SOLUTIONS FOR SEMICONDUCTORS

High-precision coating thickness measurement
and material analysis of ultra-thin multilayers and microstructures

fischer®

> **"We can only recommend Helmut Fischer for the quality assurance of surfaces. We have been more than satisfied with the measurement devices and advice for years."**
>
> *Tomasz Suchcicki, Quality Manager at Aalberts Surface Technologies GmbH, GER*

Global Application - Global Sales - Global Service
Fischer
Since 1953

Trusting number 1.
The world's best in measuring technology and service performance.

Your success is in your own hands – and we make a measurable contribution to it. With our high-performance **X-ray fluorescence (XRF)** measuring devices and other advanced measuring methods, we offer you a wide range of **non-destructive** and **contactless** solutions for **inline and offline inspection** of silicon and compound semiconductors as well as for various electronic components. In this way, we provide you with **optimum support** to improve and ensure the quality of your products.

According to our motto "Measuring Made Easy" a measuring challenge is easy to handle if you, the customer, use the right measuring technology. As part of our all-round, worry-free package we are there for you from the first joint consultation meeting to the smooth integration into your production process – and well beyond. In order to offer you the highest quality products, the majority of our devices – from single parts to software – are developed and produced in Germany.

Focus on what really matters – your work. We take care of the rest.

CONTENT

FISCHER TRUSTED BRANDS

FISCHERSCOPE®
FISIQ®
WinFTM®
XDV®

What is your challenge?

Do you measure ultra-thin multilayers down to a few nanometers? Does your measurement of complex microstructures require absolute reliability and highest accuracy? The semiconductor industry is constantly facing new challenges. What are yours?

Mastering complex measuring tasks

- Highly accurate and reliable quality control of increasingly small and thin structures and coatings of wafers and semiconductors
- Coating thickness measurement of ultra-thin and complex multilayer systems, even down to the nanometer range
- Material analysis of multilayer systems and highly complex microstructures of only a few micrometers
- Reliable measuring of wafers with potential warpage

Optimizing processes

- Saving time and costs
- Faster and more accurate measuring under constant conditions
- Avoiding production downtime due to device failures and customer service delays
- Compliance with safety standards and increased clean room requirements
- Savings in laboratory and production space

Ensuring the top-tier quality of your product

- Compliance with the narrowest tolerance limits regarding coating thicknesses and material composition with accurate and reliable measurement results
- Ensuring traceability of measurement results

Solve it with Fischer!

Together, we master your challenges! Our measuring solutions are tailored to the requirements of the semiconductor industry and to your needs. Benefit from the Fischer advantage with industry-leading and innovative measuring technologies and excellent services!

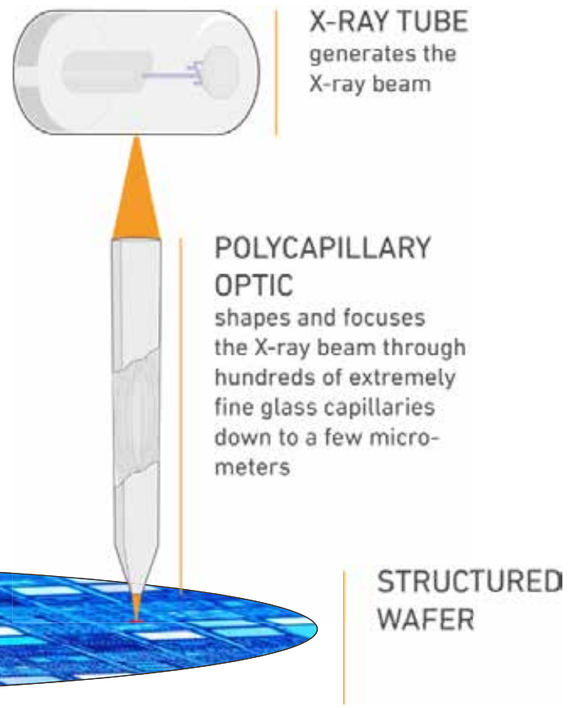
Mastering complex measuring tasks – with our high-end measuring devices

XRF devices with market-leading measurement performance. Over 70 years of experience in non-destructive and contactless coating thickness measurement and material analysis with X-ray fluorescence (XRF)

Designed for wafer and semiconductor quality control. Programmable measuring tables with a vacuum wafer chuck or wafer handling system for all standard wafer formats, even for Taiko wafers and wafers with potential warpage

Polycapillary optics made by Fischer. For smallest measuring spots down to a few micrometers, developed and produced in-house as one of only two manufacturers worldwide, independence from suppliers guaranteed

High-performance components. Long-lasting microfocus tube, highly sensitive silicon drift detector and powerful digital pulse processor DPP+ for highest count rates and short measuring times



Industry-leading software. WinFTM® offers numerous helpful features for measuring ultra-thin and complex-structured samples, including advanced technologies for automated measurements

Ensuring the top-tier quality of your product – with traceable measurement results

Certified calibration standards. Choose from our range of over 500 different pre-fabricated standards or get your sample certified by our own DAkkS calibration laboratory in Germany

Recertification of your standards. To ensure you always measure accurately and pass your customer audits

Calibration support. Remote or at your premises by our experienced XRF service professionals

Optimizing processes – with devices and support tailored to your needs

The perfect solution for your application. The choice is yours – from various benchtop devices with different collimator sizes for small and large-scale samples up to fully integrated solutions for automated measurements

Wafer quality control fully automated. Advanced process control thanks to SEMI S2/S8-compliant wafer handling system with SECS/GEM interface

Durable, reliable, made in Germany. Our XRF devices are developed and produced under German quality standards for uninterrupted 24/7 operation

Compact and user-friendly. Benchtop devices with small footprints, robust design and proven, intuitive operating concepts for easy handling

Particularly safe and cleanroom compatible. Full-protection devices in accordance with the current radiation protection legislation and extended automation solutions for increased cleanroom standards

Excellent customer service. Individual inspection agreements and regular maintenance, fast response times and personal support on-site

Reliable spare parts supply. Prompt repairs with original spare parts in proven Fischer quality

Comprehensive application consulting. We are at your disposal for all your concerns with 21 subsidiaries worldwide

Wafer packaging and advanced packaging

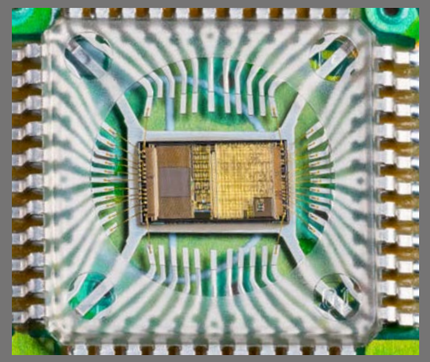
Wafer packaging is a key technology in meeting the growing demands of the semiconductor industry regarding miniaturization, competitive pricing, performance, integration and energy efficiency. Especially when it comes to high-performance technologies such as 5G, AI, autonomous driving, IoT, high-performance computing, AR and VR, quantum computing, storage systems and high-tech medical devices, advanced packaging technologies play a major role. Fischer measuring technology is used when it comes to quality control in the wafer packaging and advanced packaging processes.

Lead frames

Lead frames are essential components in basic packaging processes of semiconductor components, such as integrated circuits (ICs). They serve as a mechanical support and electrical connection between the die and the external connections of a housing.

Common multilayer system: Au/Pd/NiP/CuFe

Our polycapillary XRF devices are perfectly suited for measuring the coating thickness on very small structures, such as the individual leads of lead frames.

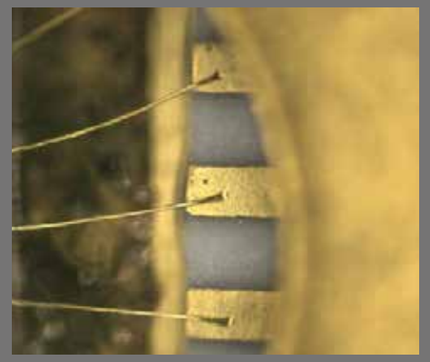


Landing pads

In semiconductor packaging technologies, they serve as basic contact points on a chip, e.g. to attach wires during wire bonding or solder bumps during flip chip packaging. Since landing pads are made of metals such as aluminum, copper or nickel, they are usually provided with protective or passivation coatings to prevent corrosion and metal diffusion.

Common multilayer system: Au/Pd/NiP/Cu/wafer substrate

Our XRF devices are successfully used to reliably measure the coating thicknesses of landing pads and their material composition.



BGAs

BGAs (Ball Grid Arrays) are a type of housing for ICs and microprocessors used for mounting on PCBs. They offer a high density of connections, which are arranged as a microscopic matrix of solder balls underneath the housing.

Common material composition: SnPb, SnAgCu

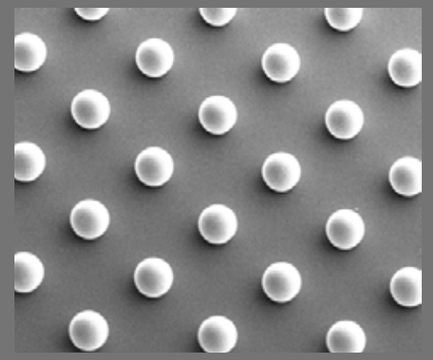
With our XRF devices, the material composition of BGA alloys can be easily and quickly measured, including their lead-free status.

UBM

High-quality UBM (Under Bump Metallization) is crucial for the performance and reliability of flip chip connections. It is usually applied to metal pads to ensure better solderability and adhesion of the solder bumps later in the process. In addition, UBM forms a barrier layer against metal diffusion and thus improves the connection between chip and package.

Common multilayer systems: Au/Ni/Ti/metal pad/wafer substrate, Au/Ni/Cu/Ti/metal pad/wafer substrate, Pd/Ni/Cu/metal pad/wafer substrate

Our XRF devices are the ideal solution for the reliable coating thickness measurement and material analysis of extremely thin and complex multilayers, including UBM. In this way, you can comply with the narrowest tolerances and ensure highest performance of electronic devices.



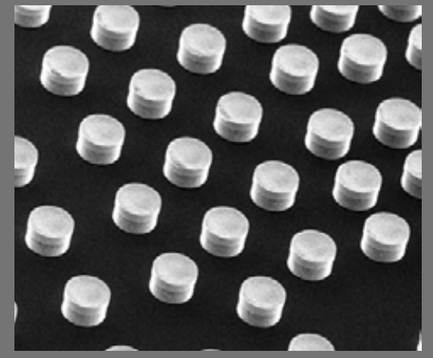
Solder bumps

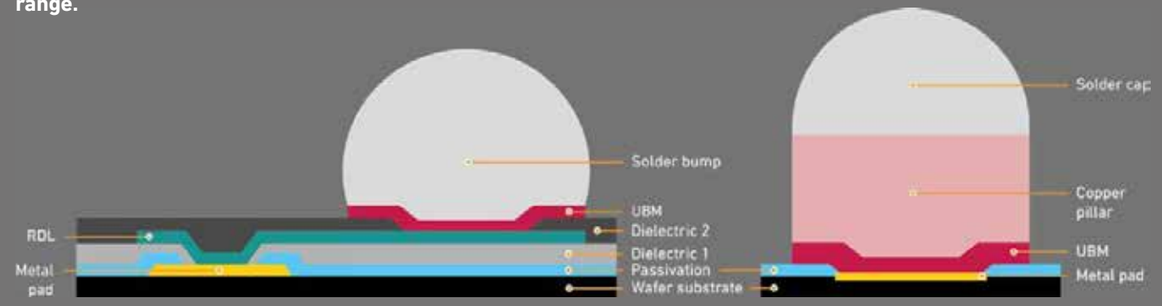
In flip chip or advanced packaging processes, such as wafer-level, 2.5D and 3D packaging technologies, solder bumps, copper pillar bumps and gold bumps are used to connect chips to the substrate or to wafers on a substrate (CoWoS). For proper functionality and cost reasons, the exact material composition, especially the SnAg concentration, of the different types of bumps as well as the coating thickness play a major role.

Common material composition of solder bumps and copper pillar bumps: SnAg or SnAg/Cu with Ag between 1 % and 3 %

Common multilayer systems of gold bumps: Au/Ni/Cu/UBM/metal pad/wafer substrate

We provide you with high-end XRF devices to precisely measure the material composition and height of your solder bumps or copper pillar bumps and the coating thickness of gold bumps. Thanks to our advanced polycapillary optics for high-performance focusing you can reliably measure small structures with diameters in the micrometer range.





RDLs

RDLs (Redistribution Layers) are critical components of wafer-level packaging (WLP), especially in advanced technologies such as WLCSP (Wafer-Level Chip Scale Packaging). They are used to redistribute the connection positions of a chip so that they fit to a standardized layout for different packaging designs. As the conductive tracks in RDLs are mostly made of copper, thin layers of titanium, chrome or nickel are also applied to prevent copper diffusion into the insulating materials and to achieve better adhesion.

Common multilayer system: Ti/Cu

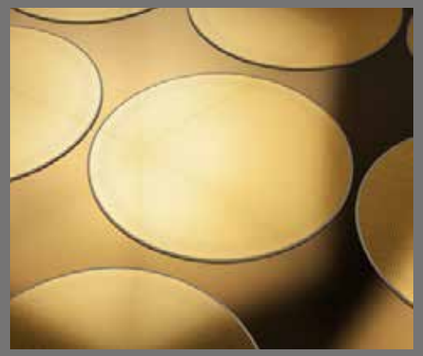
Our XRF devices are used to analyze the material composition and to measure the coating thickness of RDLs.

High-power semiconductors

High-power semiconductors play a central role in shaping an energy-efficient future. They are specifically designed to handle high currents and voltages for efficient control systems and conversion of large electrical powers. Their applications range from power generation and automotive to industrial and commercial electronic systems. Our measuring devices are used for quality control of these high-power semiconductors.

Backside metallization

Backside metallization is a key process step in high-power semiconductor and sensor manufacturing, e.g. MEMS sensors. By carefully selecting the layers and their combination sequence, the backside metallization can be optimally matched to the specific requirements of the respective semiconductor component in terms of electrical, mechanical and thermal properties.



Common multilayer systems: Ag/Ni/Ti/Al/wafer substrate

With our XRF devices, you can precisely measure the thickness and composition of backside metallizations and ensure the quality of your coating process. With our customized wafer chucks, we offer you the option of measuring thicker metal coatings as well.

Wide band gap semiconductors

Before further processing, wide band gap semiconductors such as GaN or SiC wafers need to pass quality control to test specific material properties, such as adequate electrical conductivity, which is crucial for the proper functioning of high-power applications.

In addition to XRF devices, we also offer other measuring methods, e.g. to test electrical conductivity or the density of free charge carriers. For further information, please get in touch with us.

Electronic applications

Electronic components are becoming increasingly smaller to provide higher performance, improved cost efficiency, mobility and integration. This trend is pushed by the ongoing progress in manufacturing technology and the search for better products. Reliable quality assurance is therefore becoming more and more important for the future of the electronics industry, from consumer goods to critical medical and industrial applications, and this is where Fischer devices prove to be the first choice.

Thin wires

Wires with diameters of only a few micrometers play a decisive role for wire bonding and various other areas of microelectronics and electrical engineering, especially where high precision, small size and specific electrical properties are required. Coated wires are used to improve bonding performance, prevent oxidation or to increase mechanical stability.

Common alloys or coating systems: Au or Cu wires, Au/Cu, Au/Ag, Pd/Cu, Ag/Cu, Cu/Stainless steel and various other combinations

Our polycapillary XRF devices are the perfect choice for measuring the coating thickness and alloy composition of very small wires.

Spring contacts / Pogo pins

Pogo pins, or spring-loaded pins, are electrical connection mechanisms placed on wafers for wafer testing using probe cards. In this way, the electrical properties of the individual dies on a wafer are tested before they are cut into chips.

Common coating systems: Au/Ni/Cu alloys

In order to obtain absolutely reliable results in this testing process, the functional coatings of the pogo pins must be of high quality. This is where our XRF devices come into play.

Didn’t find your application here?

We offer the right measuring solution for a wide range of other applications, e.g. for coating thickness measurement and material analysis of NiFe pillars, SMDs, IC substrates, connector contacts, PCBs (ENIG/ENEPIG), solar cells, and much more.

Don’t hesitate to contact us!

Our solutions for your challenges

Measuring task	View	Model	Measuring method	Short characteristics	Page
Coating thickness measurement & material analysis		**FISCHERSCOPE® XDV®** **FISCHERSCOPE® X-RAY XDV®-SDD** The high-end all-rounders.	XRF	Powerful XRF benchtop devices with various collimator sizes for universal use. Ideal for measuring small and large-scale samples as well as for RoHS screening at very low detection limits. **Key applications:** Backside metallization, landing pads, micro pads, RoHS screening	**14 – 17**
		**FISCHERSCOPE® X-RAY XDV®-µ** **FISCHERSCOPE® X-RAY XDV®-µ LD** Smallest spots, highest precision.	XRF	High-end XRF benchtop devices with polycapillary optics for measuring on microstructures with smallest measuring spots and highest precision. For measuring flat samples and ultra-thin multilayers, the FISCHERSCOPE XDV®-µ is the perfect solution. **Key applications:** Lead frames, thin wires, solder bumps, micro pads, SMD components, pogo pins, BGAs, UBMs, RDLs The FISCHERSCOPE XDV®-µ LD offers a uniquely large measuring distance to achieve the best performance in measuring complex shaped test parts and allows more space for wafers with potential warpage. **Key applications:** Assembled PCBs, connectors, pogo pins	**18 – 19**
		**FISCHERSCOPE® X-RAY XDV®-µ WAFER** Cutting-edge technology for wafer applications.	XRF	Developed and optimized for measuring thin films and complex microstructures on wafers with diameters from 6" to 12", this high-end XRF benchtop device is equipped with polycapillary optics and a vacuum wafer chuck. It is available as a stand-alone version, for the use in automation projects with local partners or integrated into a fully automated system (FISCHERSCOPE® X-RAY XDV®-µ SEMI). **Key applications:** Solder bumps, copper pillar bumps, gold bumps, small contact surfaces, micro pads, UBMs, RDLs	**20 – 21**
		**FISCHERSCOPE® X-RAY XDV®-µ SEMI** First choice for automated wafer measurement.	XRF	Fully automated XRF measuring system with an integrated FISCHERSCOPE® X-RAY XDV®-µ WAFER device. Equipped with an automated wafer handling system, polycapillary optics and vacuum wafer chuck so you can measure your wafers more effectively. **Key applications:** Solder bumps, copper pillar bumps, gold bumps, small contact surfaces, micro pads, UBMs, RDLs	**22 – 23**
		**CUSTOMIZED SOLUTIONS** The right solution for your measuring task.		Customized system construction on request, fully or semi-automated. Tailored to your application, we implement additional process steps, such as the mechanical flattening of wafers. By working together with local integration partners, we avoid long lead times. **We also offer other measuring methods apart from XRF. For more information, please contact us directly.**	

Get advice from our experts! sales@helmut-fischer.com

FISCHERSCOPE® XDV®

NEW

High-speed Z-axis. For fast positioning of your samples

Autofocus under 2 seconds. Fast acquisition and focusing of your measurement object for even more efficient measurement processes

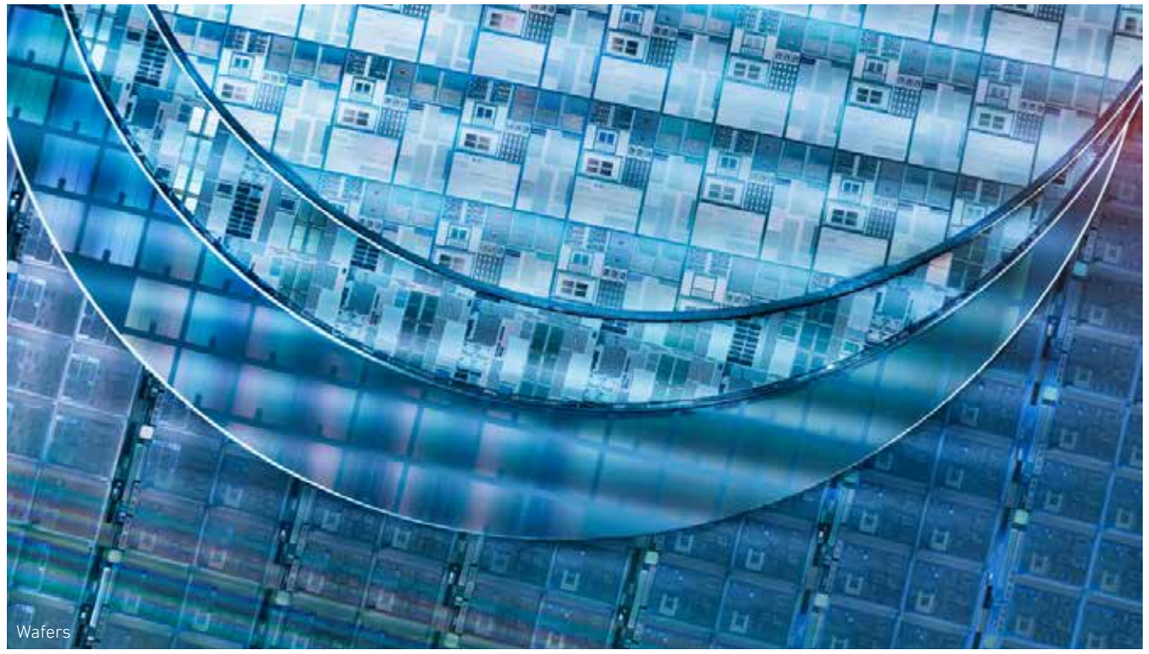
High-resolution overview camera. Keep a better overview with sharper and more detailed images

Multi-zone LED lighting. Perfect illumination at all times, no matter the surface

Automated measurement hood. Manual or automated operation for maximum flexibility

Optimized measurement geometry. Unparalleled measurement accuracy thanks to enhanced spacing between X-ray tube, sample, and detector

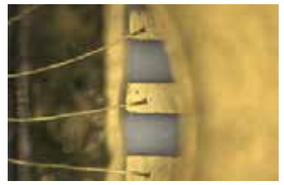
Intuitive status lighting. Check the device's status at a glance



Wafers

The high-end all-rounder.

Our new FISCHERSCOPE® XDV® is the innovative successor to the FISCHERSCOPE® X-RAY XDV®-SDD, and impresses with its easier handling,maximum speed and precision. With even faster and smarter measurement processes, our new high-performer serves a tremendous range of different applications – from efficient trace element analyses to high-precision measurement of backside metallized wafers, landing pads, or micro pads.



Landing pads (Au/Pd/Ni/wafer substrate)

Backside metallization

Equipped with a powerful overview camera and cutting-edge multi-zone LED lighting, this benchtop device provides optimum illumination for the most accurate analyses of all types of surfaces – whether matte, glossy, or reflective. The enhanced spacing between X-ray tube, sample, and detector delivers maximum intensity output, ensuring reliable and high-quality results every time. The new FISCHERSCOPE® XDV® is accompanied by our FISIQ® X software with guided workflows, a time saving calibration standard library and AI supported spectrum mode.

Features

- Innovative benchtop successor for coating thickness measurement of very thin and complex coatings, even < 0.05 µm, as well as for trace element analysis at very low detection limits
- Stepless measuring distance with measuring top down
- Microfocus tube with tungsten anode, other anodes available on request
- 4-fold changeable apertures
- 6-fold changeable filters
- Silicon drift detector 50 mm^2 for highest precision on thin layers
- Fully enclosed housing and programmable measuring table for automated measurements on small and large-scale structures
- FISIQ® X software with improved algorithmic engine for challenging measuring tasks

Video & landing page:
Scan the QR code and find out more about the **FISCHERSCOPE® XDV®**.

FISCHERSCOPE® X-RAY XDV®-SDD

Built to last. Robust design for particularly high requirements

Fully automatable. Let your instrument work for you with just one click

Quick-measure design. With a few simple steps the sample is placed and ready for measurement. Automated measurements of many parts are possible

Digital pulse processor DPP+. Even shorter measuring times with the same standard deviation*

RoHS analysis. Determination of pollutants with high detection accuracy and outstanding performance

Fast. Thanks to short measuring times, you save valuable time

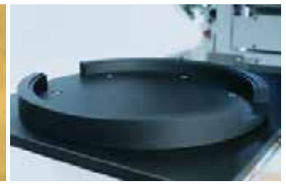
* Compared to the DPP.

Backside metallization

The high-end all-rounder.

The FISCHERSCOPE® X-RAY XDV®-SDD is one of the most flexible of our high-end XRF devices and our proven expert instrument when it comes to wide-ranging applications and highest precision. Thanks to various collimators ranging from 0.1 mm to 3 mm, it can be used both for measuring small samples such as landing pads and large-scale samples such as backside metallized wafers. Especially when measuring large-scale samples, the FISCHERSCOPE® X-RAY XDV®-SDD is convincing with its high count rates and short measuring times.

Landing pads (Au/Pd/Ni/wafer substrate)



Customized vacuum wafer chuck

Equipped with a high-performance silicon drift detector (SDD), this device is highly sensitive to fluorescence radiation of light elements and allows measuring very thin layers < 0.05 µm, e.g. gold or silver layers on backside metallized wafers. In addition, this device is ideally suited for RoHS screening at very low detection limits, even providing a dedicated RoHS setup.

With all these features, the FISCHERSCOPE X-RAY XDV®-SDD truly is a high-end all-rounder for use in research and development, in the laboratory, and in industrial production control.

Features

- Universal instrument for automated measurements of single and multilayers, even below 0.05 µm, and material analysis of smallest concentration; RoHS setup available for determining of pollutants
- Stepless measuring distance with measuring top down
- Microfocus tube with tungsten anode; other anodes optional, e.g. molybdenum anode
- 4 software-selectable collimators/spot sizes
- 6 software-selectable primary filters
- Silicon drift detector 50 mm^2 for highest precision on thin layers
- Collimators up to 3 mm: Highest intensity for shortest measuring time
- Programmable measuring table for automated measurements on small structures
- Optional customized vacuum wafer chuck available, e.g. for Taiko wafers

Video:
Scan the QR code and find out more about the **FISCHERSCOPE® X-RAY XDV®-SDD**.

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

Meeting all challenges. Reliable and fast results for ambitious measuring tasks

Digital pulse processor DPP+. Even shorter measuring times with the same standard deviation*

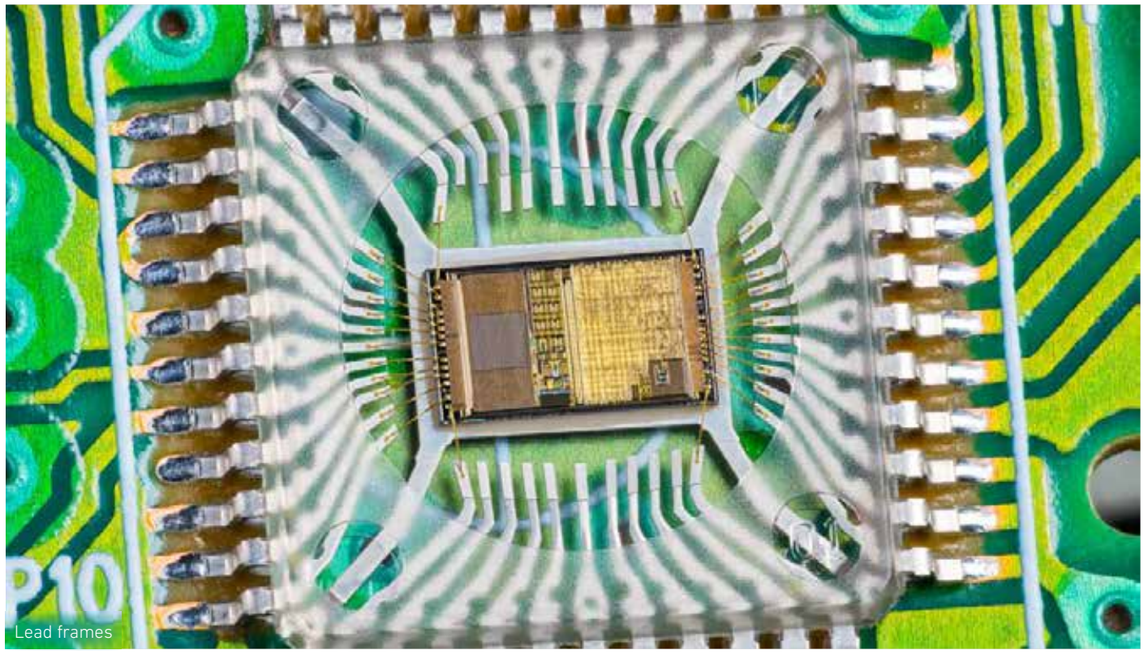
Most advanced polycapillary optics on the market. Our in-house manufactured polycapillary optics deliver outstanding measurement results with short measuring times

Fully automatable. Let your instrument work for you with just one click

Programmable. Automated measurements on predefined structures thanks to advanced pattern recognition technology

BRAND NEW MICROFOCUS TUBE ULTRA

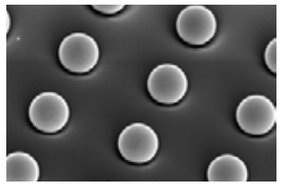
* Compared to the DPP.



Lead frames

Smallest spots, highest precision.

The FISCHERSCOPE® X-RAY XDV®-µ and the FISCHERSCOPE® X-RAY XDV®-µ LD top off our high-end range of XRF benchtop devices. Upgraded with our in-house produced polycapillary optics, the devices impress with the highest radiation intensity and precision on the smallest measuring spots. Equipped with our highly sensitive silicon drift detector (SDD) and our powerful digital pulse processor DPP+ for drastically reduced measuring times and high count rates, these devices are specially designed for coating thickness measurement and material analysis of ultra-thin multilayers and complex microstructures.


Solder bumps


Thin wires

The FISCHERSCOPE® X-RAY XDV®-µ offers the smallest of measuring spots for particularly flat samples, e.g. lead frames, thin wires, solder bumps, micro pads, SMD components, pogo pins or BGAs, and complex multilayers, e.g. UBMs or RDLs.

The FISCHERSCOPE® X-RAY XDV®-µ LD features our long distance polycapillary optic, providing a uniquely large measuring distance of 12 mm for complex shaped test parts, e.g. assembled PCBs, connectors or pins, and potential wafer warpage.

Features

- Universal instruments for measurements on the smallest of components and structures as well as complex multilayer systems
- Stepless measuring distance with measuring top down
- Microfocus tube Ultra with tungsten anode for even higher performance on the smallest spots; other anodes optional, e.g. molybdenum anode
- Polycapillary optics allow the smallest measuring spots of 10 µm or 20 µm FWHM (XDV®-µ) or 60 µm FWHM (long distance polycapillary optic in XDV®-µ LD) with a unique measuring distance of 12 mm
- 4 software-selectable primary filters
- Silicon drift detector 20 mm^2 or 50 mm^2 for highest precision on thin layers
- Video system with 3x optical zoom for precise sample positioning
- Precise programmable measuring table for automated measurements on small structures

Video:
Scan the QR code and find out more about the **FISCHERSCOPE® X-RAY XDV®-µ**.

FISCHERSCOPE® X-RAY XDV®-µ WAFER

Meeting all challenges. Reliable and fast results for ambitious measuring tasks

Programmable. Automated measurements on predefined structures thanks to advanced pattern recognition technology

Digital pulse processor DPP+. Even shorter measuring times with the same standard deviation*

Most advanced polycapillary optics on the market. Our in-house manufactured polycapillary optics deliver outstanding measurement results at short measuring times

Fully integrated solution. XDV®-µ SEMI combined with wafer handler of your choice

Fully automatable. Let your instrument work for you with just one click

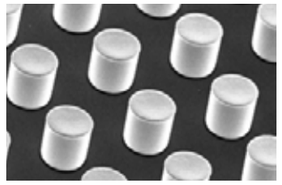
BRAND NEW MICROFOCUS TUBE ULTRA

* Compared to the DPP.

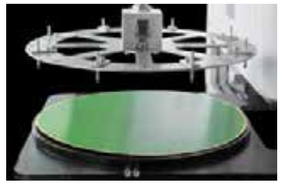
Wafer inspection

Cutting-edge technology for wafer applications.

For the growing requirements in wafer quality control, we offer the FISCHERSCOPE® X-RAY XDV®-µ WAFER. Perfectly tailored to the application, this benchtop device features a programmable measuring table with vacuum wafer chuck for measuring thin films and complex microstructures on wafers with diameters from 6" to 12". A customized wafer handling with mechanical flattening is optionally available for wafers with potential warpage.
Also part of our high-end XRF product range, this device is equipped with polycapillary optics for measuring spots of just 10 µm or 20 µm FWHM. In combination with our brand new microfocus tube Ultra and our powerful digital pulse processor DPP+, it achieves outstanding measurement performance. Typical measuring tasks include the material analysis of solder bumps, copper pillar bumps and gold bumps, as well as the coating thickness measurement on small contact surfaces and micro pads.



Copper pillar bumps before reflow



Customized wafer handling with mechanical flattening

This device is available as a stand-alone version, for the use in automation projects with local partners or integrated into a fully automated system (FISCHERSCOPE® X-RAY XDV®-µ SEMI).

Features

- Special instrument for automated measurements of thin multilayers and complex structures on wafers with diameters from 6" to 12"
- Stepless measuring distance with measuring top down
- Microfocus tube Ultra with tungsten anode for even higher performance on smallest spots; other anodes optional, e.g. molybdenum anode
- Polycapillary optics allow particularly small measuring spots of 10 µm or 20 µm FWHM with high intensity and short measuring times
- 4 software-selectable primary filters
- Silicon drift detector 20 mm^2 or 50 mm^2 for highest precision on thin layers
- Programmable measuring table with vacuum wafer chuck or customized wafer handling
- Extensive automation options with WinFTM®

Video:
Scan the QR code and find out more about the **FISCHERSCOPE® X-RAY XDV®-µ SEMI**.

FISCHERSCOPE® X-RAY XDV®-µ SEMI

Fully automated. Perfectly fitted for 24/7 use and smooth measuring processes

Programmable. Automated measurements on predefined structures thanks to advanced pattern recognition technology

Smart details for usability. Integrated CCTV monitoring of the complete handling process

Easy maintenance. Large service hatches for access to individual components

Clean room compatible. No contamination of the wafers as well as constant measuring conditions

Most advanced polycapillary optics on the market. Our in-house manufactured polycapillary optics deliver outstanding measurement results with short measurement times

Digital pulse processor DPP+. Even shorter measuring times with the same standard deviation*

* Compared to the DPP.

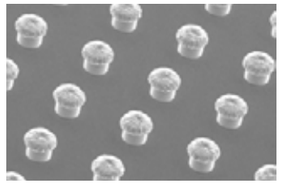
Various configurations and designs depending on country.

BRAND NEW MICROFOCUS TUBE ULTRA

Handling robot loads measuring device with wafers

First choice for automated wafer measurement.

The FISCHERSCOPE® X-RAY XDV®-µ SEMI is our fully automated measuring solution for fast and reliable inspection of wafers. The compact and turnkey system is designed for coating thickness measurement and element analysis of complex multilayers and microstructures and enables an entirely new dimension in cost effective quality control. Especially advanced packaging applications such as solder bumps, UBMs or micro pads benefit from the integrated FISCHERSCOPE® X-RAY XDV®-µ WAFER technology using proprietary polycapillary optics and our brand new microfocus tube Ultra for measuring smallest structures in shortest measuring times.



Copper pillar bumps after reflow

Automatic docking and loading of standardized FOUPs and cassettes with wafers

Thanks to an encapsulated test environment, optional filter fan units (FFU) and perforated surfaces to control the air flow, the system is optimized for clean room conditions (according to ISO Class 2). An integrated wafer handling system ensures error-free handling and measurement of the highly sensitive wafers. FOUP, SMIF or cassette boxes can be automatically docked onto the measuring system and loaded with wafers.

Features

- Fully automated system for measurements of thin multilayers and complex structures on wafers with diameters from 6" to 12"
- Microfocus tube Ultra with tungsten anode for even higher performance on smallest spots; other anodes optional, e.g. molybdenum anode
- Polycapillary optics allow particularly small measuring spots of 10 µm or 20 µm FWHM with high intensity and short measuring times
- 4 software-selectable primary filters
- Silicon drift detector 20 mm^2 or 50 mm^2 for highest precision on thin layers
- Programmable measuring table with vacuum wafer chuck and automated wafer handling system
- Compliance with SEMI S2 and S8; standardized SECS/GEM communication
- Compatible with Overhead Hoist Transport (OHT) and Automated Guided Vehicle (AGV) deliveries according to SEMI E84

Video:
Scan the QR code and find out more about the **FISCHERSCOPE® X-RAY XDV®-µ SEMI**.

WinFTM®

The mathematical heart of our FISCHERSCOPE® X-RAY devices.

Our WinFTM® is the world's most comprehensive and powerful software for coating thickness measurements and material analysis with X-ray fluorescence on the market.

Whether for process control, incoming goods and raw material inspection, or for developing new coating systems, our WinFTM® offers numerous and proven options for easy creation of measuring tasks, advanced automation and data processing options as well as a wide range of reporting functions.

Standard-free and precise measurement. Coating thickness measurement and material analysis based on optimized fundamental parameter algorithms

Traceable measurement results. Simple and guided calibration workflow with Fischer calibration standards with DAkkS certificate

Automated measurement sequences. Application-specific programming for the automatic execution of recurring measurement sequences

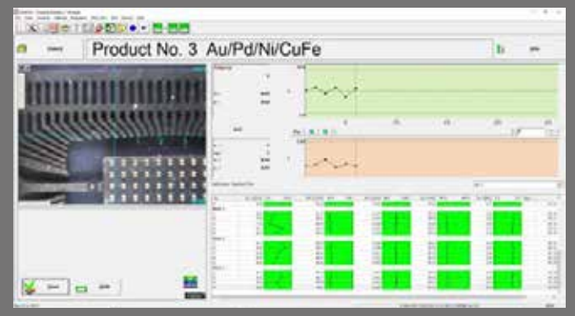
Convenient evaluation. Extensive statistical evaluations including statistical process control (SPC)

Direct data export. Simple data export via various interfaces, such as quality management systems

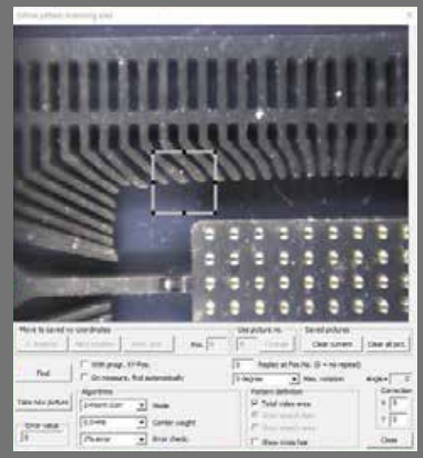
Create data reports easily. Fully customizable reports and creation of individual measurement protocols with just one click

With WinFTM®, you experience outstanding measurement accuracy and reliability for your coating thickness measurement and material analysis tasks. Enjoy maximum flexibility for automated measurements using XY programming, automated pattern recognition, our patented array mode, and many other tools and export commands for mastering challenging measuring tasks.

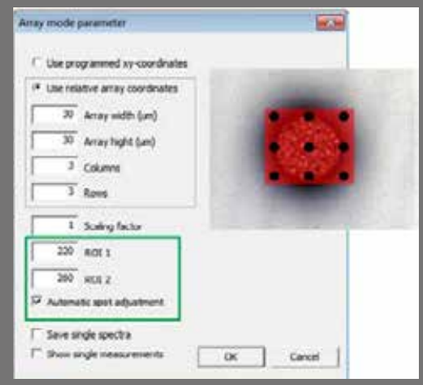
Fundamental parameter-based measuring
Our fundamental parameter-based algorithms have been developed and optimized over decades. Therefore, this software only requires a minimum of calibration standards, or even none, and always delivers reliable and traceable results. This helps you to save valuable time, making the WinFTM® particularly useful and efficient for use in research and development, as well as for industrial quality control.



Automated pattern recognition
WinFTM® features advanced image and pattern recognition technology. This allows it to automatically identify predefined structures and enables you to compensate for positional deviations when measuring multiple test parts and structures. With numerous programming tools, commands and predefined interfaces, you can fully automate your measurements and ensure the quality of your products.



Patented array mode
We are experts in measuring small structures! We are constantly improving and developing our hardware and software to meet the challenge of constant miniaturization of structures in semiconductor applications. Our small spot, halo free polycapillary optics work perfectly together with our patented array mode when sample positioning is critical or when structures are smaller than the measurement spot size.



Tutorials & webinars:
Scan the QR code and find out more about **WinFTM®**.

FISIQ® X

NEW

The first XRF software with AI technology.

Smarter, faster, more user-friendly – that is FISIQ® X. With a modern user interface and highly efficient workflows, the software solution sets new standards. Thanks to improved algorithms, it calculates your measuring results up to 6 times faster for coating thickness measurement and up to 13 times faster for material analysis. But that's not all: The AI-supported spectrum mode significantly speeds up your element searches and provides you with optimal support for analyzing and comparing your spectra.

Modern user interface. Central operating functions and information clearly in focus

Smart workflows. For efficient measurement processes and easy handling

Improved algorithmic engine. Excellent stability, accuracy, and highest repeatability, even for the most challenging measurement tasks

AI-supported spectrum mode. Analyze and compare your spectra more conveniently than ever before

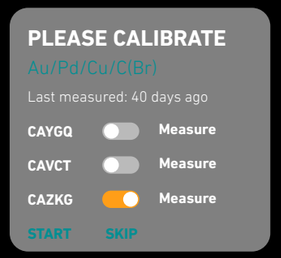
Traceable measurement results. Simple, guided calibration workflow and Fischer calibration standards with DAkkS certificate

Calibrations. Standard library for clear management of your calibration standards

Video & landing page:
Scan the QR code and find out more about **FISIQ® X**.

Get started now! Minimize user influence and make your measurements even more efficient – with FISIQ® X and the innovative new benchtop generation FISCHERSCOPE® XDV®.

Calibration



1. Create calibration easily

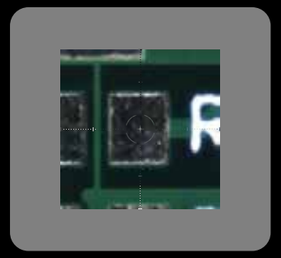
2. Select standards from library

3. Measure the standards

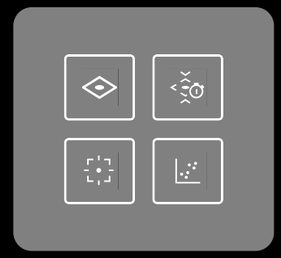
4. Calibration successful

Measuring

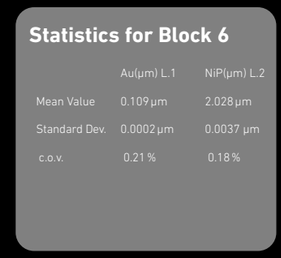
1. Choose program from taskbar



2. Place your sample



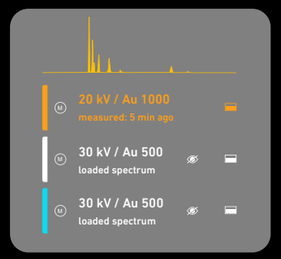
3. Launch measurement program



4. Review results effortlessly

Analysis

1. Place your sample



2. Measure spectrum

3. Get instant element identification

4. View concentration displayed with spectrum

Reporting

1. Select results blocks

2. Choose report template

3. Export with a click

4. PDF generated automatically

Calibration standards & certification

Solder bump and NiFe calibration standards

Several accredited Fischer calibration laboratories **worldwide**

Safety through **traceability**

Over 500 different certified **calibration standards**

Best support from our experts

It's all about the right measure
Only a well-calibrated measuring instrument delivers correct and traceable results. In our calibration laboratories, we produce traceable calibration standards for you, also known as reference or comparison standards. Recognized and trusted all over the world, they guarantee you absolute reliability in your measurements.

Where safety meets standards
Fischer runs several accredited calibration laboratories in the USA, Mexico, China and Switzerland. What we are especially proud of: We are the first and only company with its own DAkkS-accredited calibration laboratory in Germany that is accredited according to DIN EN ISO/IEC 17025 for the mechanical measurand "mass per unit area". By tracing the measurements back to national standards and thus to national metrology institutes such as the Physikalisch-Technische Bundesanstalt (PTB), the National Institute of Standards and Technology (NIST), or the National Institute of Metrology (NIM), we achieve highest accuracy and quality. In addition to factory certificates, we also issue DAkkS certifications, offering you even lower measurement uncertainties.

Made to fit your needs
Calibration standards are foils or coated base material. Whether for coating thickness measurement, material analysis, material testing, or microhardness measurement, our portfolio includes well over 500 different certified standards and prefabricated sets. For the semiconductor industry, we offer, among other coating systems, gold and palladium plated nickel foils, which can be conveniently combined with different wafer substrates.

A selection that leaves nothing to be desired

- Solid standards: Single and multiple layers, alloy layers, pure elements, alloys (bulk)
- Foil standards: Single and multiple layers, alloy layers
- Prefabricated sets

Your product as individual calibration standard? No problem! We also offer the DIN EN ISO/IEC 17025 certification of specific customer material for XRF measurements, e.g. solder bumps. Just hand over your sample to our experts, benefit from in-depth advice, receive your calibration certificate – and start measuring with confidence.

Please feel free to contact us! We advise you on suitable calibration standards and the optimal calibration strategy.
sales@helmut-fischer.com

Sample testing

Everything for your measuring task

Personal support on a global scale
With seven application laboratories worldwide in Germany, Switzerland, the USA, China, India, Japan, and Thailand, we are there for you around the globe. Our Fischer experts are always at your side with personalized advice and assistance – whether it's selecting the right measuring device, developing a customized measuring strategy or defining the right measuring program.

Wide-ranging expertise for reliable measurement results
Especially when solving complex measuring tasks, you benefit from our decades of expertise in measuring technology. Optimally networked with each other, as well as with research and educational institutions and industry, our application laboratories are always up to date. This is how we ensure to answer all your questions in the best possible way.

Interested in our whole product portfolio? Get an overview in our application laboratories on-site. Depending on the location, different devices are available for you to test!

Our services at a glance

- Conceptualization of your request together with our team of experts and local integrator
- Expert advice by email, phone, or in person at one of our seven application laboratories
- Targeted support for operation and calibration as well as for the implementation of new measuring tasks
- Individual testing of your sample parts
- Sample testing live: We measure your sample and you are live with us!
- Contract measurements with inspection report according to ISO 17025 (only in selected laboratories)

Contact:
You have a question about your application? Click here to find your **local contact**.

Customer service

A reliable partner for the entire life of your device

Quality is what our services are all about
For over 70 years, we have been supporting our customers with outstanding products and excellent customer service. Today, we are proud to be available to you globally, with 21 subsidiaries and over 180 service professionals worldwide. We guarantee you fast response times, personal and individual support on-site, and quick availability of original spare parts in proven Fischer quality. Fast, reliable and tailored to your needs – that's what we mean by excellent customer service.

There for you in every respect
To extend the service life of your Fischer devices and systems and to prevent possible downtimes, we offer you regular inspections and maintenance performed by our experienced and trained service professionals. We plan inspection times together with you at an early stage and coordinate them with your production schedule. Furthermore, our service experts assist you in commissioning and calibration and offer individual product trainings and much more to ensure you are fully comfortable with your Fischer product.

Our services at a glance

- On-site service thanks to 21 subsidiaries worldwide
- Individual service agreements tailored to your needs
- Fast response times, prompt repairs and reliable spare parts supply
- Telephone hotline and remote support with direct contact to our XRF service experts
- Commissioning and customized task programming on-site
- Calibration and recertification of your standards for reliable measurement results
- Customized inspection agreements and regular maintenance
- Individual product trainings and seminars

Contact:
Do you need technical support or would you like to learn more about our services? Then **get in touch** with us!

You can find us in:
AMERICA | EUROPE | AFRICA | MIDDLE EAST | ASIA & PACIFIC

- Subsidiaries
- Authorized distributors

Made in Germany! Our measuring devices and software as well as all accessories are developed, produced, and continuously optimized in-house – always with the goal to make our customer's world measurably easier.

Our experienced staff will be happy to advise you on site and in your national language. Please find your personal contact at www.helmut-fischer.com

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