M1 MISTRAL

● Tabletop Micro-XRF Spectrometer

Micro-XRF

Innovation with Integrity

M1 MISTRAL – Fast and accurate Micro-XRF

The M1 MISTRAL is a compact spectrometer for the analysis of bulk materials and layers using X-ray fluorescence technology. It allows non-destructive measurements on a wide range of sample sizes without the need for sample preparation.

Areas of application include electronics, jewelry, RoHS, automotive and many more.

Analyze arbitrarily shaped samples without need for preparation

The M1 MISTRAL is a spectrometer for the accurate Micro-XRF analysis of bulk materials and layers. All elements from Z = 22 (titanium) and higher can be analyzed. This makes a wide range of different materials accessible, like metals, alloys and metallic layers, including multi-layer systems.

Specimens up to a size of 100 x 100 x 100 mm can be placed directly on the sample stage and analyzed without further preparation.

As the measurement is contactless and from above arbitrarily shaped specimens – like finely wrought jewelry or materials of varying thickness – can be analyzed easily.

Measure exactly at the position you desire

The micro focus X-ray tubes of the M1 MISTRAL generate sufficient intensity for spot sizes even down to 100 µm, depending on the collimator used. Together with the video microscope for exact sample positioning, this ensures that measurement takes place at the desired spot. Additional functionality can be added with the optional computer-controlled stage motorization and auto focus function.

State-of-the-art analytical software provides optimum analysis results

No matter whether you want to control the quality of a sample against a known standard or determine the composition of an unknown material, the XSpect Pro and XData analysis software provides the right tool for the purpose: standard-based or standardless (fundamental parameter) quantification for both bulk materials and layer systems. Repetitive analytical tasks can be automated and later started with a single mouse click.

Ultra-fast detection systems for quick results

The M1 MISTRAL is available with a large area silicon drift detector with superior count rate performance and energy resolution to drive detection limits down to 0.01 wt.%. High performance detector, digital pulse processing and optimized geometrical conditions warrant maximum efficiency in X-ray detection and therefore fast and accurate analysis results.

Easy-to-use and maintenance-free

The design of the M1 MISTRAL and the analytical software suite permit operation even by personnel who have received only introductory training.

A power outlet is sufficient to run the system. Consumables are not required, as it relies on air-cooling. Sturdy construction ensures highest stability and maintenance free operation.

Selection of Applications

The range of possible applications for the M1 MISTRAL is very large. Three common examples are presented for illustration.

Jewelry and alloy analysis

The M1 MISTRAL is ideally suited for the analysis of pieces of jewelry, coins or precious metal alloys in general. The exact composition of all jewelry alloys, platinum group metals or silver can be determined in a fraction of a minute. Results can be output either in weight% or in Karat.

Determination of RoHS compliance

The M1 MISTRAL can also detect trace elements in light matrices according to the RoHS requirements. This allows direct control of hazardous element concentrations in electric and electronic devices.

Characterization of coatings

The X-ray fluorescence technology employed by the M1 MISTRAL allows the efficient analysis of thin coatings, e.g. on PCBs, metals or plastics. The system supports investigation of single and multi-layer coatings. The software simultaneously calculates layer thickness as well as composition, using the standardless fundamental-parameter based method. Accuracy of quantification can be further improved by the use of standards.

Testing of jewelry

- Yellow gold
- White gold
- Pt-alloys
- Ag-alloys

Accuracy: better than 0.2 wt% for main element content in the range of 40 - 100 %

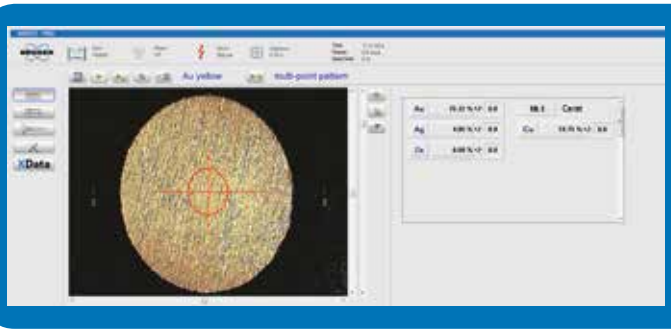
RoHS requirements

- Concentrations of Cr, Br, Pb, Hg have to be < 1,000 ppm
- Concentration of Cd has to be < 100 ppm

Analyzable multi-layers

Different layer systems can be analyzed with regard to thickness and composition, e.g.:

- Zn/Fe
- Au/Ni/Cu
- Au/Pd/Ni/Cu
- CuSn/Ni/Cu
- Cr/Ni/Cu.



Technical Specifications

Parameter	M1 MISTRAL^{SDD}
Excitation	Micro-focus, high performance with glass window, W-target
High voltage	50 kV, 50 W
Detector	Peltier cooled high performance XFlash® silicon drift detector, 30 mm² active area, < 150 eV energy resolution at Mn-Kα
Spot size	Collimator changer for 0.1 mm and larger
Sample view	Color CCTV high resolution camera system, magnification ~ 30 x
Sample stage	Motorized X-Y-Z stage with auto focus and EasyLoad function Max. travel 200 mm x 175 mm x 80 mm Max. weight load 1.8 kg
Quantification	Bulk analysis: standard-based empirical and standardless models Coatings: FP-based models
Power supply	110 to 230 V AC; 50/60 Hz, max. 120 W
Dimensions (W x D x H)	550 mm x 680 mm x 430 mm
Instrument weight	50 kg

XSpect Pro Analytical Software Suite

The software provides the following functionality:

- Instrument control, data acquisition and management
- Peak identification
- Quantitative composition analysis, standardless and standard-based empirical models
- Analysis of metallic multilayers regarding layer thickness and composition
- Report generator
- Result archive

Bruker Nano GmbH
Berlin · Germany
Phone +49 (30) 670990-0
Fax +49 (30) 670990-30
info.bna@bruker.com

Bruker Singapore Pte. Ltd.
The Helios · Singapore
Phone +65 (6500) 7288
Fax +65 (6500) 7289
info.bna.sg@bruker.com

www.bruker.com/m1mistral