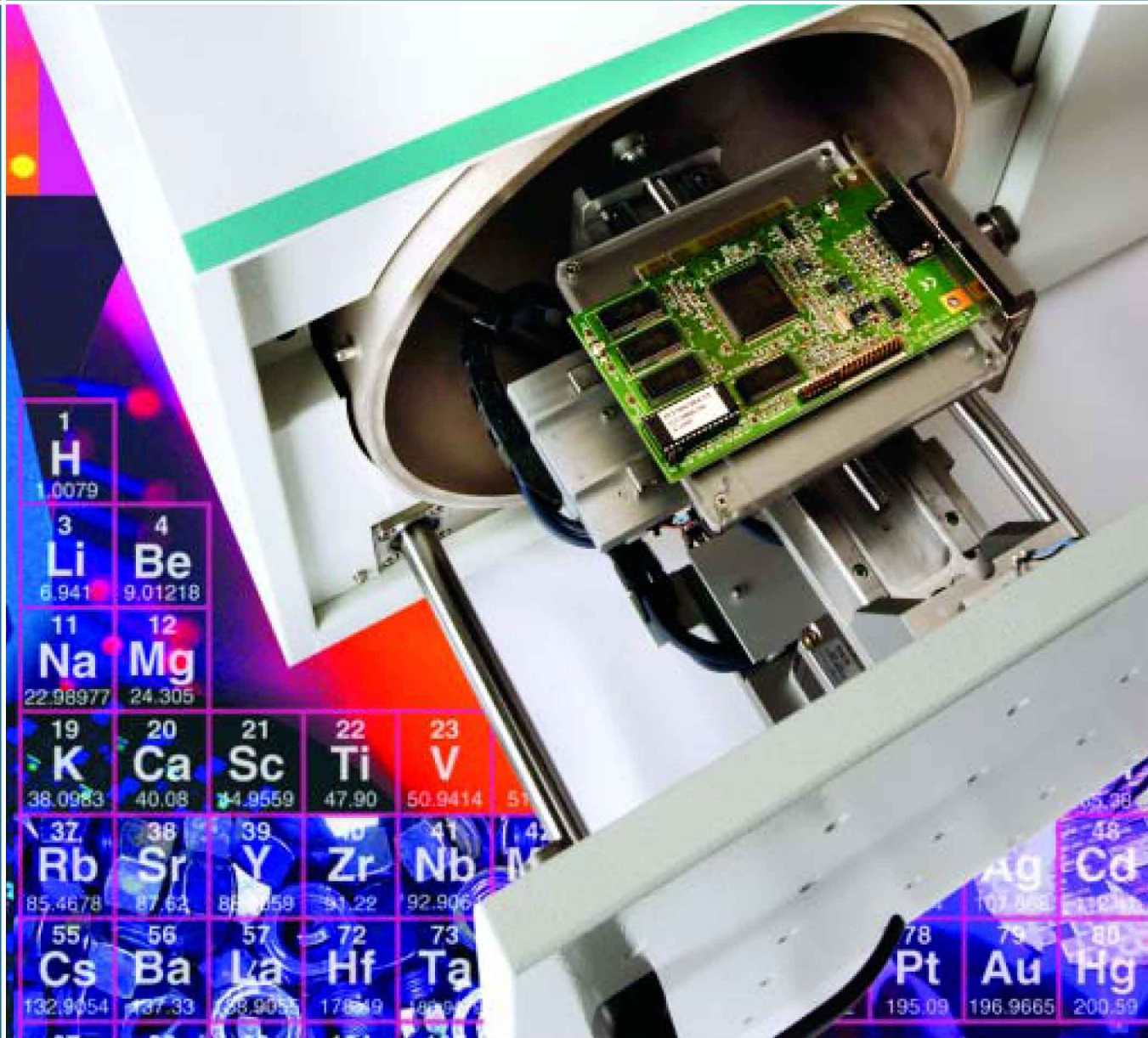


Matrix Metrologies



Benchtop XRF Analysis Tools



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Powerful. Versatile. Affordable.

Benchtop XRF Thickness and Composition Analysis Solutions from Matrix Metrologies

Matrix Metrologies is a leading global provider of X-Ray Fluorescence (XRF) measurement tools, calibration standards and services.

Our highly versatile benchtop product line offers rapid, precise, non-destructive coating thickness measurement and composition analysis of virtually any material.

Whether you are measuring plating thickness, bulk sample composition of metal alloys

or precious metals alloys, complex multilayer thin-film stacks or restricted elements for WEEE/RoHS compliance, Matrix **Compact**, **MaXXi**, **HiSpeX** and **Nano** tools deliver optimum performance at an unbeatable price performance ratio.

And Matrix tools are backed by the most experienced applications and technical support team in the industry.

When you demand performance, demand **Matrix Metrologies**.



XRF and MXRF (Microbeam XRF)
Measurement Capability

Compact & MaXXi: Maximum Performance, Minimum Investment

Compact and **MaXXi** series XRF tools are capable of measuring single, double and tri-layer coatings, and alloyed coatings. They are ideal for measuring metal finished parts such as fasteners, connectors and machined parts, as well as microelectronics and precious metal finished product.

Accurate, precise and non-destructive measurements are performed in a few seconds. Thickness of pure metals and thickness/composition of alloy coatings are analyzed simultaneously. In addition, Compact and MaXXi tools provide accurate primary metal determination in

plating solutions and verify the composition of your unfinished base material.

Compact and MaXXi are excellent choices where low equipment capitalization and low cost-of-ownership is required.

Choose Value.

Choose Compact/MaXXi.

Key Features & Benefits

- Lowest cost-of-ownership
- Simple, intuitive user interface ideal for labor intensive production environments.
- Stored application spectra provide superior accuracy and

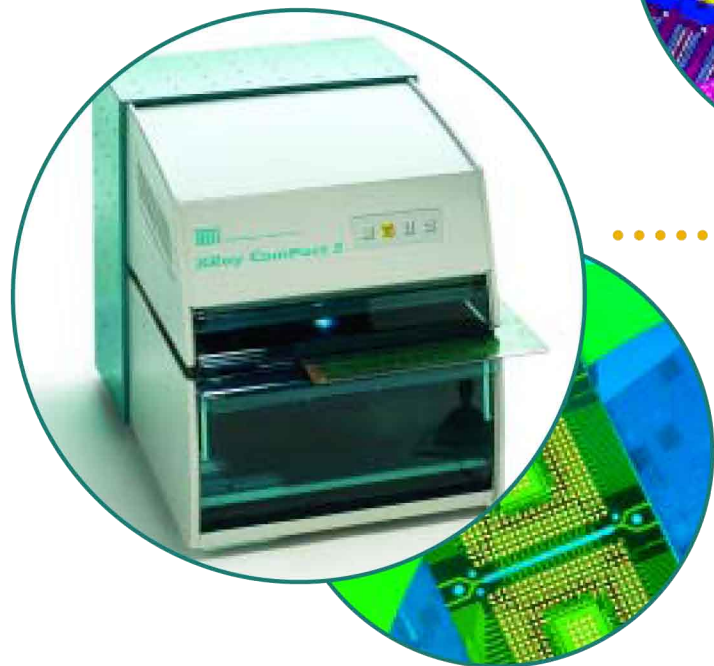
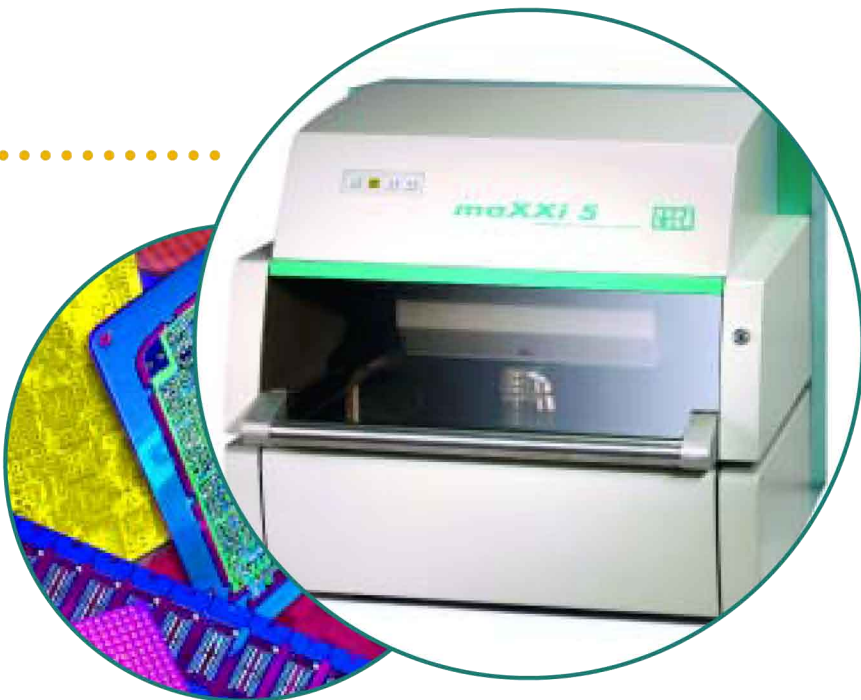
calibration longevity, virtually eliminating the need for re-calibration.

- Fundamental Parameters algorithms enable measurement of any film stack or solid without calibration standards.
- Computer-controlled focusing ensures optimum sample positioning reproducibility.
- Micro-mechanical collimation with optimized high voltage selection for economical small area measurement.
- Substrate material identification by rapid standardless X-ray assay provides confirmation of base material prior to plating.
- X-ray assay for element percent by weight in jewelry.



MaXXi 5

The MaXXi 5's extended range and programmable XYZ sample stage let you create automatic measurement recipes, significantly enhancing throughput and tool capacity.



Compact 5

The Compact 5 is an excellent choice when coating thickness measurement and material analysis applications demand high precision and versatility.

Compact ECO

The ComPact ECO is ideal for measuring metal finished parts such as fasteners, connectors and machined parts, as well as microelectronics and precious metal finished product.



Superior Resolution & Sensitivity

HiSpeX: Enhanced Detector Resolution and Signal Processing for Compact and Maxxi 5 Models

HiSpeX is an advanced detection column option providing significantly expanded measurement capability for Compact and MaXXi models.

HiSpeX configurations feature a high resolution, thermoelectrically cooled semiconductor (Silicon PIN diode) detector and enhanced digital signal pulse processing electronics.

The result: remarkable X-ray peak resolution with much greater sensitivity to very thin films and low elemental concentrations.

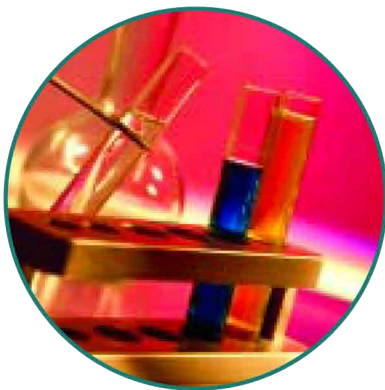
With its solid state detector and advanced multi-channel analyzer, HiSpeX insures the highest measurement accuracy, repeatability, and reproducibility in the most demanding production environments.

HiSpeX technology is an excellent choice for coating applications where extremely thin films (below 1000 Å/4 µin) are employed and analysis of binary, ternary and quaternary alloy layers and complex stacks is required.

**Choose Sensitivity.
Choose HiSpeX.**

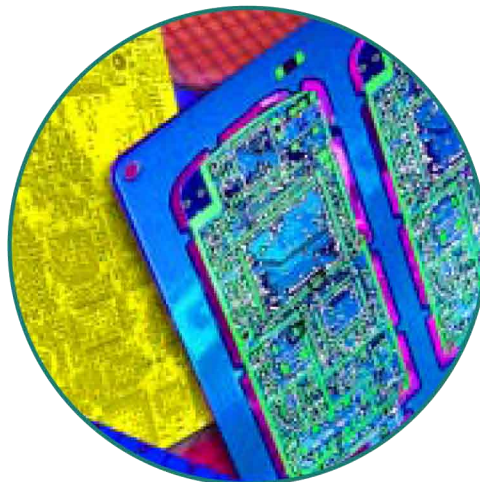
Key Features & Benefits

- Precise measurement of extremely thin coatings.
- Measurement of complex alloys with analyte X-ray emission peak overlaps.
- Superior sensitivity and electrical stability.
- Excellent choice for complex multi-layer film measurement and WEEE/RoHS screening and compliance testing.



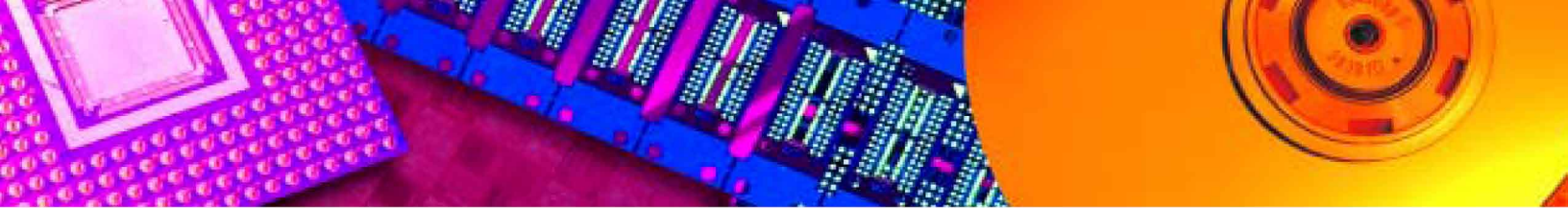
Restricted materials (WEEE/RoHS) and trace element analysis.

Blanket wafer metalization (UBM) and immersion coatings on PCB's.



Analyze complex bulk alloys and complex metal and alloy stacks, including photovoltaic thin films, electronic interconnects and connectors. Perform jewelry and ferrous/non-ferrous metal assay.

19 K 39.0983	20 Ca 40.08	21 Sc 44.9559	22 Ti 47.88	23 V 50.9415	24 Cr 51.9961	25 Mn 54.9380	26 Fe 55.845	27 Co 58.9332	28 Ni 58.71	29 Cu 63.546	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.9216	34 Se 78.96	35 Br 79.904	36 Kr 83.80
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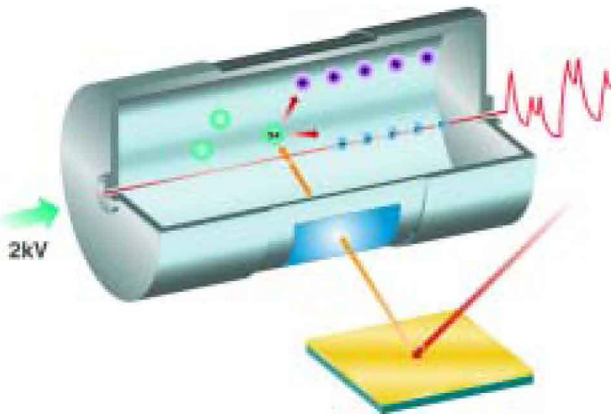
Standard vs. HiSpex Configurations

Model	# of Collimators	Minimum Collimator Size	Detector Type	Signal Processing
Compact Eco	1	12.0 mil (0.3 mm)	Proportional Counter	Analog
Compact Eco HiSpex	1	20.0 mil (0.5 mm)	Silicon PIN Diode	Digital
Compact 5	4	2.4 x 2.4 mil (60 x 60 micron)	Proportional Counter	Analog
Compact 5 HiSpex	4	8.0 mil (0.2 micron)	Silicon PIN Diode	Digital
Maxxi 5	4	2.4 x 2.4 mil (60 x 60 micron)	Proportional Counter	Analog
Maxxi 5 HiSpex	4	8.0 mil (0.2 micron)	Silicon PIN Diode	Digital

Comparative Advantages of Different Detector Types

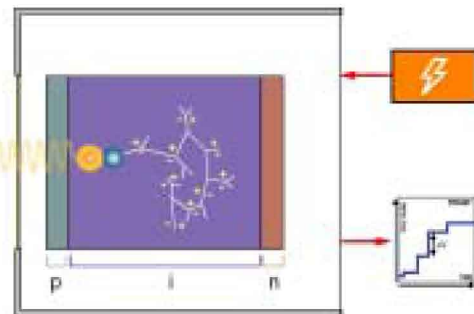
Proportional Counter (Compact/Maxxi models)

- High precision for high atomic number element X-ray lines such as Sn, Ag, In, and Pd.
- Better precision for thicker films (>1.0 μm) comprised of elements with significantly different characteristic X-ray energies.



Si-PIN Semiconductor Detector (HiSpex models)

- Enables measurement of low atomic number elements.
- Lower limits of detection for measurements of thin depositions such as Au/ENi/Cu, TiW, Au/Cu/Cr and Au/Pd/Ni/Cu.
- High accuracy for applications containing elements with close characteristic X-ray energies, such as complex alloy mixtures.



WEEE/RoHS Compliance Analysis with MaXXi 5 HiSpex

Matrix offers WEEE/RoHS-optimized configurations for MaXXi 5 HiSpex. WEEE/RoHS models incorporate primary beam filters for improved detection of regulated elements (Pb, Hg, Cr, Cd and Br). Beam filtering further enhances the signal-to-noise response of the HiSpex spectrometer for trace element analysis.

HiSpex' Element Mapping™ performs automated area scans over electronic assemblies to identify potentially non-compliant components for quantification (with Matrix Advanced Fundamental Parameters) and compliance verification or rejection.



Ultimate MXRF Performance

NanoMaster: Variable Beam Geometry, Enhanced Detection Capability and Maximum Elemental Range

NanoMaster represents a true innovation in Microbeam X-Ray Fluorescence (MXRF) spectrometry.

A versatile, highly configurable tool platform offering a variety of beam and detection column solutions, NanoMaster delivers ultimate performance for your most demanding applications.

On the beam generation column, select mechanical collimators (single or multiple) as a cost-effective alternative for samples with larger measurement areas. For applications requiring the smallest possible X-ray spot size

and extremely high precision, a polycapillary focusing lens provides an ideal solution.

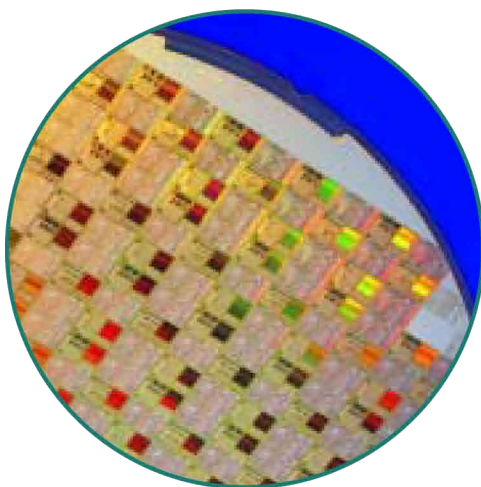
On the detection column, a Silicon PIN Diode detector offers economical and accurate analytical evaluation. If maximum sensitivity and throughput are desired, opt for an ultra-high resolution and count throughput Silicon Drift Chamber detector.

All NanoMaster tools feature enhanced digital signal processing to ensure superior analyzer stability and reproducibility of measured results.

**Choose Ultimate Performance.
Choose NanoMaster.**

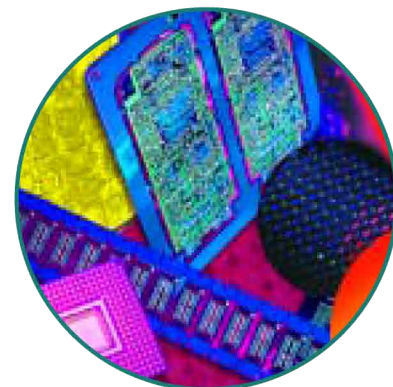
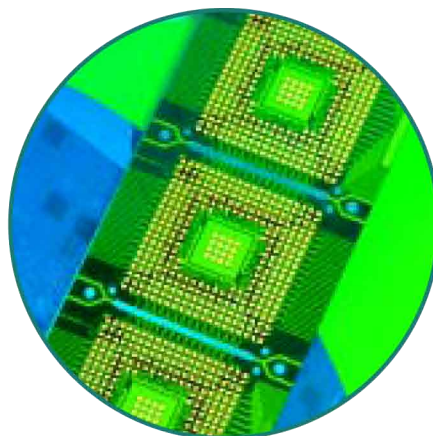
Key Features & Benefits

- Mechanical or Optical (polycapillary) X-ray beam collimation solutions.
- Low cost Si PIN Diode detector for large beam applications, or high throughput Silicon Drift Detector for optical collimation optimization.
- Available Vacuum Chamber extends low-energy sensitivity and elemental measurement range to Na-U.
- Advanced Fundamental Parameters enables standards-free thin film analysis capability.



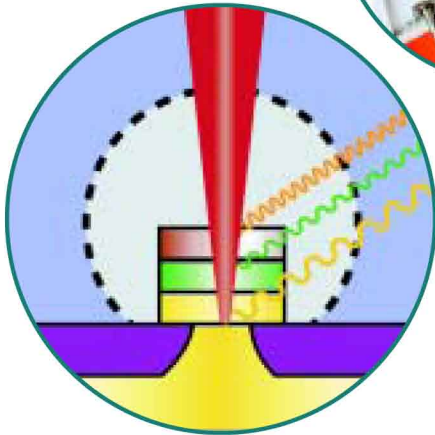
Semiconductor and semiconductor process films, including terminal metalization and magnetic poles and shields.

Leadframes, such as Pre-Plated Frames (PPF), and interconnect structures, such as UBM's, BGA's and SMT pads.



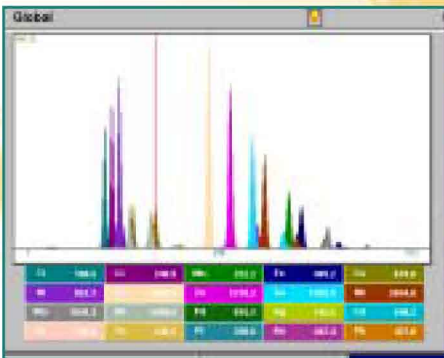
Microspot WEEE/RoHS analysis.





Above:
A polycapillary lens delivers high-flux microbeam (20 - 100 micron spot) for optimal GR&R on microelectronics parts.

Top Right:
Vacuum chamber option extends measurable elemental range from Na - U.






Advanced Fundamental Parameters (AFP) Software Package

Matrix Metrologies offers the most powerful Fundamental Parameters software package available, delivering multi-layer (up to 6 layers), multi-element (up to 30 elements) thin film measurement and bulk analysis capability.

Now you can analyze the most complex thin film structures for thickness and composition with no (or minimal) calibration standards required!

For detailed specifications, contact your Matrix Metrologies Account Manager today.

Specifications

General	Chamber Dimensions - Exterior	Chamber Dimensions - Interior				Approx. Weight
Compact Eco	H 14.0" (36 cm), W 16.0" (41 cm), D 24.0" (61 cm)	H 10.0" (25 cm), W 13.5" (34 cm), D 15.6" (40 cm)				80 lb. (36 kg)
Compact 5	H 18.0" (46 cm), W 16.0" (41 cm), D 26.0" (66 cm)	H 10.0" (25 cm), W 13.5" (34 cm), D 15.6" (40 cm)				100 lb. (46 kg)
Maxxi 5	H 26.8" (68 cm), W 24.0" (61 cm), D 30.0" (76 cm)	H 13.5" (34 cm), W 24.0" (61 cm), D 20.0" (51 cm)				200 lb. (91 kg)
NanoMaster	H 22.0" (56 cm), W 31.0" (79 cm), D 17.0" (43 cm)	Air: H 12.5" (32 cm), W 12.5" (32 cm), D 12.5" (32 cm) Vac: Cylinder Length, 12.5" (32 cm); Diam, 12.5" (32 cm)				Air: 200 lb. (91 kg) Vac: 250 lb. (114 kg)
Line Voltage	110VAC/60Hz or 230VAC/50 Hz					
Key Components		Compact Eco	Compact 5	Maxxi 5	Nano Master	
X-Ray Generation	<i>All models feature auto high voltage selection for application optimization.</i>					
X-Ray Tube:	<ul style="list-style-type: none"> Mini-focus (0.5mm x 0.5mm spot) X-ray tube, W-target. 25-50 kV/1.2mA/50W HVPS. Micro-focus (85µm x 85µm spot) Be window x-ray tube. 25-50 kV/1.2mA/50W HVPS. Micro-focus (40µm x 40µm spot) Be window x-ray tube. 25-50 kV/1.2mA/50W HVPS. Micro-focus (80 x 80µm spot) X-ray tube, Rh target. (Mo, W, and Cr target tubes available.) 50kV/1.0MA/50W HVPS. 	●	(Option) ●	●	(Option)	
Collimation:	<i>Contact Matrix Metrologies for available mechanical collimator sizes and geometries.</i>				●	
	<ul style="list-style-type: none"> Mechanical - Single position, manual collimator change. Mechanical - Four-position automatic collimator changer. Optical - Single polycapillary microfocusing element. (20 - 100µm beam spot.) 	●	●	●	●	
X-Ray Detection						
Detector:	<ul style="list-style-type: none"> Gas Proportional Counter High-Energy Gas Proportional Counter Silicon PIN Diode, electrical cooling. Silicon Drift Detector (SDD), electrical cooling. 	●	● (Option)	● (Option)	● (Option)	
Processing Electronics:	<ul style="list-style-type: none"> Analog Digital 	●	● (HiSpex)	● (HiSpex)	● (HiSpex)	
Element Range:	<ul style="list-style-type: none"> Air Environment Vacuum Chamber Option (NanoMaster) 	Ti - U	Ti - U	Ti - U	Ti - U Na - U	
Sample Positioning	<i>Motorized, programmable stages with "Point-and-Shoot".</i>					
Z-Stage:	<ul style="list-style-type: none"> Range: Z 4.0" (10 cm) Top Plate: 9.6" x 9.6" (24 x 24 cm) 	●				
XYZ Stage:	<ul style="list-style-type: none"> Range: X 4.0" (10 cm), Y 3.2" (8 cm), Z 2.2" (6 cm) Top Plate: 9.6" x 9.6" (24 x 24 cm) Range: X 12.0" (30 cm), Y 10.0" (25 cm), Z 7.0" (18 cm) Top Plate: 12.0" x 10.0" (30 x 25 cm); Optional 25.0" x 16.0" (64 x 41 cm) plate. Range: X 6.0" (15 cm), Y 6.0" (15 cm), Z 2.5" (6 cm) Top Plate: 6.0" x 6.0" (15 x 15 cm) Range: X 4.0" (10 cm), Y 4.8" (12 cm), Z 3.5" (9 cm) Top Plate: 6.0" x 5.0" (15 x 13 cm) 		●		(Air) (Vacuum)	
Viewing Optics:	<i>Color CCTV video. Adjustable chamber lighting. Computer generated reticle with beam size indicator.</i>					
	<ul style="list-style-type: none"> 20x/40x magnification; 4 x 3 mm field of view. 40x/80x mag; 2 x 1.5 mm and 4 x 3 mm field of view. 100x/200x digital zoom; 1.52 x 1.15 mm field of view. 	●	●	●	●	
Software	X-Master™ XRF analysis software package running under Microsoft Windows™. Network ready, with integrated statistics package, data file management, and report generation and storage. Add-on modules for application-specific advanced analysis available.					
Notes	Matrix Metrologies XRF systems comply with ASTM B568 and ISO 3497. "Matrix Metrologies" and the Matrix Metrologies logo are trademarks of Matrix Metrologies, Inc. in the United States and/or other countries. All other marks are properties of their respective owners. All specifications subject to change without notice.				  	



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