# Schedule of Accreditation

**Issued by**
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

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**James Hutton Ltd – a commercial subsidiary of the James Hutton Institute**

**Issue No:** 015  **Issue date:** 03 June 2020

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Website: www.huttonltd.com

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**Testing performed at the above address only**

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## DETAIL OF ACCREDITATION

<table>
<thead>
<tr>
<th>Materials/Products tested</th>
<th>Type of test/Properties measured/Range of measurement</th>
<th>Standard specifications/Equipment/Techniques used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIOLOGICAL MATERIALS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical Tests</td>
<td>Moisture Content and Loss of Material on Ignition</td>
<td>DM007 using Gravimetry</td>
</tr>
<tr>
<td>Isotopes: $^{13}$C, $^{15}$N, Total Carbon, Total Nitrogen</td>
<td>AM002 using Continuous Flow Isotope Ratio Mass Spectrometry (CF-IRMS)</td>
<td></td>
</tr>
<tr>
<td>Qualitative identification / composition</td>
<td>FM001 using Fourier Transform - Infra Red Spectroscopy (FTIR)</td>
<td></td>
</tr>
<tr>
<td><strong>BOTANICAL MATERIAL AND ANIMAL FEEDINGSTUFFS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical Tests</td>
<td>Total Carbon and Total Nitrogen</td>
<td>DM001 using Elemental Analyser / Dumas Combustion</td>
</tr>
<tr>
<td>Materials/Products tested</td>
<td>Type of test/Properties measured/Range of measurement</td>
<td>Standard specifications/Equipment/Techniques used</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>BOTANICAL MATERIAL AND ANIMAL FEEDINGSTUFFS (cont’d)</td>
<td>Isotopic Tests</td>
<td>Documented In-House Methods</td>
</tr>
<tr>
<td></td>
<td>Isotopes: $^{13}$C, $^{15}$N, Total Carbon and Total Nitrogen</td>
<td>AM002 using Continuous Flow Isotope Ratio Mass Spectrometry (CF-IRMS)</td>
</tr>
<tr>
<td>CHEMICAL PRODUCTS, CHEMICALS: ORGANIC CHEMICALS: INORGANIC</td>
<td>Chemical Tests</td>
<td>Documented In-House Methods</td>
</tr>
<tr>
<td></td>
<td>Qualitative identification/composition</td>
<td>EM001 using Scanning Electron Microscopy (SEM)</td>
</tr>
<tr>
<td></td>
<td>Qualitative identification/characterisation</td>
<td>GM001 and GM003 using XRD</td>
</tr>
<tr>
<td></td>
<td>Quantitative estimation of phase composition</td>
<td>GM004 using X-ray Diffraction (XRD)</td>
</tr>
<tr>
<td></td>
<td>Isotopic Tests</td>
<td>Documented In-House Methods</td>
</tr>
<tr>
<td></td>
<td>Isotopes: $^{13}$C, $^{15}$N, Total Carbon and Total Nitrogen</td>
<td>AM002 using Continuous Flow Isotope Ratio Mass Spectrometry (CF-IRMS)</td>
</tr>
<tr>
<td>FIBRE PRODUCTS – NATURAL / ARTIFICIAL</td>
<td>Chemical Tests</td>
<td>Documented In-House Methods</td>
</tr>
<tr>
<td></td>
<td>Qualitative identification/composition</td>
<td>EM001 using SEM</td>
</tr>
<tr>
<td>PLASTICS AND PRODUCTS</td>
<td>Chemical Tests</td>
<td>FM001 using FT-IR</td>
</tr>
<tr>
<td></td>
<td>Qualitative identification/composition</td>
<td>EM002 using SEM and Energy Dispersing Spectroscopy (EDS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Documented In-House Methods</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FM001 using FTIR</td>
</tr>
</tbody>
</table>
### Materials/Products tested

<table>
<thead>
<tr>
<th>ROCKS / GEOLOGICAL MATERIALS, SEDIMENTS AND SOILS, CLAY AND CLAY PRODUCTS</th>
<th>Geological Tests</th>
<th>Standard specifications/Equipment/Techniques used</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Semi-quantitative mineralogical composition</td>
<td>Documented In-House Methods GM005 using XRD</td>
</tr>
<tr>
<td></td>
<td>Qualitative identification / characterisation</td>
<td>GM001 and GM003 using XRD FM001 using FTIR EM001 using SEM EM002 using EDS and SEM</td>
</tr>
<tr>
<td></td>
<td>Quantitative X-ray mapping</td>
<td>EM003 using EDS and SEM</td>
</tr>
<tr>
<td></td>
<td>Quantitative estimation of mineralogical composition</td>
<td>GM002 and GM004 using X-ray Diffraction (XRD)</td>
</tr>
<tr>
<td></td>
<td>Cation Exchange Capacity using Cobalt Hexamine Trichloride</td>
<td>GM006 by colorimetry using a Discrete Analyser</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROCKS / GEOLOGICAL MATERIALS, SEDIMENTS AND SOILS</th>
<th>Isotopic Tests</th>
<th>Documented In-House Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Isotopes: Nd, Sm and Sr</td>
<td>AM004 and AM005 using Thermal Ionisation Mass Spectrometry (TIMS)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PARTICULATE MATTER, SEDIMENTS AND SOILS, CLAY AND CLAY PRODUCTS, SEDIMENTS AND SOILS</th>
<th>Physical Tests</th>
<th>Documented In-House Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Particle size distribution</td>
<td>DM011 using laser diffraction particle size analyser</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEDIMENTS AND SOILS</th>
<th>Chemical Tests</th>
<th>Documented In-House Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exchangeable acidity</td>
<td>DM002 using Titration</td>
</tr>
<tr>
<td></td>
<td>Exchangeable cations: Ca, Mg, Na, K</td>
<td>DM004 Extraction Procedure BM006 using ICP-OES</td>
</tr>
<tr>
<td></td>
<td>Moisture Content and Loss of Material on Ignition</td>
<td>DM007 using Gravimetry</td>
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<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>SEDIMENTS AND SOILS (cont'd)</strong></td>
<td>Chemical Tests (cont'd)</td>
<td>Documented In-House Methods</td>
</tr>
<tr>
<td></td>
<td>Nutrients: Ca, Mg, K, P</td>
<td>DM005 Extraction Procedure</td>
</tr>
<tr>
<td></td>
<td>Total Carbon and Total Nitrogen</td>
<td>BM005 using ICP-OES</td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>DM001 using Elemental Analyser / Dumas Combustion</td>
</tr>
<tr>
<td></td>
<td>Phosphorus</td>
<td>DM006 using Glass Electrode</td>
</tr>
<tr>
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<td><strong>Isotopic Tests</strong></td>
<td>Documented In-House Methods</td>
</tr>
<tr>
<td></td>
<td>Isotopes: $^{13}\text{C}$ and $^{15}\text{N}$</td>
<td>AM002 using Continuous Flow Isotope Ratio Mass Spectrometry (CF-IRMS)</td>
</tr>
<tr>
<td><strong>SEDIMENTS AND SOILS</strong></td>
<td>Mercury</td>
<td>BM022 using Atomic Fluorescence Spectrometry</td>
</tr>
<tr>
<td><strong>SOILS, SEDIMENTS AND SLUDGES</strong></td>
<td>Chemical Tests</td>
<td>Documented In-House Methods</td>
</tr>
<tr>
<td><strong>WATER / WATERS</strong></td>
<td>Alkalinity, ammonium, nitrite phosphate, total oxidisable nitrogen and nitrate (by calculation)</td>
<td>BM003 using a Discrete Analyser</td>
</tr>
<tr>
<td></td>
<td>Anions: chloride, nitrate and sulphate</td>
<td>BM002 using Ion Chromatography</td>
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<td>pH</td>
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<tr>
<td>WATERS (and soil extracts)</td>
<td>Chemical Tests</td>
<td>Documented In-House Methods</td>
</tr>
<tr>
<td></td>
<td>Conductivity</td>
<td>DM012 by Glass Electrode</td>
</tr>
<tr>
<td></td>
<td>Total Organic Carbon (TOC)</td>
<td>BM019 using Non-dispersive Infra-Red Spectroscopy and Chemiluminescence</td>
</tr>
<tr>
<td></td>
<td>Total Nitrogen (TN)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Isotopic Tests</td>
<td>Documented In-House Methods</td>
</tr>
<tr>
<td></td>
<td>Isotopes: Sr</td>
<td>AM005 using Thermal Ionisation Mass Spectrometry (TIMS)</td>
</tr>
<tr>
<td>WATERS (processed)</td>
<td>Mercury</td>
<td>BM022 using Atomic Fluorescence Spectrometry</td>
</tr>
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<td></td>
<td>Chemical Tests</td>
<td></td>
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</table>

**FLEXIBLE SCOPE ENCOMPASSING:**

ROCKS / GEOLOGICAL MATERIALS, SEDIMENTS, SOILS, ANIMAL TISSUE, LEACHATES, WATERS, CHEMICAL PRODUCTS (Liquids, Solids, Organic, Inorganic) ANIMAL FEEDINGSTUFFS, BOTANICAL MATERIAL, CROPS

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.

**Inorganic elements**

Documented In-House Method using acid digestion methods DM009 and DM010, and Inductively Coupled Plasma – Optical Emission Spectroscopy (ICP-OES), Developed and Validated according to Method BM014 (flexible scope)

Documented In-House Method acid digestion methods DM009 and DM010, and using Inductively Coupled Plasma – Mass Spectrometry (ICP-MS), Developed and Validated according to Method BM015 (flexible scope)

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**END**