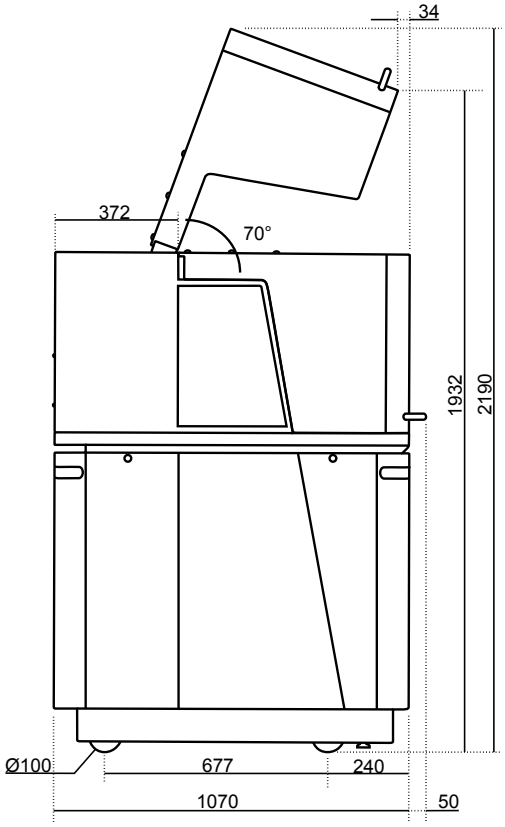
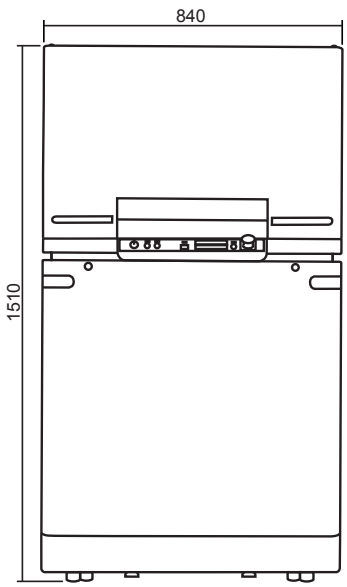
Malvern Panalytical
a spectris company

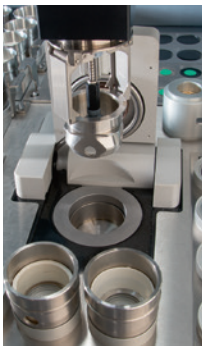
ZETIUM
TECHNICAL SPECIFICATIONS

Wavelength dispersive X-ray fluorescence spectrometer for the elemental analysis range from B to Am and the concentration range from ppm to 100 %.

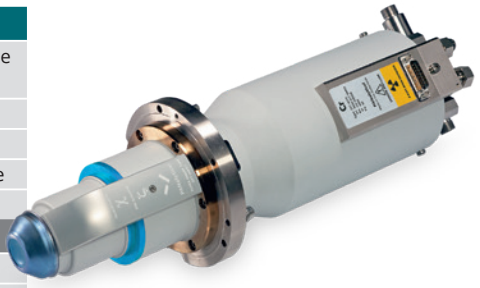


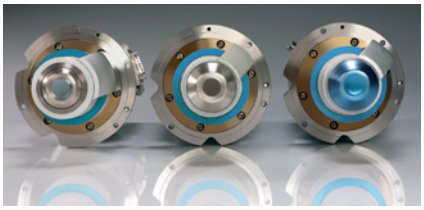


Sample handling	Basic Zetium configuration	Power upgrades and optional items
Types	Solid, fused beads, filters, pressed/loose powders and liquids	
Handling	All samples are fitted in sample holders during measurement. Liquids and loose powders in disposable (P2) liquid cells, which are fitted in liquid sample holders	
Dimensions	51.5 mm Ø x 40 mm height, maximum	
Weight	Max. 400 g including sample holder	
Sample changer	Standard sample bed; X-Y changer with priority position for 1 sample (detected) and 2 empty holders with capacity for 8 trays for 8 sample holders and 1 tray for 4 sample holders.	High-capacity changer up to 209 uncupped samples of 32 mm or 140 samples of 40 mm
Changer trays	2 Trays (1 free choice, 8 cup tray included)	For: 8 sample holders, 8 flex positions, 8 steel rings (Ø 51.5 mm), 21 samples (Ø 25 mm), 12 samples (Ø 32 mm), 10 samples (Ø 41 mm), or 4 sample holders (SPC/monitor tray)
Loading	• Single loading • Air lock with programmable pumping time, one position turret mechanism, sample surface-down	Direct loading of unmounted samples in holder loading; continuous loading
Spinner	0.5 rev/s	



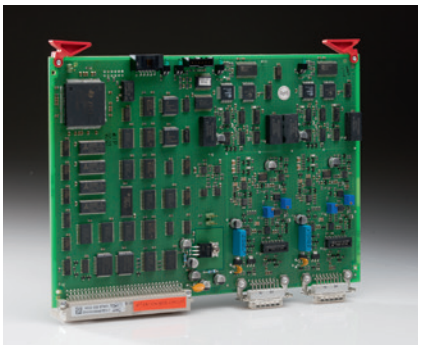
X-ray tube	Basic Zetium configuration	Power upgrades and optional items
Type	SST R, Super Sharp End Window Tube	SST R-mAX, Super Sharp End Window tube featuring ZETA Technology*
Anode	Rh	Cr optional, other anodes on request
Window	Ultra-high transmission, 75 µm	75 µm (standard) 50 µm (option)
Window coating		CHI-BLUE coating for corrosion resistance
Operation	Tube remains powered on during sample loading	
HV Generator	**Basic Zetium configuration**	**Power upgrades and optional items**
Output	Selectable in steps of 1 kV, 1 mA	
kV / mA switching	Isowatt switching	
Stability	0.00006 % / 1 % mains vari ation	
Stability mains	± 10 %	
Power rating	**Basic Zetium configuration**	**Power upgrades and optional items**
	1 kW	Upgradable to 2.4, 3 or 4 kW
	Zetium 1 kW: 20 - 60 kV, 16 - 50 mA	Zetium 2.4 kW: 20 - 60 kV, 10 - 100 mA
		Zetium 3 kW: 20 - 60 kV, 10 - 125 mA
		Zetium 4 kW: 20 - 60 kV, 10 - 160 mA

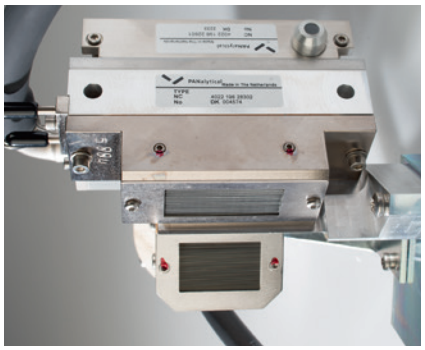


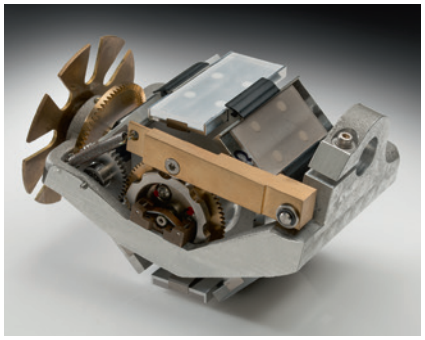


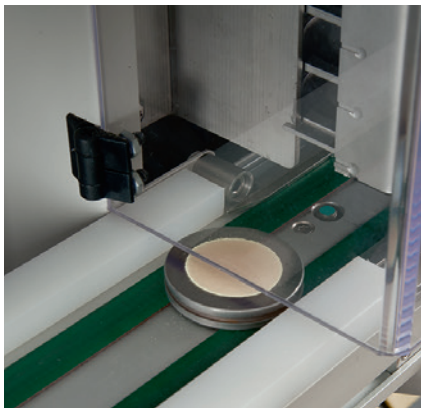
*For Cement edition of Zetium see THETA free lime core

Goniometer	Basic Zetium configuration	Power upgrades and optional items
Type	θ/2θ decoupled with Direct Optical Position Sensing (DOPS)	
Angular accuracy	0.0025° θ and 2θ	
Angular reproducibility	0.0001° θ and 2θ	
Scanning speed	Up to 10° 2θ/s	
Slewing speed	32° 2θ /s	
Temperature stabilization	Chillerless ± 0.07°C at 35°C cabinet temperature	Chiller cooled ± 0.05°C at 30°C cabinet temperature









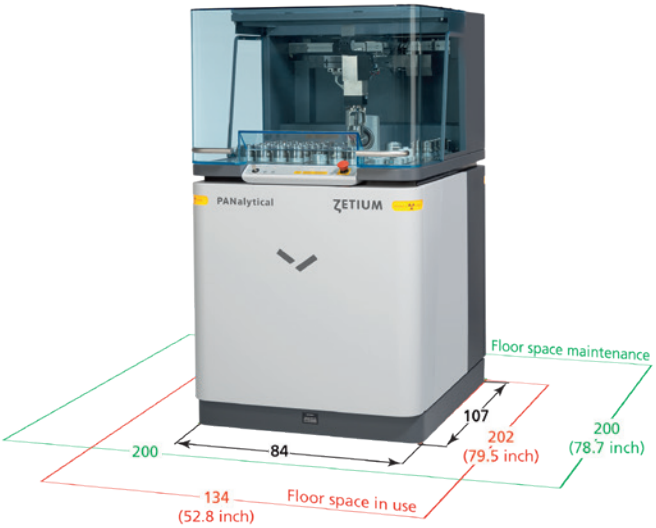
Optical path	Basic Zetium configuration	Power upgrades and optional items
Channels masks	Single mask (fixed 27, 30 or 37 mm)	switchable 3 positions (27, 30, 37 mm) switchable 6 positions (6, 10, 20, 27, 30, 37 mm, only for 2.4, 3 and 4 kW)
Primary collimators	1 collimator free choice (max allowed 3)	3 max.: 100, 150, 300, 550, 700, 4000 µm
Primary beamfilters	4 max.: wide range of materials and thickness available. One may be used as beam stop	
Crystals	3 crystals (LiF200, PE002, PX1)	8 max.: choice of LiF420, LiF220, Ge111 (flat/curved), InSb (flat/curved), TlAP coated, PX8, PX10, PE002 curved, PX4, PX5, PX6, PX7
Detectors	Flow detector	Scintillation, Duplex counter (sealed Xe in tandem with flow counter), HiPer Scint
		Hi-Per channels, max of 2 (from B to Mg)
Beam path	Vacuum: <10 Pa	He, N_2 optional

Counting electronics	Basic Zetium configuration	Power upgrades and optional items
Type	Dual multi channel analyser with digital signal processor	
Maximum count rate	Flow counter: 2500 kcps	Flow counter fixed channel: 3000 kcps Scintillation: 1000 - 1500 kcps Sealed counter: 1000 - 2500 kcps Duplex counter: 3500 kcps Hi-Per Scint: 3500 kcps (non-linearity ≤ 1 %)
Pulse shift correction	Automatic, dynamic (selectable)	
Dead time correction	Automatic	

Automation interfacing	
Inverter	
Transfer point at side	41.1 cm (16.18 in) from front side, protruding 28.95 cm (11.4 in)
Transfer point heights	85, 88.5, 91.2, 111.2 cm (33.46, 34.84, 35.91, 43.78 in)
Back feed unit	
Transfer point at side	25.25 cm (9.94 in) from side, protruding 3.5 cm (1.38 in)
Transfer point height	104.8 cm (41.26 in)

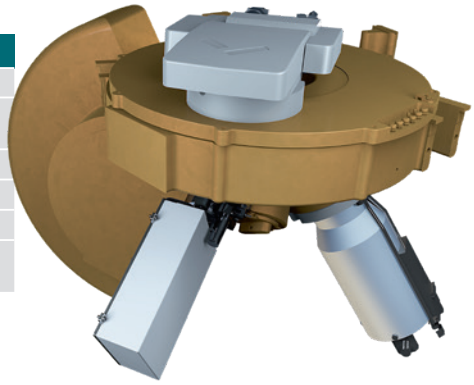
Safety standards	Basic Zetium configuration	Zetium equipped with Free-lime/ Small Spot Mapping
Generic-Europe	CE	CE
Generic-CAN/USA	CSA/UL 61010-1-12 (cMETus marked)	CSA/UL 61010-1-12 (cMETus marked)
X-ray safety	CSA/UL 61010-2-091 Vollschutz acc. to German RöV 2013/59/EURATOM	CSA/UL 61010-2-091 Vollschutz acc. to German RöV (pending) 2013/59/EURATOM
Various	Installation cat. Class II Pollution Degree 2 IP20	Installation cat. Class II Pollution Degree 2 IP20

Installation	Basic Zetium configuration	Power upgrades and optional items
Dimensions	84 x 107 x 151 cm (33.1 x 42.1 x 59.4 in) (WxDxH)	
Floor space (WxD, in use)	134 (25 + 84 + 25) x 202 (25 + 107 + 70) cm 52.8 (9.8 + 33.2 + 9.8) x 79.5 (9.8 + 42.1 + 27.6) inch	
Floor space (WxD, maintenance)	Min. 2 x 2 m (6.6 x 6.6 ft), i.e. 1 m (39 in) extra on service side	
Weight	630 kg	
Mains requirements	Single phase, 50-60 Hz, 187-253 V, 40 A max.	
Compressed air	4 to 5 bar	
Power consumption	2.0 kW, 3.0 kVA, 13 A (@ 230 V, 50 Hz)	5.5 kW, 7.5 kVA, 33 A (@ 230 V, 50 Hz)
Environment temp.	Chillerless 15° to 30° C (59° to 86° F)	Chiller cooled 10° to 35° C (50° to 95° F)
Cooling water		12° to 20° C (54° to 68° F), 3.5 to 8 bar, 5 to 11 l/min



ZETIUM -
SPECTROMETER INNOVATIONS

ED Core	
Detector	SDD (4th generation)
Resolution	<140 eV @ 5.9keV/ 100 kcps (ICR) Typically 135 eV @ 5.9keV
Max Count rate	1 Mcps ICR
Energy range	Na - Am
Cooling	Peltier cooling
Attenuators	3 programmable attenuators to optimise application results



Small spot analysis and mapping	
Spot size	0.5 mm FWHM
Step size	0.1 mm
Typical count rate standard SSM	Typically up to 3 kcps - Cu Kα
Typical count rate HiPer SSM	Typically 30 kcps
Detector	SDD (4th generation)
Resolution (as for ED core)	<140 eV @ 5.9keV/ 100 kcps (ICR) Typically 135 eV @ 5.9keV
Combined with other attenuations	SSM combined with 3 programmable attenuators for bulk ED measurements
Sample size mapping diameter	Max 35mm
Sample holder cup	SSM cup with clamp device for small samples

THETA free lime core (patent pending)	
X-ray tube	SST R, super sharp end window tube
Principle of analysis	Transmission XRD (Total volume analysis; opposite to surface techniques)
Sample thickness correction	Automatic
Typical production precision (4 point moving average)	Reproducibility (4 point moving average) 0.1 wt% (1sigma) at 1% free lime
SPC control software	SPC with automatic transmission capability
Sample diameter	35mm steel ring
Sample thickness	approx. 3 mm
Sample diameter	35 mm steel ring

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