handling.



Corrosion protection: Zn/Fe



Automotive: Cr/Ni/Cu/ABS

The XUL® series allows for measuring spots of 0.7 mm in diameter or larger. These robust devices are perfectly suited for measurements on nuts, screws and other galvanically finished surfaces. Corrosion protection is another area of application.

Connectors, contacts, wires and PCBs are the domain of the FISCHERSCOPE® X-RAY XULM® series. Because of its microfocus tube, measuring spot sizes of just 0.1 mm are possible.

### Features

- Measuring coating thickness and determining metal content in electroplating baths
- Up to 17 cm sample height possible
- Proportional counter tube detector for short measuring times
- Standard X-ray tube (XUL® series) or microfocus tube (XULM® models)
- Choice of circular or slot aperture (Ø 0.3 mm; 0.3 × 0.05 mm; XUL®)
- 3-fold exchangeable primary filter
- 4-fold exchangeable aperture as standard equipment (XULM®)
- Fully protected instrument with type approval according to German radiation protection law

# FISCHERSCOPE® X-RAY XAN®



Like the FISCHERSCOPE® X-RAY XUL® series, the XAN® instruments are designed primarily for samples with simple geometries. Though, the XAN series is highly adaptable to meet your requirements for specific application tasks. This includes detector, aperture and filter options.



Noble metal inspection

## The system for a wide range of applications

The different models of the FISCHERSCOPE® X-RAY XAN® series cover a wide range of applications. The focus is on fast and precise material analysis of precious metals and gold alloys. These devices excel in the determination of heavy-metal trace elements and other hazardous substances within the scope of the RoHS Directive. This is particularly important for electronics and other manufacturing industries.

The XAN® 215 is a device with a cost-effective PIN detector. It's suitable for analyzing simple gold alloys that contain only a few other elements, such as silver and copper. For more complex alloys, devices with a silicon drift detector (e.g. XAN® 220) are a better choice. With their much higher resolution, they can distinguish between gold and platinum. Which is decisive, for example, in the analysis of dental alloys and melted precious metal alloys.



Adjusting the sample



Video image displays the measuring spot exactly

RoHS screening also requires higher resolutions, as well as different primary filters. Ideal for that: the XAN® 250 with fixed sample support or the XAN® 252 with manually operated XY-stage.

### Features

- Comprehensive instruments for metal analysis, precious metal analysis, coating thickness measurement and RoHS screening on samples with simple geometries
- Semiconductor detectors provide excellent detection accuracy and high resolution
- 6-fold exchangeable primary filters (XAN® 250, 252)
- 4-fold exchangeable apertures (XAN® 250, 252)
- Capable of measuring samples up to 17 cm in height (XAN® 222, 252)
- Fully protected instrument with type approval according to German radiation protection law (XAN® 215, 220, 250)



# FISCHERSCOPE® X-RAY XAN® 500



The FISCHERSCOPE® X-RAY XAN® 500 is the most versatile X-ray fluorescence system available in the market. As a handheld device, it is perfect for inspecting coatings on bulky parts like airplane parts, pipes or turbine blades in a running production line. In addition, the XAN® 500 can do more than just measure on large parts. With the optionally available measurement box, the device can be transformed into a desktop instrument in just a few simple steps.



Corrosion protection in aircraft construction

## The specialist for field duty

Despite its small size, the FISCHERSCOPE® X-RAY XAN® 500 is in no way second to laboratory equipment. The modern silicon drift detector is capable of accurate and precise measurement results even with short measuring times. Even complex measuring tasks involving multiple layers are performed reliably – and quickly. How? The clever little device detects thickness and composition of the layer in a single measurement step.



Measurement box



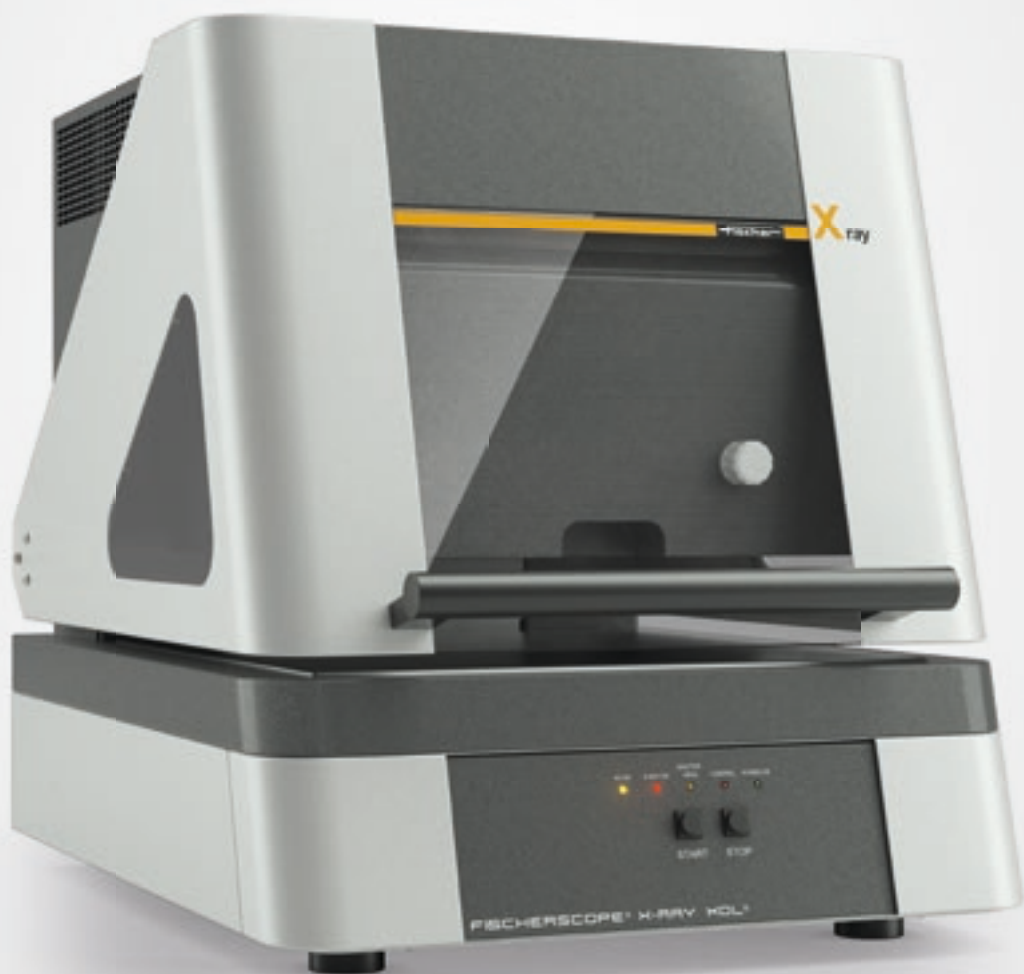
Measuring cell

Thanks to its three-point support, the XAN® 500 can be positioned securely on the surface, so layer thicknesses can be determined with repeatable accuracy. The results are shown directly on the display. For data evaluation, the handheld unit is equipped with the full version of WinFTM software that is offered with all of Fischer's other X-ray systems. As calibration samples may not be readily available, the WinFTM's fundamental parameter analysis offers standard free measurement capabilities to measure without prior calibration.

### Features

- Universal hand-held instrument for precise coating thickness measurement and material analysis – even with complicated measuring tasks
- Weight 1.9 kg
- 6 to 8 hours of operating time on a single battery charge
- Portable measurement box transforms the system into a desktop instrument
- Measuring spot diameter of 3 mm
- Silicon drift detector
- Data evaluation with full WinFTM® software with connection via Bluetooth
- Capable of bath analysis with optionally available liquid measuring cell
- Suitable for outdoor use with IP54 protection rating

# FISCHERSCOPE® X-RAY XDL® / XDLM®



Whether permanently mounted, adjustable or fully automatic, the FISCHERSCOPE® X-RAY XDL® / XDLM® series always has the right measuring stage for your requirements. A fixed sample support and a manual measuring stage simplify the handling of large samples, while those with complex geometries can be precisely positioned on the electrically driven and programmable measuring stage. This allows you to determine layer characteristics or to measure several samples one after the other – even automatically.

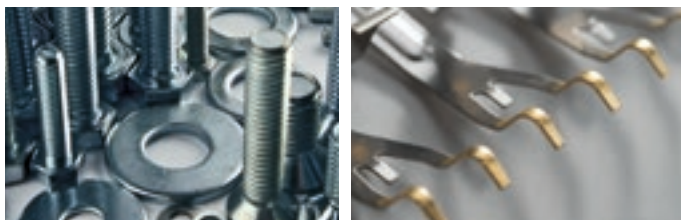


Galvanic coatings (XDL®, XDLM®)

## Your ticket to the world of automated measurement

The FISCHERSCOPE® X-RAY XDL® and XDLM® devices are closely related to the XUL® and XULM® series: The detectors, X-ray tubes, apertures and filter combinations are identical. However, the XDL® and XDLM® measure top-down. This makes it easy to implement automated measuring.

The XDL® series – ideal for the control of mass-produced galvanized parts and bath analysis – ranges from simple desktop instruments (e.g. XDL® 210 and 220 with fixed sample support) to models with programmable XY-stages (XDL® 240). The latter can also be used for automated series testing.



Corrosion protection: Zn/Fe

Connectors: Au/Ni/CuSn6

The XDLM® series differs from the XDL® line as it is equipped with a microfocus tube and multiple apertures, as well as a primary filter changer – this is ideal if you

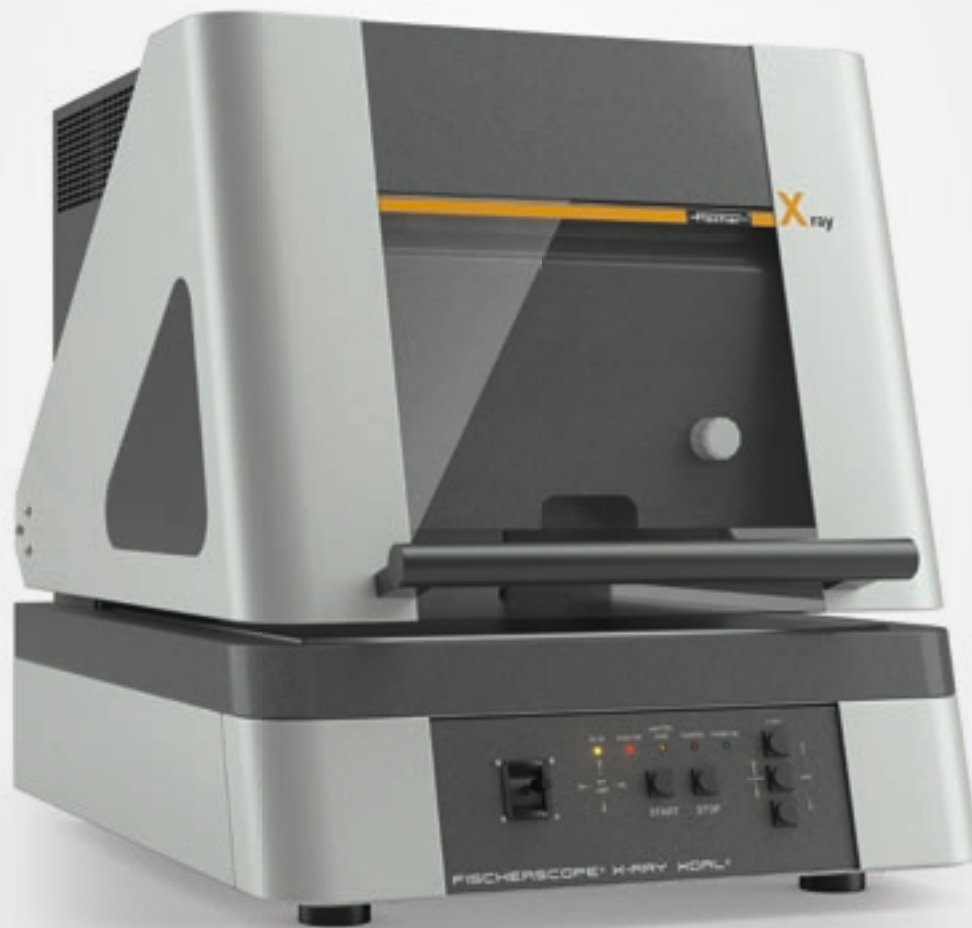
need to inspect many small parts one after the other. The XDL® and XDLM® are also very useful for the electronics industry, because the variable measuring distance of 0–80 mm facilitates measuring on irregularly shaped parts like connectors (e.g. XDLM® 237).

### Features

- Universal instruments; suitable for measuring on mass-produced, galvanized parts
- Standard X-ray tube (XDL®); microfocus tube (XDLM®)
- Fixed or 3-fold exchangeable primary filter
- Fixed or 4-fold exchangeable aperture
- Proportional counter tube enables short measuring times, even with small measuring spots
- Various measuring stage options; some models with extended sample support
- Fully protected instrument with type approval according to German radiation protection law

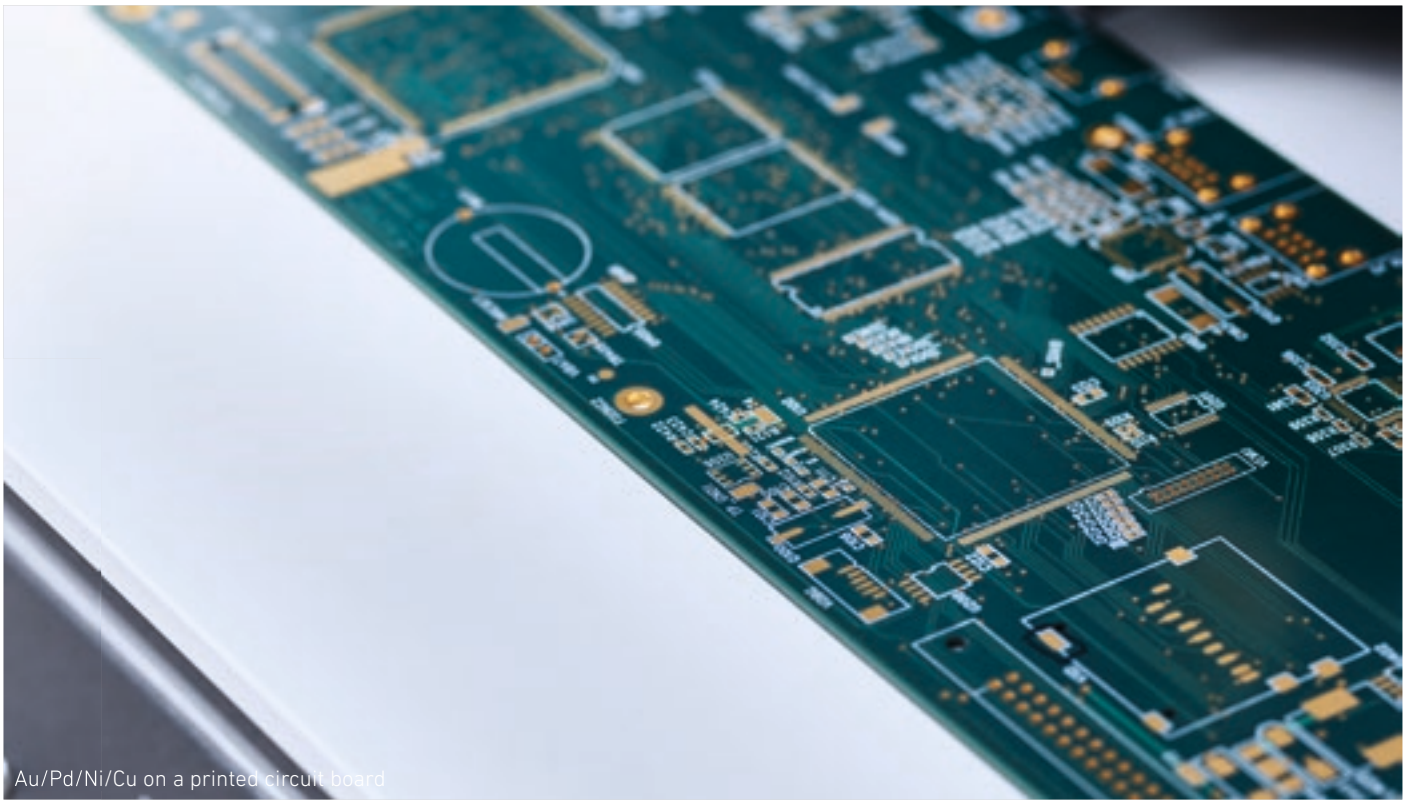


# FISCHERSCOPE® X-RAY XDAL®



The thinner the layers to be inspected, the more important the choice of detector. The FISCHERSCOPE® X-RAY XDAL® series comprises of several different models. The PIN detector can be used for both material analysis and coating thickness measurement. If ultra-precise analysis is required, the silicon drift detector is the best choice. It offers optimal energy resolution with shorter measurement times.





Au/Pd/Ni/Cu on a printed circuit board

## The best detectors for thin films

With its semiconductor detectors, the FISCHERSCOPE® X-RAY XDAL® series is an excellent choice for fast and accurate measurement of solder composition. This makes it possible to eliminate the risk of getting different solder batches via a simple scan at incoming goods inspection.

In addition, the programmable measuring stage makes the XDAL® series ideally suited for applications that require testing thin and ultra-thin coatings less than  $0.05\ \mu\text{m}$  thick. For example, mapping mode makes it easy to scan surfaces, and during production or incoming goods inspection, the testing of different components in large quantities.



An HSS drill bit: TiN/Fe



High reliability: Pb (> 3 %) in electronic components

The version with a  $50\ \text{mm}^2$  silicon drift detector is also suitable for RoHS measurements.

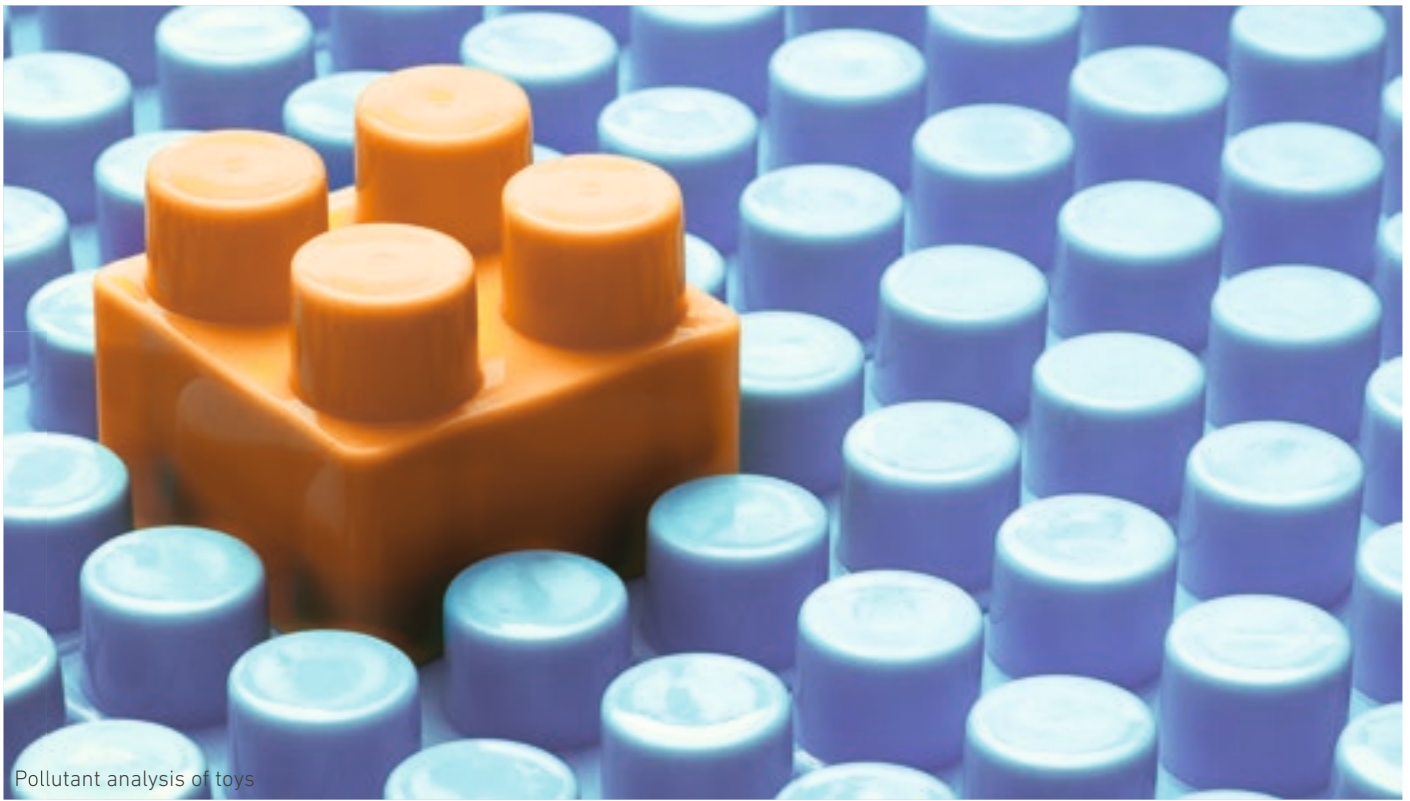
### Features

- Universal instrument for automated measurements of thin and very thin films ( $< 0.05\ \mu\text{m}$ ) and for material analysis in the ppm range
- Microfocus tube with tungsten anode
- 3-fold exchangeable primary filter
- 4-fold exchangeable apertures
- Options for different semiconductor detectors (Silicon PIN detector; SDD  $20\ \text{mm}^2$ ; SDD  $50\ \text{mm}^2$ )
- Fully protected instrument with type approval according to German radiation protection law

# FISCHERSCOPE® X-RAY XDV®-SDD



The FISCHERSCOPE® X-RAY XDV®-SDD series is one of Fischer's premium product lines. It comes equipped with a silicon drift detector with high energy resolution. In combination with large apertures, the XDV®-SDD series achieves outstanding measuring results. The large, easily accessible measuring chamber makes it suitable for both measurements on flat components as well as large samples with complex geometry.



Pollutant analysis of toys

## The high-caliber all-rounder

The FISCHERSCOPE® X-RAY XDV®-SDD is one of Fischer's most powerful X-ray devices. Its silicon drift detector is extremely sensitive to the X-ray radiation of light elements. This permits very low detection limits as well as measurement applications relating to NiP, RoHS and very thin ( $<0.05\ \mu\text{m}$ ) films. That is why the XDV®-SDD performs exceedingly well in R&D, laboratory and process qualification settings. Also, its ease of use makes it indispensable in production control.



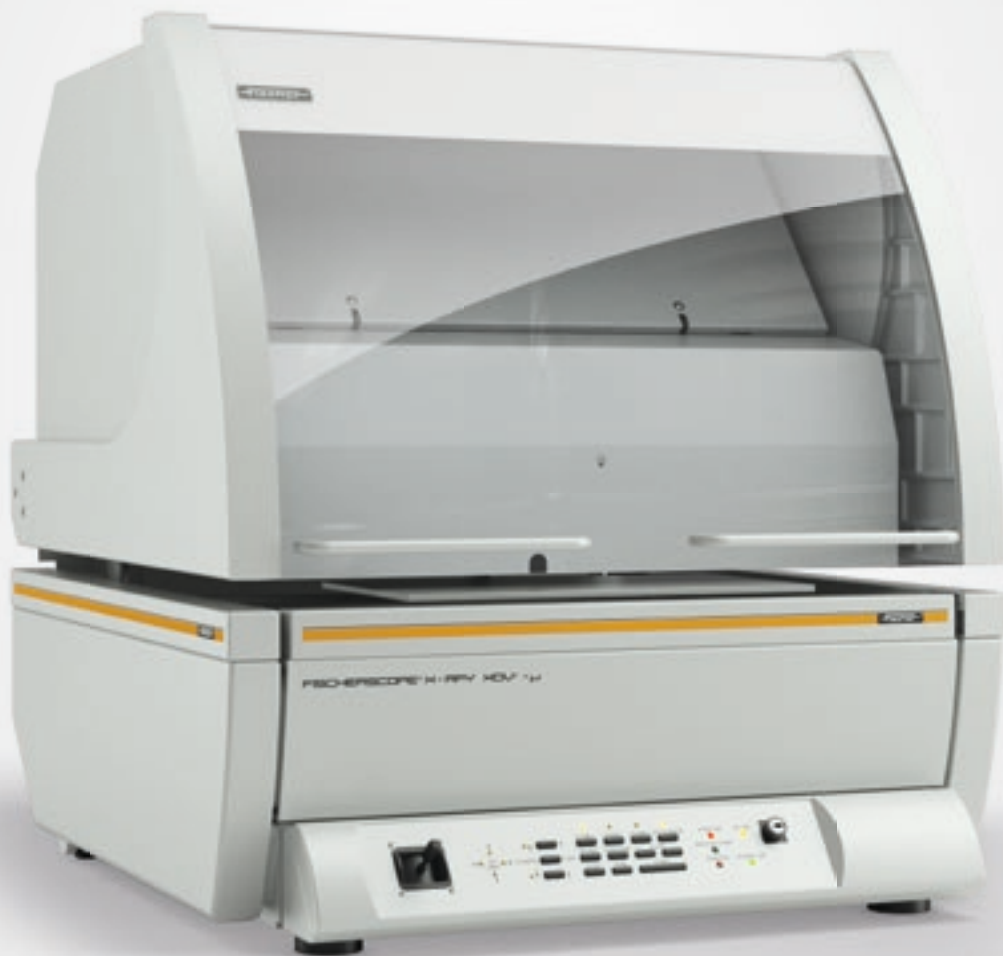
NiP/Fe: P concentration and layer thickness  
Passivation layers: Cr/Zn/Fe thickness

The XDV®-SDD system is especially well suited for trace analysis and rapid monitoring of pollutant limit values. For example, in plastics it can be used to determine critical chemical elements such as Pb, Hg and Cd with detection limits of just a few ppm.

### Features

- Universal instrument, optimal for detecting low concentrations of pollutants in accordance with the RoHS Directive, and for automated measurements of layers thinner than 50 nm
- Microfocus tube with tungsten anode; molybdenum anode optionally available
- 6-fold exchangeable primary filter
- 4-fold exchangeable aperture
- 50 mm<sup>2</sup> silicon drift detector
- Precise, programmable measuring stage for automated measurements on small structures
- Fully protected instrument with type approval according to German radiation protection law

# FISCHERSCOPE® X-RAY XDV®-μ / XDV®-μ LD



Conventional X-ray instruments require longer measuring times if the structures are very small ( $<0.1$  mm). Fischer has therefore developed a special measuring device that permits short measuring times even with small measuring spots – the FISCHERSCOPE® X-RAY XDV®-μ. This is due to its polycapillary optics, which is a bundle of hollow glass fibers that strongly focus the primary X-ray radiation. The signal intensity achieved this way enables repeatable results with short measurement times.



## Minuscule measuring surface – highest precision

The coatings on PCBs fulfill a variety of functions. Depending on the application, they can provide corrosion protection, abrasion resistance or signal transmission. To ensure that a given coating stays within narrow tolerance limits, its quality must be continuously monitored.

The FISCHERSCOPE® X-RAY XDV®-μ series is equipped with large area silicon drift detectors and polycapillary optics, which is ideal for measurements on very small structures, e.g. bond surfaces, SMD components or thin wires.



Wire: Sn/Cu



SMD component: Checking for lead content

The roomy, easily-accessible measurement chamber – with side cut-outs (C-slots) and expanded sample support – facilitates working with large samples.

The XDV®-LD model offers even more space for bulky samples. Its measuring distance of 12 mm accommodates assembled PCBs.

### Features

- Measurements on tiny components and structures, such as contact surfaces on PCBs and connector contacts, as well as complex multilayer systems
- Microfocus tube with tungsten anode; molybdenum anode optionally available
- Flexible, 4-fold exchangeable primary filter
- Polycapillary optics for particularly small measuring spots (10–60 μm FWHM) with short measuring times
- Silicon drift detectors with 20 or 50 mm<sup>2</sup> effective areas
- Video system with 3× optical zoom for precise sample positioning
- Precise, programmable measuring stage for automated measurements on small structures



# FISCHERSCOPE® X-RAY XUV 773



Air absorbs the X-ray fluorescence radiation from elements with low atomic numbers. This is why they are difficult to detect in normal atmosphere. With its FISCHERSCOPE® X-RAY XUV 773, Fischer offers a device with measuring chamber that can be evacuated, to provide a vacuum to measure light elements. For measuring liquids or loose powder samples, Fischer offers a helium option.



Gemstone analysis

## The heavyweight for light elements

Historical objects and jewelry bear witness to our history. Besides their design, the composition of the materials used can be indicative of a specific time period or region. For example, based on the presence of metal trace elements such as Mg, K, Ca, Sr and Rb, one can draw inferences about the physical origin of a gemstone. Other elements, such as Au and Pb, provide clues to the conditions under it was formed.



Soil samples, ashes, minerals



Gemstone: Matrix  $Al_2O_3$ ,  $SiO_2$

The FISCHERSCOPE® X-RAY XUV system is the specialist for material analysis. It helps to precisely identify historical objects and distinguish originals from forgeries. Ancient artifacts can be comprised of many different elements, both light and heavy, they require a measuring system that covers a wide range of elements.

As with all our X-ray lines, the FISCHERSCOPE® X-RAY XUV 773 is also equipped with the powerful WinFTM® evaluation software.

The WinFTM's multiple excitation feature makes it possible to analyze a sample under different excitation conditions – all in a single run. Thus, light elements such as aluminum or silicon can be detected together with heavy metals in the same measurement.

### Features

- Material analysis and layer thickness measurement for a wide range of elements; also for heavy elements (sodium to uranium)
- Measurements in ambient air, under vacuum or in helium atmosphere
- Microfocus tube with rhodium anode; molybdenum, tungsten or other anode materials optional
- 6-fold exchangeable primary filter
- 4-fold exchangeable aperture
- Silicon drift detector
- Fully protected instrument with type approval according to German radiation protection law







## **Is it real gold? Authenticating jewelry and precious metals**

Fine jewelry serves to decorate and beautify. At the same time, it represents a lasting investment. Whether in the lab or at the store: To find out the gold concentration of a piece of jewelry non-destructively, using the GOLDSCOPE for X-ray fluorescence is the method of choice. This method also works for authenticating coins and precious metals. In many cases, the precious metal composition can be determined within seconds – so you can see right away if all that glitters truly is gold.

# FISCHERSCOPE® GOLDSCOPE SD®



Both the hardware and the software of the robust GOLDSCOPE SD® series are specially designed to meet the requirements of the jewelry and gold business. With these models, you only buy what you really need for testing gold, jewelry and precious metals. The benefit to you: unbeatable value for your money!





Gold jewelry

## Analysis, value determination and authenticity testing

With its GOLDSCOPE SD® series, Fischer offers a tailored solution for the non-destructive testing of gold and precious metals.

All GOLDSCOPE SD® models feature the well known Fischer precision. They are equipped with the WinFTM® software, which has the most important measuring tasks for testing of gold and precious metals already pre-programmed. The GOLDSCOPE SD® family offers the right solution for your testing needs.

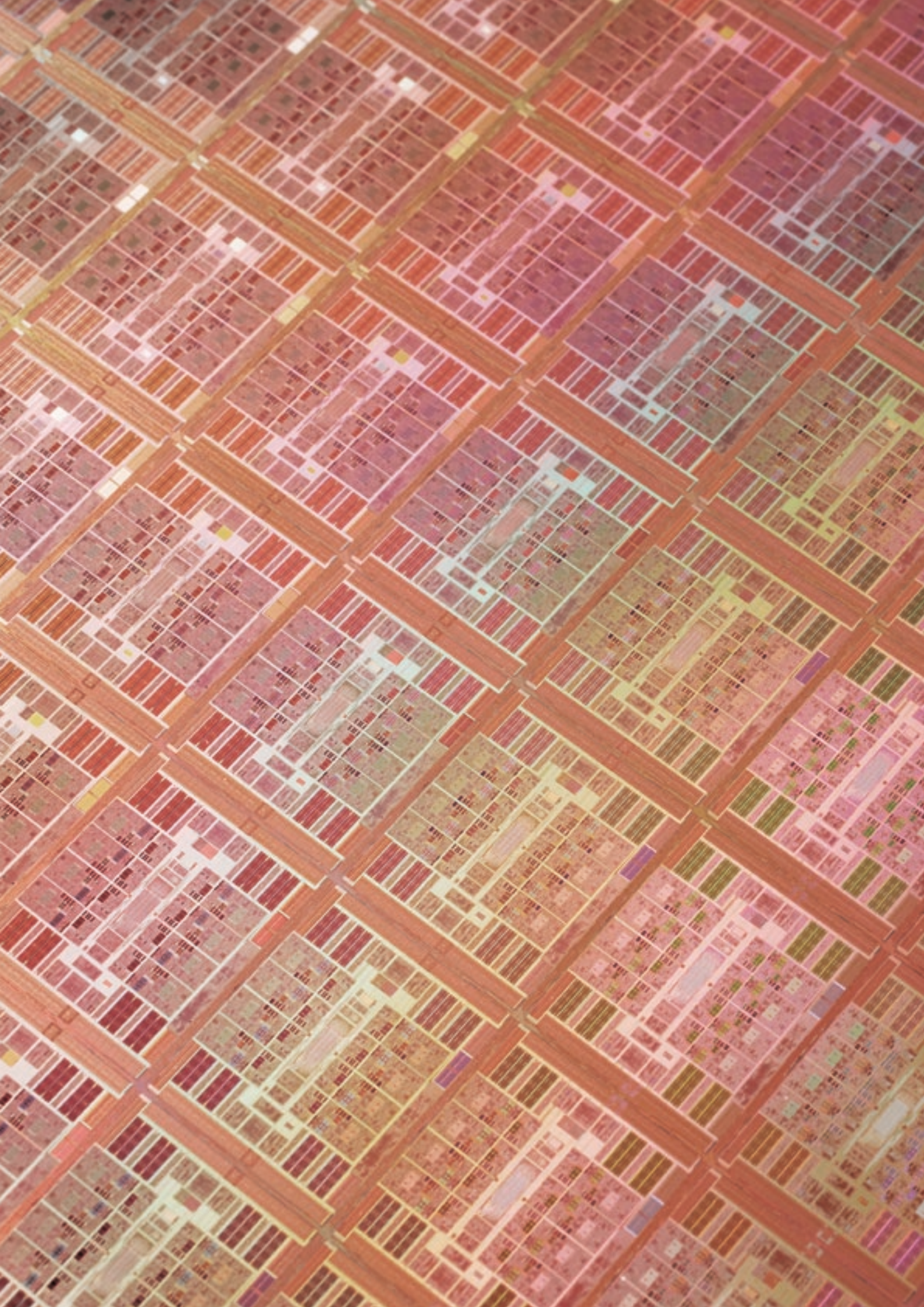
Cost-effective devices with silicon PIN detectors – designed for use in stores and pawnshops – are ideal for checking the composition of jewelry and dental gold. The GOLDSCOPE SD® 510 model is particularly space-saving: Simply place your laptop on top of the device.

For test laboratories and jewelry manufacturers, this series offers instruments with silicon drift detectors and exchangeable apertures. In this way, the GOLDSCOPE SD® series can also fulfill more exacting demands.

### Features

- Compact, robust desktop instrument with hardware and software aligned to measuring tasks related to gold and precious metals
- Especially space-saving with the GOLDSCOPE SD® 510 version
- Various apertures available; GOLDSCOPE SD® 550 with exchangeable apertures up to 2 mm in diameter
- Semiconductor detectors (PIN and silicon drift) provide very good detection accuracy and high resolution
- Fully protected instrument with type approval according to German radiation protection law (GOLDSCOPE SD® 515, 520 und 550)







An aerial photograph of a city grid, showing a dense pattern of streets and buildings. The colors are somewhat muted, with a lot of browns, greys, and some greens. A semi-transparent grey rectangular box is overlaid on the bottom left portion of the image, containing white text.

## Measurement technology for electronics and semiconductors

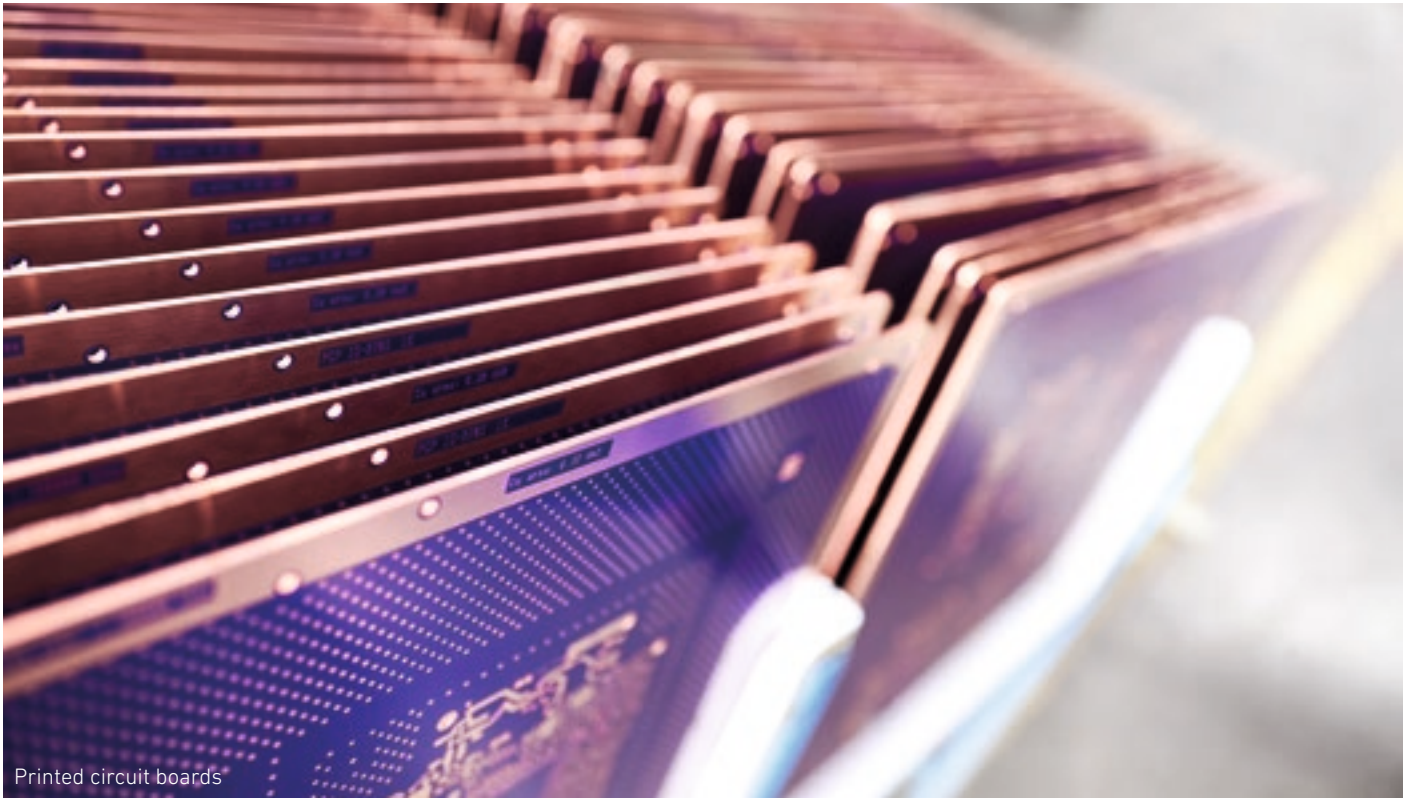
Multilayer circuit boards have a wide variety of uses in many industries. They can be used to control power plants; installed in medical equipment they help save lives; and the ones in satellites connect millions of people around the world. One industry that is particularly dependent on highly reliable electronics is aviation and aeronautics: A fault that happens mid-flight can cost many lives. Thus, it is critical for printed circuit boards to have high-quality coatings to ensure electronics function as they should. For ENIG and ENEPIG applications, most manufacturers coat PCBs with layers of gold and palladium 20 to 250 nm thick. For production control, this is a perfect case for the Fischer PCB series.

# FISCHERSCOPE® X-RAY XULM®-PCB / XDLM®-PCB / XDV®-μ PCB



With its PCB series, Fischer offers specialized solutions for printed circuit boards. Different models are available depending on the requirements. The user can choose between options such as measurement from below or from above, manual positioning, motorized XY-stages or larger support surfaces.

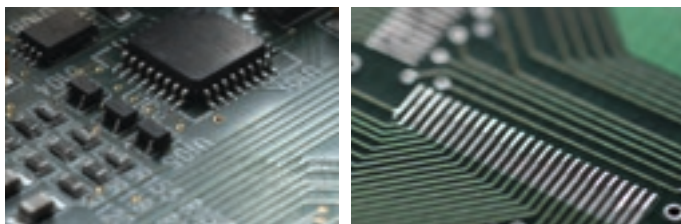




Printed circuit boards

## The professional series for printed circuit boards

Fischer devices that carry the suffix 'PCB' are specialized for printed circuit boards. For straightforward measuring tasks, the FISCHERSCOPE® X-RAY XULM®-PCB and XDLM®-PCB systems are equipped with proportional counter tubes. They are well suited for quick measurement of thicker layers using a small measuring spot. The main difference between the two model ranges is that the XDLM®-PCB systems additionally qualify for automated measurements in production control (XDLM®-PCB 210 and 220).



Assembled PCBs

Small structures

The thinner the layers to be inspected (e.g. gold/palladium  $< 0.1$ ), the more important the choice of detector. Thanks to its silicon drift detector, the FISCHERSCOPE® X-RAY XDV®- $\mu$  PCB is ideal for measuring the tiny structures found on printed circuit boards. This also applies to multiple layers, functional layers, ultra-thin coatings, and automated measurements.

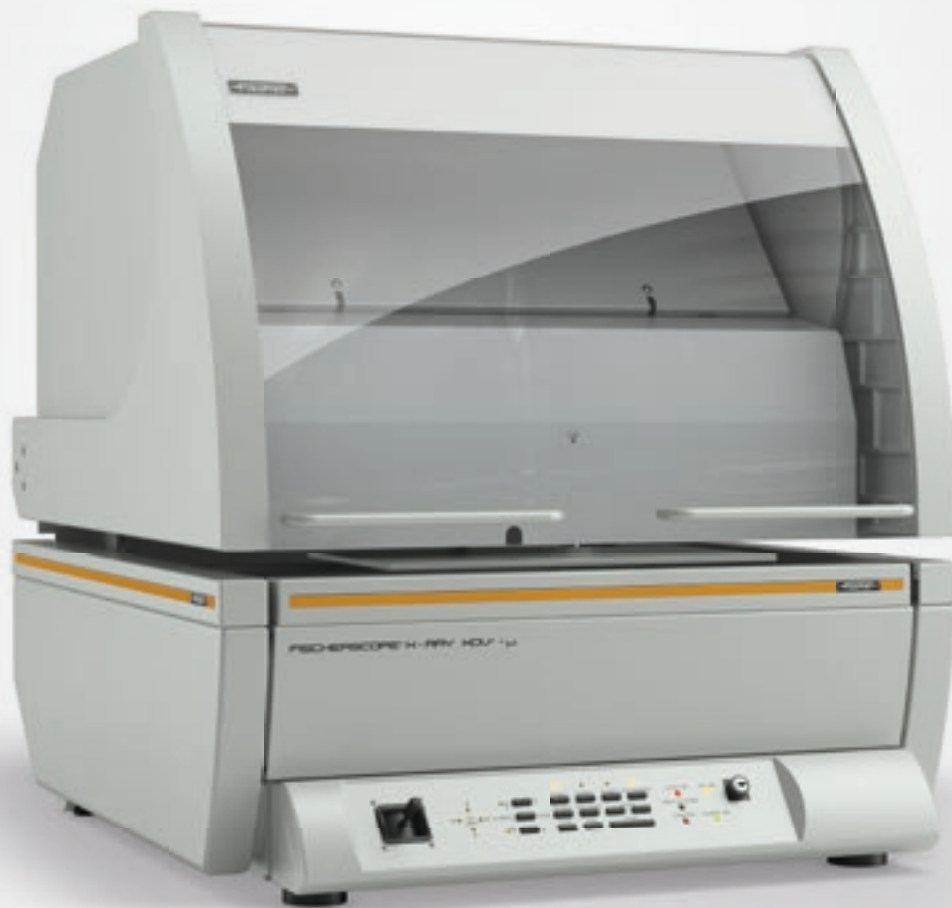
### Features of the XULM®-PCB and the XDLM®-PCB

- Instruments specialized for printed circuit boards
- 3-fold exchangeable primary filters (XDLM®-PCB 220)
- Proportional counter tube detectors for short measuring times
- Various measuring stages, partly automated and optionally available with extended support surface (up to  $120 \times 90$  cm)

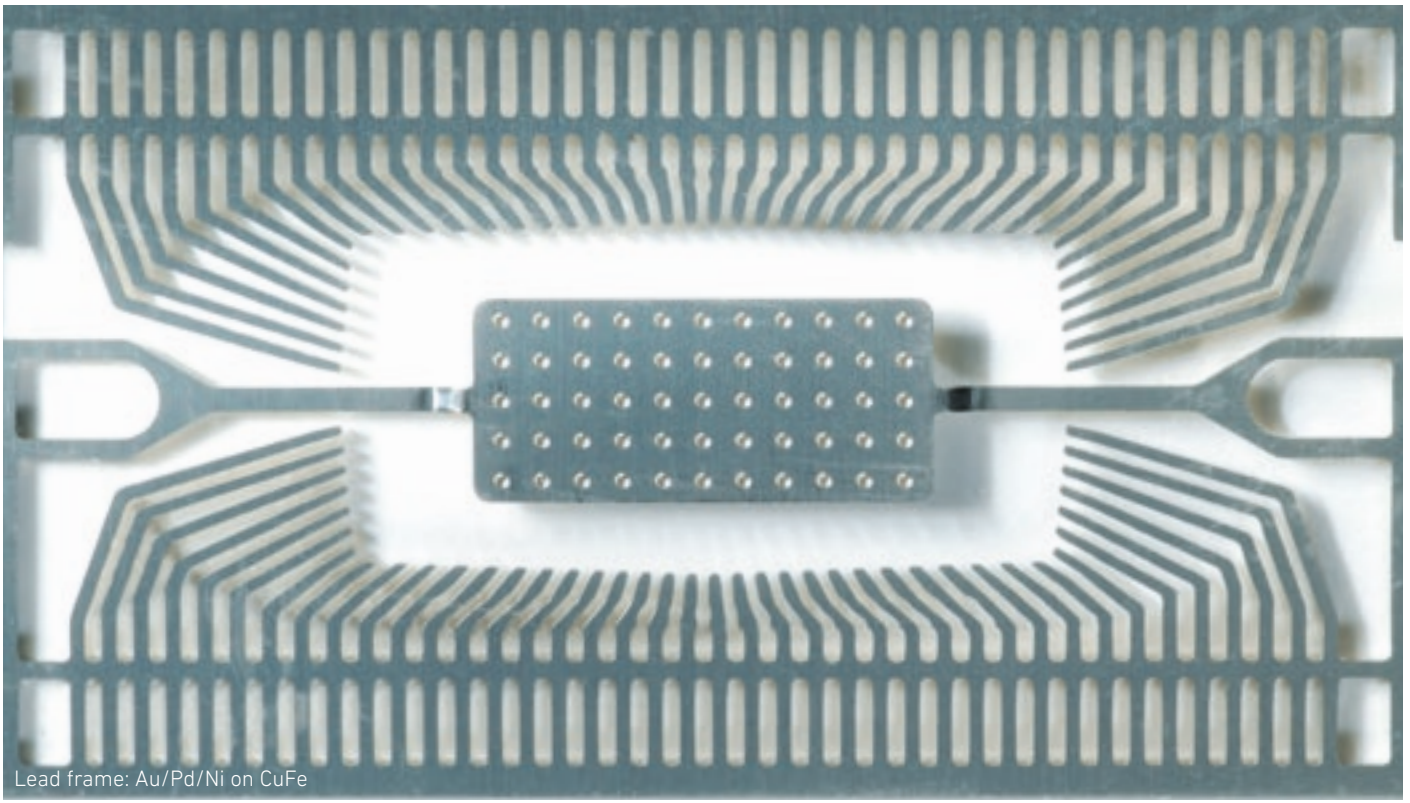
### Features XDV®- $\mu$ PCB

- Automated measurements on tiny structures
- 4-fold exchangeable primary filters
- Polycapillary optics for particularly small measuring spots ( $10$  or  $20 \mu\text{m}$  FWHM) with short measuring times
- Silicon drift detectors with  $20$  or  $50 \text{ mm}^2$  effective areas
- Programmable measuring stage with optional vacuum function

# FISCHERSCOPE® X-RAY XDV®-μ LEAD FRAME



The lead frames used in the manufacture of semiconductor memories have many multilayer coatings – gold, palladium, nickel and copper, etc. Their composition and thickness can be precisely determined using X-ray fluorescence. The specially developed desktop instrument FISCHERSCOPE® X-RAY XDV®-μ LEAD FRAME is equipped with polycapillary X-ray optics for exact measurements on very small structures. This makes it possible to take automatic measurements for quality control purposes.



Lead frame: Au/Pd/Ni on CuFe

## Your specialist for lead frames

With the FISCHERSCOPE® X-RAY XDV®- $\mu$  LEAD FRAME models, layer thicknesses in the nanometer range can be tested on lead frames and other flat micro-electrical components. Typical applications for this X-ray are the measurement of gold, palladium and nickel layers on a CuFe substrate. Also, the determination of phosphorus content in NiP layers is no problem for these special devices.

The XDV®- $\mu$  Leadframe is user-friendly and designed for automated measurements with a programmable XY-stage with an electrically driven Z-axis. A recess in the housing facilitates the measurement of flat samples that protrude from the chamber. When the protective hood is opened, the sample stage automatically moves forward into placement position. Creating ideal conditions for the respective measurement, the XDV®- $\mu$  LEAD FRAME instrument has interchangeable primary filters. Additionally, it is equipped with a polycapillary optic engineered for low energies.

### Features

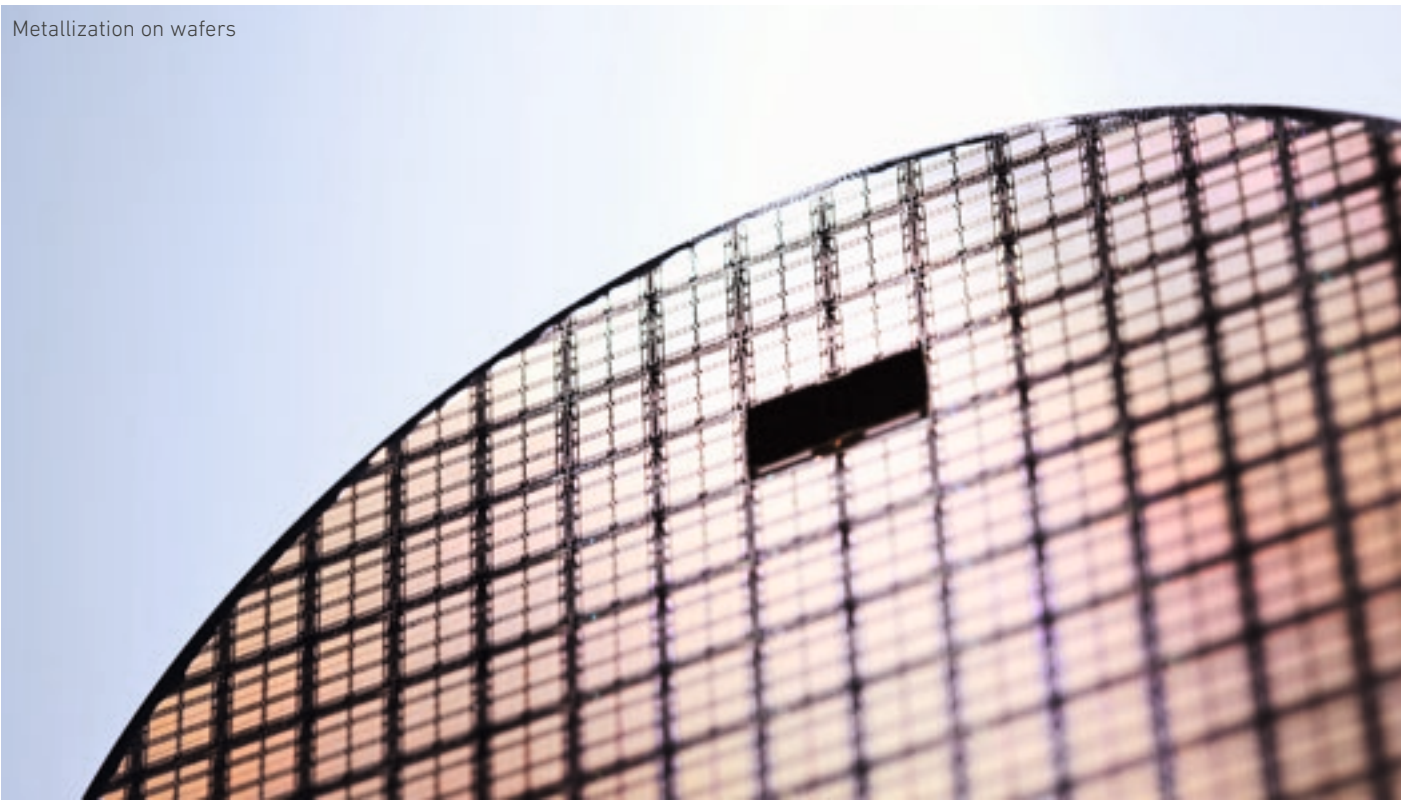
- Special device for the measurement of thin layers and multilayer layer systems on very small, flat structures such as lead frames.
- Helium flush allows for measurement of even very light elements starting at sodium
- Polycapillary optics
- High-power tubes with chrome anode
- 4-fold automatically exchangeable filter
- High-resolution CCD color camera, crosshairs with calibrated scale, adjustable LED illumination and laser pointer (class 1) for exact sample placement
- Silicon drift detector
- Fast, programmable XY-stage with pop-out function and electrically driven Z-axis

# FISCHERSCOPE® X-RAY XDV®-μ WAFER



Handling and measuring wafers is a challenging process. The FISCHERSCOPE® X-RAY XDV®-μ WAFER meets these challenges by having a programmable measuring table and vacuum wafer chuck. The wafer is positioned on the stage, and then the measurement is carried out – fully automatically – at the programmed points. The device offers pattern recognition capabilities where the system automatically finds the preset measuring positions.





## Cutting-edge technology for wafer applications

Wafers place some of the highest demands on the measurement technology used. Firstly, the surfaces are very sensitive. Secondly, the structures are so small that only special devices can analyze them.

FISCHERSCOPE® X-RAY XDV®-μ WAFER models are designed specifically for automated analysis of microstructures and to meet the needs of the semiconductor industry. Typical measuring tasks include the characterization of base metallizations, material analysis of solder bumps and coating thickness measurement on contact surfaces.

Testing of such tiny structures requires minuscule measuring spots. That's why XDV®-μ WAFER devices are equipped with polycapillary optics. They focus the X-rays onto a measuring spot of just 10–20 μm. An XDV®-μ WAFER system thus allows for much more precise characterization of the individual microstructures than any conventional device can.

### Features

- Special device for automated measurements on wafers ranging from 6 to 12 inches in diameter
- Microfocus tubes with molybdenum anode as standard, tungsten anode optionally available
- 4-fold automatically exchangeable filter
- Optimal local resolution; halo-free polycapillary optics enable measuring spots of 10 or 20 μm FWHM
- Silicon drift detector for maximum precision on thin layers
- Precise, programmable measuring stage with vacuum wafer chuck for automated measurements on small structures









## Quality assurance on the go

Whether in automotive, electronics or electroplating environments, robots are increasingly being utilized in areas where repetitive sequences must be carried out with both precision and speed. As this process can be optimized under constant conditions, this not only increases quality but lowers costs as well.

For this vision to become reality, quality control has to keep pace with production. It requires powerful and fully integrated measurement technology. For this purpose, Fischer offers tailor-made X-ray solutions from cleanroom-compatible measuring systems for automated chip production to modules for coating thickness measurement that can be seamlessly integrated into production.

# FISCHERSCOPE® X-RAY in the line

The demand for efficiency, flexibility, transparency and continuous process optimization plays a key role in modern production systems. For production measurement technology, this means: ever faster, ever more adaptable, ever more accurate – and safer, too. With its end-to-end solutions, Fischer covers the entire engineering process from requirements analysis to installation and system integration.



## FISCHERSCOPE® X-RAY XDV®-μ SEMI

Designed for quality control in the semiconductor industry, the FISCHERSCOPE® XDV®-μ SEMI series stands out for its handling of wafers. It gently picks up the wafers from the FOUP or SMIF boxes and positions them safely in the encapsulated measuring chamber. The measurement takes place automatically. Thanks to image recognition, the specified measuring positions are reliably inspected.

## FISCHERSCOPE® X-RAY 5000

The devices in this series form modular units that are easy to install in production lines. The main remit of the X-RAY 5000 system is the analysis of thin coatings on large substrates, for example in photovoltaics (CIGS; CIS, CdTe).

The X-ray source, detector and primary filter can all be customized.







## Automation solutions by Fischer



### FISCHERSCOPE® X-RAY 4000

The FISCHERSCOPE X-RAY 4000 is designed for measuring coating thickness during the strip electroplating process. The ultra-fast mechanics for moving the measuring head around make it possible to take measurements at various places on the test piece. X-ray source and detector can be selected individually according to your requirements.

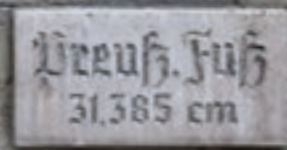
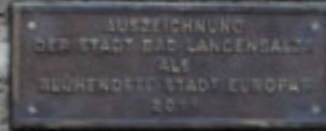
#### Features of our X-ray inline solutions

- Simple integration in an industrial plant environment
- Seamless IT integration via fieldbus systems
- Customer-specific adaptations according to the measuring task
- Numerous additional options
- Easy scalability
- Individually tailored service offers









## Is there a standard way to measure?

A medieval market. The maid is sent to the next town to buy 16 lengths of cloth. The price seems unusually low to her. Is it a real bargain, or is the cubit here much shorter than at home? What if there is insufficient fabric for Madame's dress? Luckily, the maid knows that the cubit on display at the town hall back home is slightly longer than her forearm. There is a cubit displayed here too... and indeed: This cubit is a bit shorter. So the maid bought 18 cubits of fabric for the lady's dress!

Every city used to have its own cubit exemplar. Each ruler could define his own units of measurement. Today things are different, institutions such as the Bureau International des Poids et Mesures (BIPM) and the Physikalisch-Technische Bundesanstalt (PTB) ensure uniform metrological standards that can be reproduced anywhere, anytime. For measuring instruments to provide the expected accuracy, they have to be calibrated with standards that are traceable to the international system of units.







# Standards you can rely on

**Only a well-calibrated gauge can deliver correct results. That is why Fischer places top priority on accuracy for its calibration standards. Our in-house calibration laboratory produces traceable standards that are recognized all around the world.**

With over 700 different calibration standards for coating thickness or material analysis, Fischer has the right standard for every application. With ready-made sets for corrosion protection, printed circuit boards and RoHS, you are set for special measuring tasks.

Calibration standards are available either as coated base materials or as foils. Foil standards can be combined with other materials for optimal adaptation to your measuring task. Our experts will gladly help you find the right calibration strategy.

## Accredited test labs

Fischer runs several accredited calibration laboratories. Our specialty: Fischer is the only company in Germany to certify calibration standards for the measurement quantity "surface dimensions" according to DIN EN ISO/IEC 17025.

Such standards are used to calibrate X-ray fluorescence instruments for measuring layer thicknesses. They meet the highest quality standards of state metrological institutes like the Physikalisch-Technische Bundesanstalt (PTB), the National Institute of Standards and Technology (NIST) or the National Institute of Metrology (NIM).

And thanks to our internationally recognized calibration and analysis certificates, you gain certainty while bolstering your customers' confidence in your products.



## Our unique service:

### Your own product as an individual calibration standard

Thanks to our many years of experience and expertise developed by our calibration laboratory, we can offer our customers something extra. This includes a service found nowhere else: We will develop individual standards and certify them for you.

Send us your sample and our laboratory will test the sample and certify it as a calibration standard according to ISO 17025. If required, Fischer will also reach out to its network of partner laboratories to have them carry out their own comparison and verification measurements.

Next, you will receive a certified test standard that matches your product exactly, so you'll pass every audit with flying colors!



## A reliable partner – for the entire life of your instrument

### In every respect, we are there for

- Telephone hotline plus online support
- Regional service centers – worldwide
- Onsite service in 21 countries
- Individual product training seminars
- Customized inspection contracts
- Calibration services
- Individualized task programming
- Rental equipment

### So that your X-ray instrument is always ready

At Fischer, service and proximity to our customers are of utmost importance. Our experts are there to assist you worldwide with advice and support throughout the entire service life of your instrument. You can be rest assured that you will get the help you need – and fast. Additional support is available from our application laboratories. This includes working out the best measurement strategy or defining a suitable measurement program.

### Our recommendation: regular inspections

To ensure the longevity of your instrument, we recommend regular inspections – preferably annually. Our standard packages automatically include inspections according to ISO 9001 and IATF 16949 guidelines. We also offer customized contracts to suit your specific needs.

All inspections are carried out on your premises by our specially trained service personnel. This keeps downtime to the absolute minimum. If the maintenance and/or calibration phase is expected to take longer, we are happy to provide rental equipment to bridge the gap.

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“ At Fischer, the customer relationship doesn't end with the sale of the device – that's just the beginning. ”

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*Paul Comer, Technical Director at Graphic Plc., England*





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