


# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

 <p><b>UKAS TESTING</b> 7541</p> <p>Accredited to ISO/IEC 17025:2005</p>	<p><b>James Hutton Ltd</b> - a commercial subsidiary of the James Hutton Institute</p> <p><b>Issue No:</b> 011    <b>Issue date:</b> 04 October 2018</p>	
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<p><b>Testing performed at the above address only</b></p>		

### DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ANIMAL TISSUES	<p><u>Chemical Tests</u></p> <p>Polychlorinated Biphenyls (PCB) and Polybrominated Diphenyl Ethers (PDBE)</p>	<p>Documented In-House Methods</p> <p>CM003 using GC-MS</p>
BIOLOGICAL MATERIALS	<p><u>Chemical Tests</u></p> <p>Moisture Content and Loss of Material on Ignition</p> <p>Isotopes: <sup>13</sup>C, <sup>15</sup>N, Total Carbon, Total Nitrogen</p> <p>Qualitative identification / composition</p> <p>n-Alkanes, specifically: n-C21 n-C23 n-C25 n-C27 n-C29 n-C31 n-C33 n-C35</p>	<p>Documented In-House Methods</p> <p>DM007 using Gravimetry</p> <p>AM002 using Continuous Flow Isotope Ratio Mass Spectrometry (CF-IRMS)</p> <p>FM001 using Fourier Transform - Infra Red Spectroscopy (FTIR)</p> <p>HM002 using Gas Chromatography With Flame Ionisation Detection (GC-FID)</p>
BOTANICAL MATERIAL AND ANIMAL FEEDINGSTUFFS	<p><u>Chemical Tests</u></p> <p>Total Carbon and Total Nitrogen</p>	<p>Documented In-House Methods</p> <p>DM001 using Elemental Analyser / Dumas Combustion</p>



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
BOTANICAL MATERIAL AND ANIMAL FEEDINGSTUFFS (cont'd)	<u>Isotopic Tests</u>  Isotopes: $^{13}\text{C}$ , $^{15}\text{N}$ , Total Carbon and Total Nitrogen	Documented In-House Methods  AM002 using Continuous Flow Isotope Ratio Mass Spectrometry (CF-IRMS)
CHEMICAL PRODUCTS, CHEMICALS: ORGANIC CHEMICALS: INORGANIC	<u>Chemical Tests</u>  Qualitative identification / composition  Qualitative identification / characterisation  Quantitative estimation of phase composition	Documented In-House Methods  EM001 using Scanning Electron Microscopy (SEM) FM001 using FTIR  GM001 and GM003 using XRD EM002 using EDS and SEM
FIBRE PRODUCTS – NATURAL / ARTIFICIAL	<u>Isotopic Tests</u>  Isotopes: $^{13}\text{C}$ , $^{15}\text{N}$ , Total Carbon and Total Nitrogen	Documented In-House Methods  AM002 using Continuous Flow Isotope Ratio Mass Spectrometry (CF-IRMS)
PLASTICS AND PRODUCTS	<u>Chemical Tests</u>  Qualitative identification / composition	Documented In-House Methods  EM001 using SEM FM001 using FT-IR EM002 using SEM and Energy Dispersing Spectroscopy (EDS)
	<u>Chemical Tests</u>  Qualitative identification / composition	Documented In-House Methods  FM001 using FTIR



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ROCKS / GEOLOGICAL MATERIALS, SEDIMENTS AND SOILS, CLAY AND CLAY PRODUCTS	<u>Geological Tests</u>	Documented In-House Methods
	Semi-quantitative mineralogical composition	GM005 using XRD
	Qualitative identification / characterisation	GM001 and GM003 using XRD FM001 using FTIR EM001 using SEM EM002 using EDS and SEM
	Qualitative X-ray mapping	EM003 using EDS and SEM
	Quantitative estimation of mineralogical composition	GM002 and GM004 using X-ray Diffraction (XRD)
ROCKS / GEOLOGICAL MATERIALS, SEDIMENTS AND SOILS	Cation Exchange Capacity using Cobalt Hexamine Trichloride	GM006 by colorimetry using a Discrete Analyser
	<u>Isotopic Tests</u>	Documented In-House Methods
PARTICULATE MATTER, SEDIMENTS AND SOILS, CLAY AND CLAY PRODUCTS,	Isotopes: Nd, Sm, Sr and Pb	AM001, AM004 and AM005 using Thermal Ionisation Mass Spectrometry (TIMS)
	<u>Physical Tests</u>	Documented In-House Methods
SEDIMENTS AND SOILS	Particle size distribution	DM011 using laser diffraction particle size analyser
	<u>Chemical Tests</u>	Documented In-House Methods
	Elements: Al, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Zn	DM009 using acid digestion and BM014 using ICP-OES BM015 using ICP-MS
	Exchangeable acidity	DM002 using Titration
	Exchangeable cations: Ca, Mg, Na, K	DM004 Extraction Procedure BM006 using ICP-OES
Moisture Content and Loss of Material on Ignition	DM007 using Gravimetry	



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
SEDIMENTS AND SOILS (cont'd)	<u>Chemical Tests (cont'd)</u>  Nutrients: Ca, Mg, K, P  Total Carbon and Total Nitrogen  pH  Phosphorus  n-Alkanes, specifically: n-C21 n-C23 n-C25 n-C27 n-C29 n-C31 n-C33 n-C35	Documented In-House Methods  DM005 Extraction Procedure BM005 using ICP-OES  DM001 using Elemental Analyser / Dumas Combustion  DM006 using Glass Electrode  DM003 sodium hydroxide fusion and BM003 using a Discrete Analyser  HM002 using Gas Chromatography With Flame Ionisation Detection (GC-FID)
SEDIMENTS AND SOILS	<u>Isotopic Tests</u>  Isotopes: <sup>13</sup> C and <sup>15</sup> N	Documented In-House Methods  AM002 using Continuous Flow Isotope Ratio Mass Spectrometry (CF-IRMS)
SOILS, SEDIMENTS AND SLUDGES	Mercury	BM022 using Atomic Fluorescence Spectrometry
WATER / WATERS	<u>Chemical Tests</u>  Alkalinity, ammonium, nitrite phosphate, total oxidisable nitrogen and nitrate (by calculation)  Anions: chloride, nitrate and sulphate  Elements: Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, Ni, P, Pb, Si, Zn  pH	Documented In-House Methods  BM003 using a Discrete Analyser  BM002 using Ion Chromatography  BM016 using ICP-MS  DM006 using Glass Electrode



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WATERS (and soil extracts)	<u>Chemical Tests</u>  Conductivity  Total Organic Carbon (TOC) Total Nitrogen (TN)	Documented In-House Methods  DM012 by Glass Electrode  BM019 using Non-dispersive Infra-Red Spectroscopy and Chemiluminescence
WATERS (processed)	<u>Isotopic Tests</u>  Isotopes: Sr and Pb  Mercury	Documented In-House Methods  AM001 and AM005 using Thermal Ionisation Mass Spectrometry (TIMS)  BM022 using Atomic Fluorescence Spectrometry
FLEXIBLE SCOPE ENCOMPASSING: ROCKS / GEOLOGICAL MATERIALS, SEDIMENTS, SOILS, ANIMAL TISSUE, LEACHATES, WATERS, CHEMICAL PRODUCTS (Liquids, Solids, Organic, Inorganic) ANIMAL FEEDINGSTUFFS, BOTANICAL MATERIAL, CROPS	<u>Chemical Tests</u>  Inorganic elements <b><i>The organisation holds a flexible scope of accreditation for these tests. Please contact the organisation for details of the further individual determinands they can analyse using this method.</i></b>	Documented In-House Method using Inductively Coupled Plasma – Optical Emission Spectroscopy (ICP-OES), Developed and Validated according to Method BM014 (flexible scope)  Documented In-House Method using Inductively Coupled Plasma – Mass Spectrometry (ICP-MS), Developed and Validated according to Method BM015 (flexible scope)
END		