

## Portfolio of Services (1/2)

Characteristics / Parameters	Material / Material Group	Analysis Technique	Calibration
Carbon (C), Sulphur (S)	Various materials	Combustion analysis	Certified reference materials
Oxygen (O), Nitrogen (N), hydrogen (H)	Various materials	Carrier gas hot extraction	Certified reference materials
Total Organic Carbon (TOC)	Various materials (carbides, ores, etc.)	Combustion analysis	Certified reference materials
Total Carbon (C <sub>tot</sub> )	Carbides	Combustion analysis	Certified reference materials
Free Carbon (C <sub>free</sub> )	Carbides	Combustion analysis	Certified reference materials
Anions (F <sup>-</sup> , Cl <sup>-</sup> , Br <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , NO <sub>2</sub> <sup>-</sup> , PO <sub>4</sub> <sup>3-</sup> , SO <sub>4</sub> <sup>2-</sup> )	Various materials	Ion chromatography (IC)	Synthetic standard samples
Fluoride (F <sup>-</sup> ) and Chloride (Cl <sup>-</sup> )	E.g. tantalum matrix	Ion chromatography (IC) after pyrohydrolysis or distillation	Certified reference materials
Metals	Various	Inductively coupled plasma optical emission spectrometry (ICP-OES)	Synthetic standard samples
Trace Elements	E.g. magnesium alloy	Inductively coupled plasma optical emission spectrometry (ICP-OES)	Synthetic standard samples
Metals	Various	Atomic absorption spectrometry (AAS)	Synthetic standard samples
Sodium (Na), Potassium (K), Lithium (Li)	E.g. tungsten matrix	Atomic absorption spectrometry (AAS)	Synthetic standard samples
Metals	Various	Inductively coupled plasma mass spectrometry (ICP-MS)	Synthetic standard samples
Trace elements	E.g. niobium matrix	Inductively coupled plasma mass spectrometry (ICP-MS)	Synthetic standard samples
Mercury (Hg)	Various	Atomic fluorescence spectrometry (AFS)	Synthetic standard samples
Elements of the periodic table above Z > 12	Various	X-ray fluorescence spectroscopy	Reconstitution of the sample matrix with primary substances
Elements of the periodic table (excluding H and noble gases)	Various	Glow discharge mass spectrometry (GDMS)	
Various	Various	Photometry, conductometry, titrimetry, gravimetry	
Loss on drying, incandescent difference	Various	Gravimetry	

***We are happy to provide individual quotes for specific tests.***

## Portfolio of Services (2/2)

Characteristics / Parameters	Material / Material Group	Analysis Technique	Calibration
Particle size distribution	Laser diffraction	MasterSizer 3000, 2000, S $\mu$ , Microtrac S3500	ISO 13320, ASTM B 822
Particle size distribution	Sieving (RoTap sieving, air jet sieving, wet sieving)	W.S. Tyler Incorporated, Haver & Böcker, Alpine, Retsch	ASTM B 214, DIN 66161, ASTM D 2862
Flow behaviour	Vibrational flow	Retsch sieving machine	
Medium particle sizes	Fisher sub sieve sizer	Fisher Scientific Type 95	ASTM B 330
Filling density, flow behaviour	Scott volumeter, Hall flowmeter		ASTM B 212, ASTM B 213, ASTM B 329, ASTM B 964
Tapped density	Jolting volumeter	Engelsmann	DIN EN ISO 3953, ASTM B 527
Density	Helium pycnometer	Micromeritics	ASTM B 923
Deagglomeration		Tungsten rod mills	ASTM B 859
Pore volume distribution	Pore volume distribution from adsorption or desorption isotherms	TriStar 3000, TriStar II Plus 3030	ASTM D 4222, DIN 66134
Specific surface area	Specific surface area according to BET	TriStar 3000, TriStar II Plus 3030	DIN ISO 9277, ASTM D 3663
Quantitative and qualitative analysis	Scanning electron microscopy (EDX)	JSM-6490LV, Quantax 400	
Quantitative and qualitative analysis	Scanning electron microscopy	Jeol JSM-6700 F, JSM-6490LV	
Line profile analysis	X-ray diffraction analysis	Panalytical X'Pert MPD	
Natural radioactivity by gamma spectroscopy	Gamma spectroscopy	Canberra, Ge detector, Ge detector (GX)	
Microscopy, pore measurement, metallographic specimen preparation	Metallography		
Calorific value	Calorimetry	IKA	
Combustion class, dust explosion hazard, burning rate, relative autoignition temperature		Hartmann	

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