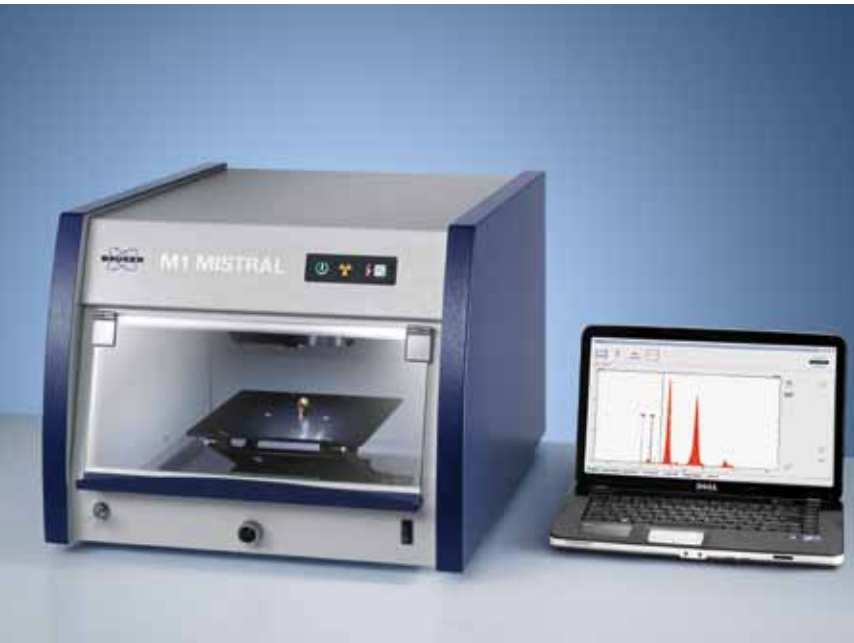




# M1 MISTRAL

- Tabletop  $\mu$ -XRF Spectrometer

# M1 MISTRAL – Fast and accurate $\mu$ -XRF



The M1 MISTRAL is a compact spectrometer for the analysis of bulk materials and layers using X-ray fluorescence technology. It allows the non-destructive analysis of 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  $\mu$ -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 produce sufficient intensity even down to spot sizes down to 100  $\mu$ m, 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 comfort 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 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 two different X-ray detectors, either a large area gas-filled proportional counter for standard applications in quality control or a silicon drift detector with superior speed and energy resolution, to drive detection limits down to 0.01 wt.%. These detectors, 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 XSpect software 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 insures highest stability and freedom of maintenance.

## Selection of applications

The range of possible applications for the M1 MISTRAL is very large. We have selected three common examples 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 high performance version of 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 XSpect software simultaneously calculates layer thickness as well as composition, using the standardless fundamental-parameter based method. Accuracy of quantification can be further improved by using standards.

### Testing of jewelry

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

Accuracy: better than 0.2wt%

### RoHS requirements

- Concentrations of Cr, Br, Pb, Hg have to be < 1,000 ppm
- Concentration of Cd have 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
- Au-Pd-Ni-Cu
- Cr-Ni-Cu.



## Technical data

The M1 MISTRAL is available in two different versions that differ in the detector installed – available are a proportional counter (PC) and a high resolution silicon drift detector (SDD).

Parameter	M1 MISTRAL <sup>PC</sup>	M1 MISTRAL <sup>SDD</sup>
Excitation	Micro-focus, high performance with glass window, W-target	Micro-focus, high performance with glass window, W-target
High voltage	40 kV, 40 W	50 kV, 50 W
Detector	Large area prop-counter, 1100 mm <sup>2</sup> active area	Peltier cooled high performance XFlash <sup>®</sup> silicon drift detector, 30 mm <sup>2</sup> active area, < 150 eV energy resolution at Mn-K $\alpha$
Spot size	Collimator changer for 0.3 mm and larger	Collimator changer for 0.3 mm and larger
Sample view	Color CCTV high resolution camera system, magnification between 20 x and 40 x	Color CCTV high resolution camera system, magnification between 20 x and 40 x
Sample stage	Motorized Z-stage for auto focus, option: motorized X-Y-Z stage with auto focus and EasyLoad function	Motorized X-Y-Z stage with auto focus and EasyLoad function
Quantification	Bulk analysis: standard-based empirical and standardless models Coatings: FP-based models	Bulk analysis: standard-based empirical and standardless models Coatings: FP-based models
Power supply	110 to 230 V AC; 50/60 Hz, max. 100 W	110 to 230 V AC; 50/60 Hz, max. 120 W
Dimensions (W x D x H)	550 x 700 x 430 mm	550 x 700 x 430 mm
Weight	46 kg	50 kg

## XSpect analytical software suite

The XSpect software provides you with the following functionality:

- Instrument control, data acquisition and management
- Peak identification
- Quantitative composition analysis, standardless and with standard-based empirical models
- Analysis of coating systems regarding layer thickness and composition
- Editor for design of specific layer analysis applications using FP-calculations
- Report generator

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