

## Environmental matrix reference materials

## Waters

Code	Product	Unit
<b>Drinking water</b>		
<b>New</b> ERM-CA011	Hard drinking water - Metals Hard drinking water sourced from Tamworth (Staffordshire, UK) spiked with high purity metal standards to levels as close to the EU/UK drinking water regulation limits as possible (EC directive 98/83/EC). Certified values Al.....209 µg/L      K.....5.11mg/L As.....10.15 µg/L      Mg.....14.78 mg/L B.....952 µg/L      Mn.....48.3 µg/L Ba.....115.2 µg/L      Na.....22.77 mg/L Be.....5.01 µg/L      Ni.....19.27 µg/L Ca.....73.6 mg/L      Pb.....24.51 µg/L Cd.....4.88 µg/L      Sb.....5.1 µg/L Co.....4.82 µg/L      Se.....9.91 µg/L Cu.....1936 µg/L      Sr.....471 µg/L Cr.....48.2 µg/L      Vn.....4.75 µg/L Fe.....186 µg/L      Zn.....597 µg/L	250 mL
<b>New</b> ERM-CA015	Hard drinking water - Anions Hard drinking water sourced from Teddington, UK, containing anions at concentrations close to the maximum permissible levels specified in EU/UK drinking water regulations (EC directive 98/83/EC). Certified values Cl ..... 247 mg/L      Nitrate ( as NO <sub>3</sub> ).....45 mg/L F..... 1.3 mg/L      Sulfate (as SO <sub>4</sub> ) .....247 mg/L	250 mL
<b>New</b> ERM-CA022	Soft drinking water - Metals Certified values Al..... 204 ± 10 µg/L      Cr .....50.8 ± 2.7 µg/L      Na ..... 5.84 ± 0.14 mg/L As..... 10.3 ± 1.3 µg/L      Cu.....2100 ± 70 µg/L      Ni ..... 20.5 ± 1.6 µg/L Ba ..... 127 ± 13 µg/L      Fe .....201 ± 2 µg/L      Pb ..... 26 ± 0.9 µg/L Ca ..... 7.33 ± 0.25 mg/L      Mg ..... 1.01 ± 0.04 mg/L      Zn.....628 ± 4 µg/L Cd..... 5.26 ± 0.21 µg/L      Mn .....52.5 ± 3.9 µg/L	250 mL
<b>New</b> ERM-CA016	Soft drinking water - Anions Soft drinking water sourced from Plymouth, UK, containing anions at concentrations corresponding to the maximum permissible levels specified in EU/UK drinking water regulations (EC directive 98/83/EC). Certified values Cl ..... 250 mg/L      Nitrate ( as NO <sub>3</sub> ).....48 mg/L F..... 1.5 mg/L      Sulfate (as SO <sub>4</sub> ) .....254 mg/L	250 mL
<b>New</b> NWLETHBRIDG-03	Drinking water - Major ions and nutrients Lot 0909 Certified values Alkalinity, Total (as CaCO <sub>3</sub> ).....118 mg/L      Nitrate + Nitrite (as N) ..... 0.18 mg/L Ammonia (as N).....0.385 mg/L      pH ..... 8.19 Calcium.....38.5 mg/L      Potassium ..... 1.5 mg/L Chloride .....12.5 mg/L      Silica (as Si) ..... 1.3 mg/L Conductivity (25°C)..... 338 µS/cm      Sodium..... 9.48 mg/L Dissolved Inorganic Carbon (DIC).....28.0 mg/L      Sulfate (as SO <sub>4</sub> ) ..... 34.9 mg/L Fluoride.....0.682 mg/L      Total Kjeldahl Nitrogen (TKN)..... 0.516 Magnesium .....13.5 mg/L      Total Nitrogen ..... 0.687 Hardness, Total (as CaCO <sub>3</sub> ).....153 mg/L Indicative values for Boron, Colour (Hazen units), Dissolved Organic Carbon (DOC) and Turbidity (JTU/NTU).	500 mL
<b>Rainwater</b>		
NWAES-05	A low pH acid rain sample - Major ions and nutrients Lot 0310 Certified Values Al.....0.0117 mg/L      NO <sub>3</sub> + NO <sub>2</sub> (as N)..... 0.26 mg/L NH <sub>3</sub> (as N) .....0.243 mg/L      K..... 0.028 mg/L Ca .....0.187 mg/L      SO <sub>4</sub> ..... 1.28 mg/L Cl .....0.225 mg/L      Conductivity (µS/cm, 25°C)..... 10.8 Mg.....0.0376 mg/L      pH ..... 4.9 Na .....0.181 mg/L      Total Nitrogen ..... 0.512 mg/L Indicative values DIC.....0.31 mg/L      N (Total Kjeldahl, TKN)..... 0.26 mg/L DOC.....0.32 mg/L DOC = Dissolved Organic Carbon DIC = Dissolved Inorganic Carbon	500 mL

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<b>New</b> ERM-CA408	Simulated rainwater	95 mL																																																
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NWRAIN-97	Rain sample - Major ions and nutrients The sample was collected from a greenhouse roof in Grimsby, Ontario. It was centrifuged and filtered and several years later was modified to represent acid rain by addition of nitric and sulfuric acids. Many of the 52 laboratories which participated in the PE studies are accredited and traceable to NIST and other CRMs. Lot 1109 Certified Values <table border="0"> <tbody> <tr> <td>Alkalinity, Gran Tit'n (as CaCO<sub>3</sub>) .....</td> <td>- 1.80L</td> <td>NO<sub>3</sub> + NO<sub>2</sub> (as N) .....</td> <td>2.22 mg/L</td> </tr> <tr> <td>Al .....</td> <td>0.034 mg/L</td> <td>K .....</td> <td>0.166 mg/L</td> </tr> <tr> <td>NH<sub>3</sub> (as N) .....</td> <td>0.186 mg/L</td> <td>Na .....</td> <td>0.298 mg/L</td> </tr> <tr> <td>Ca .....</td> <td>2.86 mg/L</td> <td>Sulfate (as SO<sub>4</sub>) .....</td> <td>5.68 mg/L</td> </tr> <tr> <td>Cl .....</td> <td>0.576 mg/L</td> <td>pH .....</td> <td>4.47</td> </tr> <tr> <td>Dissolved Organic Carbon (DOC) .....</td> <td>0.96 mg/L</td> <td>Conductivity (25°C) .....</td> <td>47.2 µS/cm</td> </tr> <tr> <td>Mg .....</td> <td>1.0 mg/L</td> <td colspan="2">Indicative values for Colour (Hazen units), Dissolved Inorganic Carbon (DIC), Hardness, Total (as CaCO<sub>3</sub>), Silica (as Si), and Total Kjeldahl Nitrogen (TKN)</td> </tr> </tbody> </table>	Alkalinity, Gran Tit'n (as CaCO <sub>3</sub> ) .....	- 1.80L	NO <sub>3</sub> + NO <sub>2</sub> (as N) .....	2.22 mg/L	Al .....	0.034 mg/L	K .....	0.166 mg/L	NH <sub>3</sub> (as N) .....	0.186 mg/L	Na .....	0.298 mg/L	Ca .....	2.86 mg/L	Sulfate (as SO <sub>4</sub> ) .....	5.68 mg/L	Cl .....	0.576 mg/L	pH .....	4.47	Dissolved Organic Carbon (DOC) .....	0.96 mg/L	Conductivity (25°C) .....	47.2 µS/cm	Mg .....	1.0 mg/L	Indicative values for Colour (Hazen units), Dissolved Inorganic Carbon (DIC), Hardness, Total (as CaCO <sub>3</sub> ), Silica (as Si), and Total Kjeldahl Nitrogen (TKN)		500 mL																				
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<b>Freshwater</b>																																																		
LGC6019	River water - Trace elements Collected from the River Thames downstream of Henley-on-Thames at Aston, U.K. Filtered at 0.7 µm and then at 0.45 µm. Stabilised at pH 2 by the addition of concentrated HNO <sub>3</sub> . Certified values <table border="0"> <tbody> <tr> <td>Al .....</td> <td>73 µg/L</td> <td>Cu .....</td> <td>15.4 µg/L</td> <td>Na .....</td> <td>24.7 mg/L</td> </tr> <tr> <td>Ca .....</td> <td>109 mg/L</td> <td>Fe .....</td> <td>287 µg/L</td> <td>Pb .....</td> <td>5.2 µg/L</td> </tr> <tr> <td>Cd .....</td> <td>0.11 µg/L</td> <td>K .....</td> <td>4.78 mg/L</td> <td>Zn .....</td> <td>59.7 µg/L</td> </tr> <tr> <td>Cr .....</td> <td>0.78 µg/L</td> <td>Mg .....</td> <td>4.62 mg/L</td> <td></td> <td></td> </tr> </tbody> </table>	Al .....	73 µg/L	Cu .....	15.4 µg/L	Na .....	24.7 mg/L	Ca .....	109 mg/L	Fe .....	287 µg/L	Pb .....	5.2 µg/L	Cd .....	0.11 µg/L	K .....	4.78 mg/L	Zn .....	59.7 µg/L	Cr .....	0.78 µg/L	Mg .....	4.62 mg/L			250 mL																								
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BCR-479	Freshwater - Nitrate, low level Produced by adding a solution of the required salt to ultra pure water. Final pH was around 6.8 Certified value NO <sub>3</sub> .....	214 µmol/kg	100 mL																																															
BCR-480	Freshwater - Nitrate, high level Produced by adding a solution of the required salt to ultra pure water. Final pH was around 6.8 Certified value NO <sub>3</sub> .....	885 µmol/kg	100 mL																																															

Code	Product	Unit
<b>New</b> NIST-1640A	<b>Natural water - Trace elements</b> This Standard Reference Material (SRM) is intended for use in evaluating methods used in the determination of trace elements in freshwater. NIST-1640a consists of acidified spring water with mass fractions and mass concentrations assigned for 29 elements, 22 of which were gravimetrically added. The solution contains nitric acid at a volume fraction of approximately 2 %. A unit of NIST-1640a consists of 250 mL of solution in a high-density polyethylene (HDPE) bottle sealed inside an aluminized Mylar pouch. Certified values Ag ..... 8.017 ± 0.042 µg/kg      Co.....20.08 ± 0.24 µg/kg      Se ..... 19.97 ± 0.16 µg/kg Al..... 52.6 ± 1.8 µg/kg      Cu.....85.07 ± 0.48 µg/kg      Sr ..... 125.03 ± 0.86 µg/kg As..... 8.010 ± 0.067 µg/kg      Fe .....36.5 ± 1.7 µg/kg      Tl..... 1.606 ± 0.015 µg/kg B ..... 300.7 ± 3.1 µg/kg      Mn .....40.07 ± 0.35 µg/kg      U ..... 25.15 ± 0.26 µg/kg Ba ..... 150.60 ± 0.74 µg/kg      Mo .....45.24 ± 0.59 µg/kg      V ..... 14.93 ± 0.21 µg/kg Be ..... 3.002 ± 0.027 µg/kg      Ni.....25.12 ± 0.12 µg/kg      Zn..... 55.20 ± 0.32 µg/kg Cd ..... 3.961 ± 0.072 µg/kg      Pb.....12.005 ± 0.040 µg/kg Cr..... 40.22 ± 0.28 µg/kg      Sb..... 5.064 ± 0.045 µg/kg	250 mL
NIST-1643e	<b>Simulated freshwater - Trace elements</b> NIST-1643e simulates the elemental composition of freshwater. Nitric acid is present at a concentration of approximately 0.8 mol/L to stabilise the trace elements. Certified values Ag .....1.036 µg/kg .....1.062 µg/L Al.....138.33 µg/kg ..... 141.8 µg/L As.....58.98 µg/kg .....60.45 µg/L B ..... 154.0 µg/kg .....157.9 µg/L Ba ..... 531.0 µg/kg .....544.2 µg/L Be ..... 13.64 µg/kg ..... 13.98 µg/L Bi..... 13.75 µg/kg ..... 14.09 µg/L Ca .....31500 µg/kg .....32300 µg/L Cd .....6.408 µg/kg .....6.568 µg/L Cr.....19.90 µg/kg .....20.40 µg/L Co .....26.40 µg/kg .....27.06 µg/L Cu .....22.20 µg/kg .....22.76 µg/L Fe.....95.7 µg/kg .....98.1 µg/L K .....1984 µg/kg .....2034 µg/L Li.....17.0 µg/kg ..... 17.4 µg/L Mg.....7841 µg/kg .....8037 µg/L Mn.....38.02 µg/kg .....38.97 µg/L Mo.....118.5 µg/kg .....121.4 µg/L Na .....20230 µg/kg .....20740 µg/L Ni.....60.89 µg/kg .....62.41 µg/L Pb .....19.15 µg/kg .....19.63 µg/L Rb .....13.80 µg/kg .....14.14 µg/L Sb .....56.88 µg/kg .....58.30 µg/L Se .....11.68 µg/kg .....11.97 µg/L Sr.....315.2 µg/kg .....323.1 µg/L Te.....1.07 µg/kg ..... 1.09 µg/L Tl.....7.263 µg/kg .....7.445 µg/L V .....36.93 µg/kg .....37.86 µg/L Zn.....76.5 µg/kg .....78.5 µg/L	250 mL
NIST-1641d	<b>Natural water - Mercury</b> Mercury in 2% (v/v) HNO <sub>3</sub> initially stabilised with 1 mg/kg gold Certified value: .....1.557 mg/kg ± 0.020 mg/kg	10 x 10 mL
<b>New</b> ERM-CA615	<b>Ground water - Trace elements</b> Certified values As..... 9.9 ± 0.7 µg/L      Hg.....0.037 ± 0.004 µg/L      Pb ..... 7.1 ± 0.6 µg/L Cd ..... 0.106 ± 0.011 µg/L      Mn ..... 107 ± 5 µg/L Fe..... 5.11 ± 0.26 mg/L      Ni.....25.3 ± 1.1 µg/L	95 mL
<b>New</b> ERM-CA616	<b>Ground water - Trace elements, conductivity, pH</b> ERM-CA616 is a natural groundwater fortified with ammonium dihydrogenphosphate Certified value      Uncertainty mg/L      mg/L Calcium.....42.6 ..... 1.4 Chloride .....44.6 ..... 0.9 Magnesium .....10.1 ..... 0.3 <i>Ortho</i> -phosphate.....2.24 ..... 0.1 Potassium .....5.79 ..... 0.15 Sodium .....27.9 ..... 0.8 Electrochemical property Conductivity ..... 426 µS/cm ..... 5 µS/cm pH (20°C).....7.12 ..... 0.18	95 mL
BCR-609	<b>Ground water - Trace elements (low level)</b> The material has been filtered at 0.45 µm and acidified with HNO <sub>3</sub> to around pH 1.5 Certified values Al..... 47.7 µg/kg      Cd.....0.164 µg/kg      Pb ..... 1.63 µg/kg As..... 1.2 µg/kg      Cu.....2.48 µg/kg	500 mL

## Waters

Code	Product	Unit
BCR-610	Ground water - Trace elements (high level) The material has been filtered at 0.45 µm and acidified with HNO <sub>3</sub> to around pH 1.5 Certified values Al..... 159 µg/kg      Cd..... 2.94 µg/kg      Pb ..... 7.78 µg/kg As..... 10.8 µg/kg      Cu..... 45.7 µg/kg	500 mL
BCR-611	Ground water - Bromide (low level) (Based on IC measurements) The material has been filtered at 0.45 µm and sterilised by autoclaving Certified value Br ..... 93 µg/kg	4 x 25 mL
BCR-612	Ground water - Bromide (high level) (Based on IC measurements) The material has been filtered at 0.45 µm and sterilised by autoclaving Certified value Br ..... 252 µg/kg	4 x 25 mL
BCR-617	Artificial ground water - Trace elements, low carbonate content Produced by adding solutions of the required salts to ultra pure water. Sterilised by autoclaving Certified values Ca ..... 14.6 mg/kg      Mg ..... 7.32 mg/kg      NO <sub>3</sub> ..... 25.8 mg/kg Cl ..... 26.4 mg/kg      Mn ..... 0.050 mg/kg      SO <sub>4</sub> ..... 26.3 mg/kg K ..... 9.93 mg/kg      Na ..... 14.6 mg/kg	75 mL
<b>New</b> NRCSLRS-5	River water - Trace elements Certified values Aluminum (Al) ..... 49.5 ± 5.0 µg/kg      Nickel (Ni) ..... 0.476 ± 0.064 µg/kg Arsenic (As) ..... 0.413 ± 0.039 µg/kg      Strontium (Sr) ..... 53.6 ± 1.3 µg/kg Barium (Ba) ..... 14.0 ± 0.5 µg/kg      Vanadium (V) ..... 0.317 ± 0.033 µg/kg Cadmium (Cd) ..... 0.0060 ± 0.0014 µg/kg      Zinc (Zn) ..... 0.845 ± 0.095 µg/kg Chromium (Cr) ..... 0.208 ± 0.023 µg/kg      Calcium (Ca) ..... 10.5 ± 0.4 µg/g Copper (Cu) ..... 17.4 ± 1.3 µg/kg      Magnesium (Mg) ..... 2.54 ± 0.16 µg/g Iron (Fe) ..... 91.2 ± 5.8 µg/kg      Potassium (K) ..... 0.839 ± 0.036 µg/g Lead (Pb) ..... 0.081 ± 0.006 µg/kg      Sodium (Na) ..... 5.38 ± 0.10 µg/g Manganese (Mn) ..... 4.33 ± 0.18 µg/kg Indicative values for Sb, Be, Co, Mg, U The density of SLRS-5 is 1.0007 g/mL.	470 mL
NWMIRAMICHI-02	River Water Soft, Coloured - Major ions and nutrients Lot 0310 Certified values Alkalinity, Gran (as CaCO <sub>3</sub> ) ..... 6.87 mg/L      Dissolved Organic Carbon (DOC) ..... 4.57 ml/L Al ..... 0.07 mg/L      Magnesium ..... 0.459 mg/L Ammonia (as N) ..... 0.025 mg/L      Nitrate + Nitrite (as N) ..... 0.0500 mg/L Calcium ..... 2.72 mg/L      pH ..... 6.91 Chloride ..... 0.64 mg/L      Potassium ..... 0.358 mg/L Colour (Hazen units) ..... 33.9      Silica (as Si) ..... 2.78 mg/L Conductivity (25°C) ..... 24.7 µS/cm      Sodium ..... 1.39 mg/L Dissolved Inorganic Carbon (DIC) ..... 1.71 mg/L      Sulfate (as SO <sub>4</sub> ) ..... 2.49 mg/L Indicative values for Fluoride and Hardness	500 mL
<b>New</b> NWMISSISSIPPI-03	River Water - Major ions and nutrients Lot 1010 Certified values Alkalinity, Total (as CaCO <sub>3</sub> ) ..... 142 mg/L      Magnesium ..... 18.1 mg/L Boron ..... 0.0255 mg/L      Nitrate + Nitrite (as N) ..... 2.42 mg/L Calcium ..... 44.8 mg/L      pH ..... 8.14 Chloride ..... 17.3 mg/L      Potassium ..... 2.61 mg/L Colour (Hazen units) ..... 20.7      Silica (as Si) ..... 0.51 mg/L Conductivity (25°C) ..... 404 µS/cm      Sodium ..... 9.99 mg/L Dissolved Inorganic Carbon (DIC) ..... 33.6 mg/L      Sulfate (as SO <sub>4</sub> ) ..... 32.8 mg/L Dissolved Organic Carbon (DOC) ..... 6.31 ml/L      Total Kjeldahl Nitrogen (TKN) ..... 0.546 mg/L Fluoride ..... 0.151 mg/L      Total Nitrogen ..... 2.81 mg/L Hardness, Total (as CaCO <sub>3</sub> ) ..... 187 mg/L      Turbidity (JTU/NTU) ..... 0.141	500 mL
<b>New</b> NWBATTLE-02	River water - Major ions and nutrients Lot 1010 Certified values Alkalinity, Total (as CaCO <sub>3</sub> ) ..... 299 mg/L      Magnesium ..... 21.6 mg/L Boron ..... 0.261 mg/L      pH ..... 8.55 Calcium ..... 25.0 mg/L      Potassium ..... 5.54 mg/L Chloride ..... 41.7 mg/L      Silica (as Si) ..... 0.253 mg/L Colour (Hazen units) ..... 20.2      Sodium ..... 1.62 mg/L Conductivity (25°C) ..... 962 µS/cm      Sulfate (as SO <sub>4</sub> ) ..... 149 mg/L Dissolved Inorganic Carbon (DIC) ..... 69.5 mg/L      Total Nitrogen ..... 0.548 mg/L Fluoride ..... 0.196 mg/L      Turbidity (JTU/NTU) ..... 0.157 Hardness, Total (as CaCO <sub>3</sub> ) ..... 152 mg/L Indicative values for Dissolved Organic Carbon (DOC), Nitrate + Nitrite (as N) and Total Kjeldahl Nitrogen (TKN).	500 mL

Code	Product	Unit
NWONTARIO-99	Natural lake water - Major ions and nutrients Lot 1109 Certified values Alkalinity, Total (as CaCO <sub>3</sub> ).....93.1 mg/L Calcium.....35.4 mg/L Chloride.....20.8 mg/L Dissolved Inorganic Carbon (DIC).....22.2 mg/L Fluoride.....0.63 mg/L Hardness, Total (as CaCO <sub>3</sub> ).....124 mg/L Magnesium.....8.6 mg/L pH.....8.12 Potassium.....1.51 mg/L Silica (as Si).....0.53 mg/L Sodium.....12.7 mg/L Conductivity (25°C).....307 µS/cm Sulfate (as SO <sub>4</sub> ).....26.0 mg/L Total nitrogen.....0.58 mg/L Indicative values for Boron, Colour (Hazen Units), Dissolved Organic Carbon (DOC), Nitrate + Nitrite (as N), Total Kjeldahl Nitrogen (as N) and Turbidity (JTU/NTU).	500 mL
<b>New</b> NWBIGMOOSE-02	Lake water - Major ions and nutrients Lot 1010 Certified values Alkalinity, Gran (as CaCO <sub>3</sub> ).....0.992 mg/L Aluminium.....0.117 mg/L Ammonia (as N).....0.0263 mg/L Calcium.....2.00 mg/L Chloride.....0.463 mg/L Colour (Hazen units).....13.0 Conductivity (25°C).....21.2 µS/cm Dissolved Inorganic Carbon (DIC).....0.483 mg/L Dissolved Organic Carbon (DOC).....3.90 mg/L Fluoride.....0.0648 mg/L Magnesium.....0.326 mg/L Nitrate + Nitrite (as N).....0.179 mg/L pH.....6.02 Potassium.....0.326 mg/L Silica (as Si).....1.76 mg/L Sodium.....0.729 mg/L Sulfate (as SO <sub>4</sub> ).....5.08 mg/L Total Nitrogen.....0.352 mg/L Indicative values for Hardness, Total (as CaCO <sub>3</sub> ), Total Kjeldahl Nitrogen (TKN) and Turbidity (JTU/NTU).	500 mL
<b>New</b> NWCORBERRY-05	Lake water - Major ions and nutrients Lot 1010 Certified values Alkalinity, Total (as CaCO <sub>3</sub> ).....40 mg/L Calcium.....13.0 mg/L Chloride.....35.3 mg/L Colour (Hazen units).....19.3 Conductivity (25°C).....219 µS/cm Dissolved Inorganic Carbon (DIC).....9.42 mg/L Dissolved Organic Carbon (DOC).....3.64 mg/L Fluoride.....0.68 mg/L Hardness, Total (as CaCO <sub>3</sub> ).....55.5 mg/L Magnesium.....5.63 mg/L Nitrate + Nitrite (as N).....0.151 mg/L pH.....7.69 Potassium.....0.70 mg/L Silica (as Si).....0.269 mg/L Sodium.....20.1 mg/L Sulfate (as SO <sub>4</sub> ).....8.86 mg/L Total Kjeldahl Nitrogen (TKN).....0.208 mg/L Total Nitrogen.....0.343 mg/L Turbidity (JTU/NTU).....0.172 Indicative value for Boron	500 mL
NWION-915	Natural lake water - Major ions and nutrients Collected from Lake Superior Lot 1109 Certified Values pH.....7.79 Dissolved Inorganic Carbon (DIC).....10.2 mg/L Dissolved Organic Carbon (DOC).....1.37 mg/L Conductivity (25°C).....98.9 µS/cm Total alkalinity (as CaCO <sub>3</sub> ).....43.2 mg/L Total hardness (as CaCO <sub>3</sub> ).....46.4 mg/L Ca.....13.7 mg/L Cl.....1.42 mg/L K.....0.509 mg/L Mg.....2.88 mg/L NO <sub>3</sub> + NO <sub>2</sub> (as N).....0.352 mg/L Na.....1.39 mg/L Silica (as Si).....1.18 mg/L Sulfate (as SO <sub>4</sub> ).....3.42 mg/L Total nitrogen.....0.44 mg/L Indicative values for Ammonia, Colour (Hazen units), Fluoride, NH <sub>3</sub> (as N), Total N (Kjeldahl) and Turbidity (NTU/JTU).	500 mL
NRCORMS-4	River water - Mercury Certified Value for Mercury Hg.....22.0 ± 1.5 pg/g	3 x 50 mL
SPS-SW1	Surface water - Trace metals Certified values Al.....50 ng/mL As.....10.0 ng/mL Ba.....50 ng/mL Ca.....2000 ng/mL Cd.....0.50 ng/mL Co.....2.00 ng/mL Cr.....2.00 ng/mL Cs.....2.00 ng/mL Cu.....20 ng/mL Fe.....20 ng/mL K.....200 ng/mL Mg.....400 ng/mL Mn.....10.0 ng/mL Mo.....10.0 ng/mL Na.....2000 ng/mL Ni.....10.0 ng/mL P.....100 ng/mL Pb.....5.0 ng/mL Rb.....10.0 ng/mL S.....2000 ng/mL Se.....2.00 ng/mL Si.....1000 ng/mL Sr.....50.0 ng/mL Ti.....0.50 ng/mL V.....10.0 ng/mL Zn.....20 ng/mL Rare earth metals (Sc, Y, Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Th, Tm, U, Yb) 0.50 ng/mL	6 x 50 mL

## Waters

Code	Product	Unit
SPS-SW2	Surface water - Trace metals	6 x 50 mL
	Certified values	
Al.....	250 ng/mL	Fe ..... 100 ng/mL
As.....	50.0 ng/mL	K ..... 1000 ng/mL
Ba.....	250 ng/mL	Mg ..... 2000 ng/mL
Ca.....	10000 ng/mL	Mn ..... 50.0 ng/mL
Cd.....	2.50 ng/mL	Mo ..... 50.0 ng/mL
Co.....	10.0 ng/mL	Na ..... 10000 ng/mL
Cr.....	10.0 ng/mL	Ni ..... 50.0 ng/mL
Cs.....	10.0 ng/mL	P ..... 500 ng/mL
Cu.....	100 ng/mL	Pb ..... 25.0 ng/mL
	Rare earth metals (Sc, Y, Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Th, Tm, U, Yb) 2.50 ng/mL	Rb ..... 50.0 ng/mL
		S ..... 10000 ng/mL
		Se ..... 10.0 ng/mL
		Si ..... 5000 ng/mL
		Sr ..... 250 ng/mL
		V ..... 50.0 ng/mL
		Zn ..... 100 ng/mL
		Tl ..... 2.50 ng/mL

## Sea water

LGC6016	Estuarine water - Trace metals	50 mL
	Collected from the Severn Estuary, UK, offshore from a heavily industrialised area near Avonmouth.	
	Certified Values	
Cd.....	101 µg/kg	Mn ..... 976 µg/kg
Cu.....	190 µg/kg	Ni ..... 186 µg/kg
	Indicative values for Ca, K, Mg, Na, Zn	Pb ..... 196 µg/kg
BCR-505	Estuarine water - Trace elements	1 L
	The material has been filtered at 0.45 µm and acidified with HNO <sub>3</sub> to around pH 1.5	
	Certified values	
Cd.....	0.80 nmol/kg	Ni ..... 24.1 nmol/kg
Cu.....	29.4 nmol/kg	Zn ..... 172 nmol/kg
BCR-579	Coastal sea water - Mercury	1 L
	The material has been filtered at 0.45 µm and acidified with HCl to around pH 1.7	
	Certified value	
Hg.....	1.9 ng/kg	
NRCSLEW-3	Estuarine water - Trace elements	470 mL
	Collected from the San Francisco Bay, California, USA at a depth of 5 metres	
	Certified values	
As.....	1.36 µg/L	Cu ..... 1.55 µg/L
Cd.....	0.048 µg/L	Fe ..... 0.568 µg/L
Co.....	0.042 µg/L	Mn ..... 1.61 µg/L
Cr.....	0.183 µg/L	Ni ..... 1.23 µg/L
	Indicative values for Ag, Mo, U	Pb ..... 0.0090 µg/L
		V ..... 2.57 µg/L
		Zn ..... 0.201 µg/L
<b>New</b> NRCNASS-6	Seawater - Trace metals	500 mL
	Certified values	
Arsenic (As).....	1.40 ± 0.12 µg/kg	1.43 ± 0.12 µg/L
Cadmium (Cd).....	0.0303 ± 0.0019 µg/kg	0.0311 ± 0.0019 µg/L
Chromium (Cr).....	0.116 ± 0.008 µg/kg	0.118 ± 0.008 µg/L
Copper (Cu).....	0.242 ± 0.025 µg/kg	0.248 ± 0.025 µg/L
Iron (Fe).....	0.483 ± 0.045 µg/kg	0.495 ± 0.046 µg/L
Lead (Pb).....	0.006 ± 0.002 µg/kg	0.006 ± 0.002 µg/L
Manganese (Mn).....	0.516 ± 0.047 µg/kg	0.530 ± 0.050 µg/L
Nickel (Ni).....	0.294 ± 0.025 µg/kg	0.301 ± 0.025 µg/L
Vanadium (V).....	1.42 ± 0.16 µg/kg	1.46 ± 0.17 µg/L
Zinc (Zn).....	0.251 ± 0.020 µg/kg	0.257 ± 0.020 µg/L
	Indicative values for Cobalt (Co), Molybdenum (Mo) and Uranium (U).	
<b>New</b> NRCMOOS-2	Sea water - Nutrients	2 x 50 mL
	This certified reference material is primarily intended for use in the calibration of procedures and the development of methods for the analysis of nutrients in seawater.	
	Certified values	
Orthophosphate.....	1.58 ± 0.10 µmol/L	Nitrite..... 3.31 ± 0.18 µmol/L
Silicate.....	28.8 ± 1.0 µmol/L	Nitrite and Nitrate..... 24.9 ± 1.0 µmol/L

## Spiked/fortified water

<b>New</b> NWTM-15.2	Water - Trace elements	500 mL
	Lot 1010	
	Certified values	
Aluminum (Al).....	33.6 µg/L	Cobalt (Co)..... 15.1 µg/L
Antimony (Sb).....	16.3 µg/L	Copper (Cu)..... 17.2 µg/L
Arsenic (As).....	15.7 µg/L	Iron (Fe)..... 25.6 µg/L
Barium (Ba).....	13.2 µg/L	Lead (Pb)..... 11.6 µg/L
Beryllium (Be).....	15.3 µg/L	Lithium (Li)..... 15.0 µg/L
Boron (B).....	23.2 µg/L	Manganese (Mg)..... 18.1 µg/L
Cadmium (Cd).....	13.0 µg/L	Molybdenum (Mo)..... 14.0 µg/L
Chromium (Cr).....	16.4 µg/L	Nickel (Ni)..... 17.6 µg/L
	Indicative value for Bismuth (Bi), Gallium (Ga), Rubidium (Rb), Silver (Ag) and Tungsten (W)	Selenium (Se)..... 15.1 µg/L
		Strontium (Sr)..... 111 µg/L
		Thallium (Tl)..... 18.0 µg/L
		Tin (Sn)..... 14.8 µg/L
		Titanium (Ti)..... 14.6 µg/L
		Uranium (U)..... 15.4 µg/L
		Vanadium (V)..... 13.1 µg/L
		Zinc (Zn)..... 35.4 µg/L

Code	Product	Unit
<b>New</b> NWTM-23.4	Water - Trace elements Lot 1010 Certified values Aluminum (Al) ..... 94.6 µg/L Antimony (Sb) ..... 3.27 µg/L Arsenic (As) ..... 8.16 µg/L Barium (Ba) ..... 14.3 µg/L Beryllium (Be) ..... 2.02 µg/L Boron (B) ..... 18.1 µg/L Cadmium (Cd) ..... 2.92 µg/L Chromium (Cr) ..... 6.8 µg/L Cobalt (Co) ..... 7.09 µg/L Copper (Cu) ..... 8.51 µg/L Iron (Fe) ..... 14.4 µg/L Lead (Pb) ..... 2.97 µg/L Lithium (Li) ..... 2.04 µg/L Manganese (Mg) ..... 8.75 µg/L Molybdenum (Mo) ..... 4.23 µg/L Nickel (Ni) ..... 4.95 µg/L Selenium (Se) ..... 4.59 µg/L Strontium (Sr) ..... 111 µg/L Thallium (Tl) ..... 3.99 µg/L Tin (Sn) ..... 2.78 µg/L Titanium (Ti) ..... 3.19 µg/L Uranium (U) ..... 5.01 µg/L Vanadium (V) ..... 1.93 µg/L Zinc (Zn) ..... 2.47 µg/L Indicative value for Bismuth (Bi), Gallium (Ga), Rubidium (Rb), Silver (Ag) and Tungsten (W)	500 mL
<b>New</b> NWTM-24.3	Water - Trace elements Lot 0510 Certified values Aluminum (Al) ..... 34.4 µg/L Antimony (Sb) ..... 3.36 µg/L Arsenic (As) ..... 5.21 µg/L Barium (Ba) ..... 13.2 µg/L Beryllium (Be) ..... 2.06 µg/L Bismuth (Bi) ..... 2.37 µg/L Boron (B) ..... 15.9 µg/L Cadmium (Cd) ..... 3.97 µg/L Chromium (Cr) ..... 5.01 µg/L Cobalt (Co) ..... 6.29 µg/L Copper (Cu) ..... 6.79 µg/L Iron (Fe) ..... 15.4 µg/L Lead (Pb) ..... 5.82 µg/L Lithium (Li) ..... 5.02 µg/L Manganese (Mg) ..... 8.12 µg/L Molybdenum (Mo) ..... 6.18 µg/L Nickel (Ni) ..... 5.12 µg/L Selenium (Se) ..... 3.42 µg/L Strontium (Sr) ..... 110 µg/L Thallium (Tl) ..... 4.18 µg/L Tin (Sn) ..... 3.72 µg/L Titanium (Ti) ..... 7.3 µg/L Uranium (U) ..... 4.42 µg/L Vanadium (V) ..... 7.03 µg/L Zinc (Zn) ..... 23.5 µg/L Indicative values for Gallium (Ga), Rubidium (Rb) and Silver (Ag)	500 mL
<b>New</b> NWTM-27.3	Water - Trace elements Lot 0310 Certified values Aluminum (Al) ..... 44.2 µg/L Antimony (Sb) ..... 1.49 µg/L Arsenic (As) ..... 2.13 µg/L Barium (Ba) ..... 14.8 µg/L Beryllium (Be) ..... 1.16 µg/L Boron (B) ..... 14.7 µg/L Cadmium (Cd) ..... 1.05 µg/L Chromium (Cr) ..... 1.74 µg/L Cobalt (Co) ..... 2.05 µg/L Copper (Cu) ..... 6.19 µg/L Iron (Fe) ..... 10.9 µg/L Lead (Pb) ..... 2.86 µg/L Lithium (Li) ..... 3.5 µg/L Manganese (Mg) ..... 2.25 µg/L Molybdenum (Mo) ..... 2.22 µg/L Nickel (Ni) ..... 2.42 µg/L Selenium (Se) ..... 1.68 µg/L Strontium (Sr) ..... 105 µg/L Thallium (Tl) ..... 1.48 µg/L Tin (Sn) ..... 2.26 µg/L Titanium (Ti) ..... 2.01 µg/L Uranium (U) ..... 2.03 µg/L Vanadium (V) ..... 2.18 µg/L Zinc (Zn) ..... 16.2 µg/L Indicative value for Rubidium (Rb) and Silver (Ag)	500 mL
<b>New</b> NWTMDA-61.2	Water - Trace elements Lot 0510 Certified values Aluminum (Al) ..... 57.9 µg/L Antimony (Sb) ..... 33.6 µg/L Arsenic (As) ..... 34.4 µg/L Barium (Ba) ..... 62.7 µg/L Beryllium (Be) ..... 36.3 µg/L Bismuth (Bi) ..... 22.7 µg/L Boron (B) ..... 79 µg/L Cadmium (Cd) ..... 58 µg/L Chromium (Cr) ..... 67.2 µg/L Cobalt (Co) ..... 63 µg/L Copper (Cu) ..... 63.5 µg/L Iron (Fe) ..... 79.7 µg/L Lead (Pb) ..... 61.4 µg/L Lithium (Li) ..... 33.4 µg/L Manganese (Mg) ..... 75.7 µg/L Molybdenum (Mo) ..... 72.2 µg/L Nickel (Ni) ..... 57.5 µg/L Selenium (Se) ..... 39.3 µg/L Strontium (Sr) ..... 113 µg/L Thallium (Tl) ..... 36.8 µg/L Tin (Sn) ..... 55.9 µg/L Titanium (Ti) ..... 37.2 µg/L Uranium (U) ..... 36.8 µg/L Vanadium (V) ..... 71.1 µg/L Zinc (Zn) ..... 71.3 µg/L Indicative values for Gallium (Ga), Rubidium (Rb) and Silver (Ag)	500 mL
<b>New</b> NWTMDA-64.2	Water - Trace elements Lot 1010 Certified values Aluminum (Al) ..... 290 µg/L Antimony (Sb) ..... 128 µg/L Arsenic (As) ..... 162 µg/L Barium (Ba) ..... 291 µg/L Beryllium (Be) ..... 161 µg/L Bismuth (Bi) ..... 131 µg/L Boron (B) ..... 282 µg/L Cadmium (Cd) ..... 266 µg/L Chromium (Cr) ..... 290 µg/L Cobalt (Co) ..... 254 µg/L Copper (Cu) ..... 274 µg/L Iron (Fe) ..... 306 µg/L Lead (Pb) ..... 288 µg/L Lithium (Li) ..... 152 µg/L Manganese (Mg) ..... 295 µg/L Molybdenum (Mo) ..... 290 µg/L Nickel (Ni) ..... 263 µg/L Selenium (Se) ..... 154 µg/L Strontium (Sr) ..... 640 µg/L Thallium (Tl) ..... 147 µg/L Tin (Sn) ..... 290 µg/L Titanium (Ti) ..... 128 µg/L Uranium (U) ..... 142 µg/L Vanadium (V) ..... 290 µg/L Zinc (Zn) ..... 310 µg/L Indicative value for Gallium (Ga), Rubidium (Rb), Silver (Ag) and Tungsten (W)	500 mL
<b>New</b> NWTMDA-51.4	Fortified water - Trace elements Lot 1010 Certified values Aluminum (Al) ..... 94.8 µg/L Antimony (Sb) ..... 15.0 µg/L Arsenic (As) ..... 16.3 µg/L Barium (Ba) ..... 72.9 µg/L Beryllium (Be) ..... 10.0 µg/L Boron (B) ..... 47.6 µg/L Cadmium (Cd) ..... 25.6 µg/L Chromium (Cr) ..... 66.0 µg/L Cobalt (Co) ..... 70.4 µg/L Copper (Cu) ..... 80.6 µg/L Iron (Fe) ..... 116 µg/L Lead (Pb) ..... 68.9 µg/L Lithium (Li) ..... 17.8 µg/L Manganese (Mn) ..... 84.0 µg/L Molybdenum (Mg) ..... 57.3 µg/L Nickel (Ni) ..... 65.6 µg/L Selenium (Se) ..... 13.8 µg/L Strontium (Sr) ..... 116 µg/L Thallium (Tl) ..... 20.4 µg/L Tin (Sn) ..... 16.6 µg/L Titanium (Ti) ..... 14.3 µg/L Uranium (U) ..... 29.1 µg/L Vanadium (V) ..... 48.0 µg/L Zinc (Zn) ..... 140 µg/L Indicative value for Bismuth (Bi), Gallium (Ga), Silver (Ag) and Rubidium (Rb)	500 mL

## Waters

Code	Product	Unit
NWTMDA-52.3	Fortified water - Trace elements Lot 1010 Certified values Aluminum (Al) ..... 310 µg/mL Antimony (Sb) ..... 16.4 µg/mL Arsenic (As) ..... 25.4 µg/mL Barium (Ba) ..... 148 µg/mL Beryllium (Be) ..... 17.6 µg/mL Bismuth (Bi) ..... 12.3 µg/mL Boron (B) ..... 10.7 µg/mL Cadmium (Cd) ..... 90.9 µg/mL Chromium (Cr) ..... 165 µg/mL Cobalt (Co) ..... 136 µg/mL Copper (Cu) ..... 197 µg/mL Iron (Fe) ..... 412 µg/mL Lead (Pb) ..... 358 µg/mL Lithium (Li) ..... 13.9 µg/mL Manganese (Mg) ..... 198 µg/mL Molybdenum (Mo) ..... 207 µg/mL Nickel (Ni) ..... 274 µg/mL Selenium (Se) ..... 21.7 µg/mL Silver (Ag) ..... 20.6 µg/mL Strontium (Sr) ..... 286 µg/mL Thallium (Tl) ..... 18.3 µg/mL Tin (Sn) ..... 19.9 µg/mL Titanium (Ti) ..... 120 µg/mL Uranium (U) ..... 22.7 µg/mL Vanadium (V) ..... 145 µg/mL Zinc (Zn) ..... 263 µg/mL Indicative values for Gallium (Ga), Rubidium (Rb) and Tungsten (W)	500 mL
<b>New</b> NWTMDA-53.3	Fortified water - Trace elements Lot 0310 Certified values Aluminum (Al) ..... 364 µg/L Antimony (Sb) ..... 16.9 µg/L Arsenic (As) ..... 34.2 µg/L Barium (Ba) ..... 283 µg/L Beryllium (Be) ..... 13.2 µg/L Bismuth (Bi) ..... 12.0 µg/L Boron (B) ..... 10.4 µg/L Cadmium (Cd) ..... 118 µg/L Chromium (Cr) ..... 340 µg/L Cobalt (Co) ..... 251 µg/L Copper (Cu) ..... 308 µg/L Iron (Fe) ..... 325 µg/L Lead (Pb) ..... 349 µg/L Lithium (Li) ..... 11 µg/L Manganese (Mg) ..... 360 µg/L Molybdenum (Mo) ..... 252 µg/L Nickel (Ni) ..... 311 µg/L Selenium (Se) ..... 22.7 µg/L Silver (Ag) ..... 14.7 µg/L Strontium (Sr) ..... 369 µg/L Thallium (Tl) ..... 15.3 µg/L Tin (Sn) ..... 18.5 µg/L Uranium (U) ..... 32.8 µg/L Vanadium (V) ..... 315 µg/L Zinc (Zn) ..... 385 µg/L Indicative value for Rb	500 mL
NWTMDA-70	Fortified water - Trace elements Lot 0310 Certified values Aluminum (Al) ..... 415 µg/L Antimony (Sb) ..... 21.7 µg/L Arsenic (As) ..... 40.7 µg/L Barium (Ba) ..... 309 µg/L Beryllium (Be) ..... 15.1 µg/L Bismuth (Bi) ..... 13.5 µg/L Cadmium (Cd) ..... 145 µg/L Chromium (Cr) ..... 389 µg/L Cobalt (Co) ..... 285 µg/L Copper (Cu) ..... 398 µg/L Iron (Fe) ..... 368 µg/L Lead (Pb) ..... 444 µg/L Lithium (Li) ..... 21.6 µg/L Manganese (Mg) ..... 302 µg/L Molybdenum (Mo) ..... 259 µg/L Nickel (Ni) ..... 327 µg/L Selenium (Se) ..... 25.8 µg/L Silver (Ag) ..... 10.9 µg/L Strontium (Sr) ..... 441 µg/L Thallium (Tl) ..... 20 µg/L Tin (Sn) ..... 19.5 µg/L Uranium (U) ..... 55.9 µg/L Vanadium (V) ..... 312 µg/L Zinc (Zn) ..... 477 µg/L Indicative values for Boron (B), Rubidium (Rb) and Titanium (Ti)	500 mL
NWTM-DWS.2	Fortified water - Trace elements Lot 1010 Certified values Aluminum (Al) ..... 58.6 µg/L Antimony (Sb) ..... 3.21 µg/L Arsenic (As) ..... 4.18 µg/L Barium (Ba) ..... 146 µg/L Beryllium (Be) ..... 13.4 µg/L Boron (B) ..... 81.5 µg/L Cadmium (Cd) ..... 4.20 µg/L Chromium (Cr) ..... 44.4 µg/L Cobalt (Co) ..... 64.4 µg/L Copper (Cu) ..... 167 µg/L Iron (Fe) ..... 224 µg/L Lead (Pb) ..... 7.87 µg/L Lithium (Li) ..... 20.2 µg/L Manganese (Mg) ..... 47.3 µg/L Molybdenum (Mo) ..... 67.1 µg/L Nickel (Ni) ..... 82.5 µg/L Selenium (Se) ..... 8.65 µg/L Silver (Ag) ..... 9.94 µg/L Strontium (Sr) ..... 244 µg/L Thallium (Tl) ..... 8.32 µg/L Tin (Sn) ..... 12.2 µg/L Titanium (Ti) ..... 1.25 µg/L Uranium (U) ..... 14.2 µg/L Vanadium (V) ..... 44.5 µg/L Zinc (Zn) ..... 379 µg/L Indicative values for Bismuth (Bi), Gallium (Ga) and Rubidium (Rb)	500 mL
<b>New</b> NCS ZC76308	Water - Trace elements Certified values Cd ..... 11.3 ± 5 ng/g Pb ..... 52 ± 2 ng/g Cu ..... 50 ± 2 ng/g Cr ..... 30 ± 2 ng/g Zn ..... 91 ± 3 ng/g Ni ..... 62 ± 2 ng/g	100 mL
<b>New</b> NIM-GBW08604	Water - Fluoride Certified value F ..... 1.0 µg/g	100 mL
<b>New</b> NIM-GBW08605	Water - Arsenic Certified value As ..... 0.500 µg/g	100 mL
<b>New</b> NIM-GBW08611	Water - Arsenic Certified value As ..... 1000 µg/mL	20 mL
<b>New</b> NIM-GBW08607	Water - Metals Certified values Cd ..... 0.100 µg/g Cr ..... 0.500 µg/g Cu ..... 1.00 µg/g Ni ..... 0.500 µg/g Pb ..... 1.00 µg/g Zn ..... 5.00 µg/g	20 mL

	Code	Product	Unit
<b>New</b>	NIM-GBW08608	Water - Metals Certified values Cd ..... 12.2 ng/g      Cu ..... 51 ng/g      Zn ..... 91 ng/g Pb ..... 51 ng/g      Cr ..... 33 ng/g      Ni ..... 61 ng/g	80 mL
<b>New</b>	NIM-GBW08610	Water - Silver Certified value Ag ..... 1000 µg/mL	20 mL
<b>New</b>	NIM-GBW08612	Water - Cadmium Certified value Cd ..... 1000 µg/mL	20 mL
<b>New</b>	NIM-GBW08602	Water - Cadmium Certified value Cd ..... 0.100 ± 0.002 µg/g	80 mL
<b>New</b>	NIM-GBW08613	Water - Cobalt Certified value Co ..... 1000 µg/mL	20 mL
<b>New</b>	NIM-GBW08614	Water - Chromium Certified value Cr ..... 1000 µg/mL	20 mL
<b>New</b>	NIM-GBW08615	Water - Copper Certified value Cu ..... 1000 µg/mL	20 mL
<b>New</b>	NIM-GBW08616	Water - Iron Certified value Fe ..... 1000 µg/mL	20 mL
<b>New</b>	NIM-GBW08617	Water - Mercury Certified value Hg ..... 1000 µg/mL	20 mL
<b>New</b>	NIM-GBW08603	Water - Mercury Certified value Hg ..... 10 ± 0.4 ng/g	20 mL
<b>New</b>	NIM-GBW08618	Water - Nickel Certified value Ni ..... 1000 µg/mL	20 mL
<b>New</b>	NIM-GBW08619	Water - Lead Certified value Pb ..... 1000 µg/mL	20 mL
<b>New</b>	NIM-GBW08601	Water - Lead Certified value Pb ..... 1 µg/g	80 mL
<b>New</b>	NIM-GBW08620	Water - Zinc Certified value Zn ..... 1000 µg/mL	20 mL
<b>New</b>	NIM-GBW08606	Water - Chloride, nitrate, sulfate Certified values Cl <sup>-</sup> ..... 22.2 ± 0.4 µg/g      NO <sub>3</sub> ..... 4.5 ± 0.1 µg/g      SO <sub>4</sub> <sup>2-</sup> ..... 38.1 ± 0.8 µg/g	20 mL
<b>New</b>	NIM-GBW08606-80	Water - Chloride, nitrate, sulfate	80 mL

### Miscellaneous

LGC6175	Landfill leachate - Trace elements Landfill leachate collected and supplied in high density polyethylene bottles. Certified values B ..... 8.9 mg/L      Mn ..... 0.33 mg/L Ca ..... 148 mg/L      Na ..... 860 mg/L Fe ..... 1.05 mg/L      Ni ..... 0.09 mg/L K ..... 385 mg/L      Zn ..... 0.28 mg/L Mg ..... 221 mg/L	50 mL
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## Waters

Code	Product	Unit
LGC6177	Landfill leachate - Trace elements Landfill leachate collected from a landfill site in Loughborough, Leicestershire, UK Assessed values B ..... 9.8 mg/L      K ..... 780 mg/L      Ni ..... 0.21 mg/L Ca ..... 74.8 mg/L      Mg ..... 73.5 mg/L      P ..... 11.5 mg/L Cr ..... 0.18 mg/L      Mn ..... 0.14 mg/L Fe ..... 3.8 mg/L      Na ..... 1750 mg/L	50 mL
BCR-713	Waste water effluent - Trace elements Certified values As ..... 9.7 µg/L      Cu ..... 69 µg/L      Ni ..... 30 µg/L Cd ..... 5.1 µg/L      Fe ..... 0.40 mg/L      Pb ..... 47 µg/L Cr ..... 21.9 µg/L      Mn ..... 43.4 µg/L      Se ..... 5.6 µg/L	100 mL
SPS-WW1	Waste water - Trace metals Certified values Al ..... 2000 ng/mL      Cu ..... 400 ng/mL      Pb ..... 100.0 ng/mL As ..... 100.0 ng/mL      Fe ..... 1000 ng/mL      V ..... 100.0 ng/mL Cd ..... 20.0 ng/mL      Mn ..... 400 ng/mL      Zn ..... 600 ng/mL Co ..... 60.0 ng/mL      Ni ..... 1000 ng/mL Cr ..... 200 ng/mL      P ..... 1000 ng/mL	6 x 50 mL
SPS-WW2	Waste water - Trace metals Certified values Al ..... 10000 ng/mL      Cu ..... 2000 ng/mL      Pb ..... 500 ng/mL As ..... 500 ng/mL      Fe ..... 5000 ng/mL      V ..... 500 ng/mL Cd ..... 100.0 ng/mL      Mn ..... 2000 ng/mL      Zn ..... 3000 ng/mL Co ..... 300 ng/mL      Ni ..... 5000 ng/mL Cr ..... 1000 ng/mL      P ..... 5000 ng/mL	6 x 50 mL
SPS-NU-WW1	Waste water - Anions Certified values Cl <sup>-</sup> ..... 5.00 µg/mL      NO <sub>3</sub> <sup>-</sup> ..... 1.00 µg/mL F <sup>-</sup> ..... 1.00 µg/mL      SO <sub>4</sub> <sup>2-</sup> ..... 20.0 µg/mL PO <sub>4</sub> <sup>3-</sup> ..... 1.50 µg/mL	6 x 50 mL
SPS-NU-WW2	Waste water - Anions Certified values Cl <sup>-</sup> ..... 50.0 µg/mL      NO <sub>3</sub> <sup>-</sup> ..... 5.00 µg/mL      SO <sub>4</sub> <sup>2-</sup> ..... 100 µg/mL F <sup>-</sup> ..... 10.0 µg/mL      PO <sub>4</sub> <sup>3-</sup> ..... 7.50 µg/mL	6 x 50 mL
IAEA-304	Oxygen-18 labelled water Two Oxygen-18 labelled water samples (A and B) prepared from oxygen-18 enriched water and diluted with distilled water Sample A Assessed value: ..... <sup>18</sup> O ..... 251.7δD <sub>VSMOW</sub> Sample B Assessed value: ..... <sup>18</sup> O ..... 502.5δD <sub>VSMOW</sub> *The isotopic compositions are given in parts per thousand difference from isotope ratio standard Vienna Standard Mean Ocean Water (VSMOW).	2 x 10 mL
<b>New</b> NCS ZC80301D	Chemical oxygen demand (COD) - low level Certified value COD ..... 1164 mg/L	20 mL
<b>New</b> NCS ZC80302D	Chemical oxygen demand (COD) - medium level Certified value COD ..... 2528 mg/L	20 mL
<b>New</b> NCS ZC80303D	Chemical oxygen demand (COD) - high level Certified value COD ..... 5027 mg/L	20 mL

The Quality Control Materials RTC-QCI-039 - RTC-QCI-088 for water analysis are formulated at known sample target concentrations for routine use. The samples are packaged in flame sealed ampoules to ensure stability. The materials can be used as the basis for a range of control materials by altering the final volume to which the concentrate is diluted.

The analytes and concentrations will vary from lot to lot (except "constant value") but will always be certified within the concentration range shown on the next page.

Code	Product	Unit
RTC-QCI-039	<b>Residue - Constant value</b> A set of 2 ampoules of solids for dilution up to 2 litres of residue-free water. Vial 1: Lot 001378 Residue (Total solids) (TS).....491 mg/L Filterable residue (TDS) .....441 mg/L Non-filterable residue (TSS).....57.1 mg/L Vial 2: Lot 018524 Total residue (Total solids) (TS) .....496 mg/L Filterable residue (TDS) .....255 mg/L Non-filterable residue (TSS) .....244 mg/L Residue volatile .....50.1 mg/L	set
RTC-QCI-040	<b>Demand - Constant value</b> A single sample to be diluted up to 1 litre of reagent water. Biochemical Oxygen Demand (BOD).....147 mg/L Carbonous BOD (CBOD) .....126 mg/L Chemical Oxygen Demand (COD) .....226 mg/L Total Organic Carbon (TOC) .....93.1 mg/L	Amp.
<b>New</b> RTC-QCI-301	<b>Demand - WP (Whole Volume)</b> Certified values Biochemical oxygen demand (BOD) ..... 147 ± 5.61 mg/L Carbonaceous BOD (CBOD)..... 126 ± 5.59 mg/L Chemical oxygen demand (COD)..... 227 ± 3.63 mg/L Total organic carbon (TOC)..... 93.2 ± 1.44 mg/L	500 mL
RTC-QCI-041	<b>pH QC Sample - Constant value</b> A single sample for direct measurement of pH. pH .....7.2 units	Amp.
<b>New</b> RTC-QCI-028K	<b>Nutrients</b> Three samples for dilution up to 1 L QCI-028-1 (20 mL concentrate) Ammonia as N .....14.5 mg/L      Nitrate + Nitrite as N ..... 12.4 mg/L Nitrate as N .....12.4 mg/L      Orthophosphate as P ..... 1.53 mg/L QCI-028-2 (2 mL concentrate) Kjeldahl nitrogen, total (TKN) .....11.5 mg/L      Phosphorus, total ..... 3.65 mg/L Nitrogen, total ..... 11.5 mg/L QCI-028-3 (2 mL concentrate) Nitrite as N 0.672 mg/L	set
RTC-QCI-028-1	<b>Nutrients</b> Samples for dilution up to 1 L 20 mL concentrate Ammonia as N .....14.5 mg/L      Nitrate + Nitrite as N ..... 12.4 mg/L Nitrate as N .....12.4 mg/L      Orthophosphate as P ..... 1.53 mg/L	Amp.
RTC-QCI-028-2	<b>Nutrients</b> Sample for dilution up to 1 L 2 mL concentrate Kjeldahl nitrogen, total (TKN) .....11.5 mg/L      Phosphorus, total ..... 3.65 mg/L Nitrogen, total ..... 11.5 mg/L	Amp.
RTC-QCI-028-3	<b>Nutrients</b> Samples for dilution up to 1L 2 mL concentrate Nitrite as N ..... 0.672 mg/L	Amp.
RTC-QCI-042	<b>Nutrients - Constant value</b> A two-sample set for dilution up to 2 litres of reagent water. Ampoule 1: Ammonia-N.....2.05 mg/L Nitrate-N .....1.99 mg/L Nitrite-N.....1.50 mg/L Orthophosphate as P.....0.758 mg/L Ampoule 2: Kjeldahl-Nitrogen (TKN) .....7.41 mg/L Total Nitrogen .....7.49 mg/L Total Phosphorus .....1.77 mg/L	set

## Waters

Code	Product	Unit
<b>New</b> RTC-QCI-303-1	Nutrients - WP (Whole-volume) Certified values Ammonia as N ..... 12.9 ± 0.129 mg/L Nitrate as N ..... 27.8 ± 0.429 mg/L Nitrate+nitrite as N ..... 28.2 ± 0.535 mg/L Nitrite as N ..... 0.411 ± 0.00601 mg/L Orthophosphate as P ..... 3.07 ± 0.0199 mg/L	500 mL
<b>New</b> RTC-QCI-303-2	Complex Nutrients - WP (Whole-volume) Certified values Kjeldahl nitrogen (TKN) ..... 3.56 ± 0.140 mg/L Phosphorus, total ..... 7.73 ± 0.121 mg/L	500 mL
RTC-QCI-032	Total phenolics A single sample for dilution up to 1 L Sample Target Concentration Total phenolics ..... 1.52 mg/L	Amp.
RTC-QCI-043	Phenolics - Constant value A set of 2 ampoules for dilution up to 2 litres of reagent water. 4AAP (colorimetric) methods are recommended for analysis. RTC-QCI-043-1: Total phenolics (by 4AAP Method) ..... 6.62 mg/L Total phenolics are derived from phenol (40%), 2-Chlorophenol (20%), 2,4-Dinitrophenol (20%), and 2,4-Dichlorophenol (20%). RTC-QCI-043-2: Total phenolics (as phenol) ..... 5.0 mg/L	set
RTC-QCI-033	Total residual chlorine A single sample for dilution up to 1 L Sample Target Concentration Total residual chlorine ..... 1.47 mg/L	Amp.
RTC-QCI-044	Residual chlorine - Constant value A single sample for dilution up to 1 litre of reagent water. Total or free residual chlorine ..... 1.66 mg/L	Amp.
RTC-QCI-267	Water -Total residual chlorine (Low level) A single sample for dilution up to 2 litres Certified value Total residual chlorine ..... 0.104 ± 0.00600 mg/L	
RTC-QCI-046	Minerals (set of 2 ampoules) - Constant value A set of 2 ampoules for dilution into 2 litres of reagent water. RTC-QCI-046-1 and RTC-QCI-046-2 are packaged as 20 mL concentrate Conductivity ..... 458 µmhos/cm <sup>3</sup> Corrosivity (ph) ..... 7.25 Hardness ..... 106 mg/L Ca ..... 25.7 mg/L Mg ..... 10.1 mg/L K ..... 8.09 mg/L Na ..... 40.6 mg/L Alkalinity as CaCO <sub>3</sub> ..... 43.0 mg/L Chloride ..... 85.7 mg/L Fluoride ..... 6.03 mg/L Sulfate ..... 24.4 mg/L	set
RTC-QCI-031	Total cyanide A single sample for dilution up to 1 L Total cyanide ..... 0.490 mg/l	Amp.
RTC-QCI-047	Cyanide - Constant value A set of 2 ampoules for dilution up to 2 L of reagent water. Ampoule 1: Cyanide (from Potassium Ferricyanide) ..... 0.626 mg/L Ampoule 2: Cyanide (from Potassium Cyanide) ..... 0.482 mg/L	set
RTC-QCI-048	Turbidity - Constant value A single sample for dilution up to 2 L of turbidity-free reagent water. Turbidity ..... 9.06 NTU	Amp.

Code	Product	Unit
RTC-QCI-034K	Trace metals kit RTC-QCI-034-2 Lot 016766 Sb .....392 µg/kg      Ag..... 393 µg/kg Ba .....1440 µg/kg      Sr ..... 165 µg/kg B .....1900 µg/kg      Tl..... 168 µg/kg Mo.....255 µg/kg RTC-QCI-034-5 Lot 016205 Sn .....1260 µg/kg      Tl..... 126 µg/kg	
RTC-QCI-049	Trace metal-AA (set of 3 ampoules) - Constant value A set of 3 ampoules for dilution up to 1 L of reagent water. Ampoule 1: Ampoule Concentration      Ampoule Concentration      Ampoule Concentration Ag ..... 19.2 µg/L      Cd.....41 µg/L      Hg ..... 40.8 µg/L As ..... 30.2 µg/L      Cr .....71.5 µg/L      Pb ..... 51.2 µg/L Ba ..... 109 µg/L      Cu.....61.6 µg/L      Se ..... 28.9 µg/L Ampoule 2: Ampoule Concentration      Ampoule Concentration      Ampoule Concentration Al..... 107 µg/L      Mn .....30.4 µg/L      Tl..... 41.9 µg/L Be ..... 40.9 µg/L      Mo .....61.9 µg/L      V ..... 71.1 µg/L Co ..... 30.8 µg/L      Ni.....93.5 µg/L Fe.....84.9 µg/L      Sb.....117 µg/L Ampoule 3 (21 mL): Ampoule Concentration      Ampoule Concentration      Ampoule Concentration Ba ..... 2030 µg/L      K.....1030 µg/L      Zn..... 844 µg/L Ca ..... 2080 µg/L      Mg .....617 µg/L Fe..... 775 µg/L      Na.....1010 µg/L	set
RTC-QCI-050	Trace metal-ICP (set of 2 ampoules) - Constant value A set of 2 ampoules for dilution, the values listed are ampoule concentration. Ampoule 1: Ampoule Concentration      Ampoule Concentration      Ampoule Concentration As..... 61.3 µg/L      Fe .....30.7 µg/L      Sb ..... 30.7 µg/L Be ..... 71.6 µg/L      Pb .....71.5 µg/L      Se ..... 122 µg/L Ca ..... 112 µg/L      Li .....61.6 µg/L      Sr ..... 143 µg/L Cd ..... 102 µg/L      Mg .....91.9 µg/L      Tl..... 133 µg/L Cr ..... 40.9 µg/L      Mn .....40.9 µg/L      Ti..... 72.1 µg/L Co ..... 61.1 µg/L      Mo .....91.9 µg/L      V ..... 91.7 µg/L Cu ..... 71.2 µg/L      Ni.....71.2 µg/L      Zn..... 30.6 µg/L Ampoule 2 (21 mL): Ampoule Concentration      Ampoule Concentration      Ampoule Concentration Ag ..... 250 µg/L      B.....816 µg/L      Si..... 3000 µg/L Al..... 550 µg/L      K.....3700 µg/L Ba ..... 664 µg/L      Na.....750 µg/L	set
RTC-QCI-051	Anions QC sample A single sample for dilution up to 2 L of reagent water. Sample Target Concentration      Sample Target Concentration Bromide .....1 – 10 mg/L      Nitrite as Nitrogen ..... 0.4 – 4 mg/L Chloride .....25 – 275 mg/L      Orthophosphate Phosphorous ..... 0.5 – 5.5 mg/L Fluoride .....0.3 – 4 mg/L      Sulfate..... 5 – 125 mg/L Nitrate as Nitrogen.....0.25 – 40 mg/L	Amp.
RTC-QCI-052	Corrosivity/Sodium (set of 2 ampoules) - Constant value A set of 2 ampoules for dilution up to 2 L of reagent water. pH .....9.12      Alkalinity as CaCO <sub>3</sub> ..... 63 mg/L Filterable residues (TDS).....578 mg/L      Na ..... 25 mg/L Ca .....99.9 mg/L	set
<b>New</b> RTC-QCI-244	Waters - Anionic surfactant (MBAS)-WP Sample for dilution in 1 litre Certified values Surfactants – MBAS .....0.414 ± 0.0313 mg/L      Total organic carbon (TOC)..... 1.45 ± 0.157 mg/L	vial
RTC-QCI-088	Nonionic surfactants in water Certified value Surfactant – Nonionic .....0.700 ± 0.0107 mg/L	20 mL