

Overview of measurement uncertainties for soil

The specified measurement uncertainties were in accordance with DIN ISO 11352 (2013-03) determined and correspond to the combined, relative expanded measurement uncertainties ($k=2$, $P=95\%$).

Section 1.2

| Parameter | Measuring principle | Norm | Measurement uncertainties |
|---------------|---------------------|----------------------------------------------------|---------------------------|
| Dry substance | Gravimetry | DIN ISO 11465 (1996-12), DIN EN 14346 (2007-03) | 5 % |
| pH-value | Electrode | DIN ISO 10390 (2005-12) | 0,2 pH-units |
| Antimony | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 30 % |
| Antimony | ICP-OES | DIN ISO 22036 (2009-06) | 30 % |
| Arsenic | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 20 % |
| Arsenic | ICP-OES | DIN ISO 22036 (2009-06) | 20 % |
| Lead | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 25 % |
| Lead | ICP-OES | DIN ISO 22036 (2009-06) | 25 % |
| Cadmium | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 25 % |
| Cadmium | ICP-OES | DIN ISO 22036 (2009-06) | 25 % |
| Chromium | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 30 % |
| Chromium | ICP-OES | DIN ISO 22036 (2009-06) | 30 % |
| Copper | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 25 % |
| Copper | ICP-OES | DIN ISO 22036 (2009-06) | 25 % |
| Molybdenum | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 45 % |
| Molybdenum | ICP-OES | DIN ISO 22036 (2009-06) | 45 % |
| Nickel | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 30 % |
| Nickel | ICP-OES | DIN ISO 22036 (2009-06) | 30 % |
| Thallium | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 45 % |
| Thallium | ICP-OES | DIN ISO 22036 (2009-06) | 50 % |
| Selenium | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 30 % |
| Selenium | ICP-OES | DIN ISO 22036 (2009-06) | 30 % |
| Uranium | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 25 % |
| Vanadium | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 25 % |
| Vanadium | ICP-OES | DIN ISO 22036 (2009-06) | 25 % |
| Zinc | ICP-MS | DIN EN ISO 17294-2 (2005-02) | 25 % |
| Zinc | ICP-OES | DIN ISO 22036 (2009-06) | 25 % |
| Mercury | AAS | DIN EN 1483 (2007-07), DIN ISO 16772 (2005-06) | 25 % |
| Cyanide | Photometry | DIN ISO 11262 (2012-04) | 35 % |
| Cyanide | CFA | DIN ISO 17380 (2013-10) | 35 % |

Section 1.3

| Parameter | Measuring principle | Norm | Measurement uncertainties |
|-----------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------|---------------------------|
| Total organic carbon (TOC) | IR-Spektrometry | DIN ISO 10694 (1996-08), DIN EN 13137 (2001-12), DIN EN 15936 (2012-11) | 10 % |
| Polycyclic aromatic hydrocarbons (PAH), per parameter | HPLC | DIN ISO 13877 (2000-01) | 45 % |
| Polycyclic aromatic hydrocarbons (PAH), per parameter | HPLC | DIN 38414-23 (2002-02) | 45 % |
| Polycyclic aromatic hydrocarbons (PAH), per parameter | GC-MS | DIN ISO 18287 (2006-05) | 45 % |
| Hexachlorobenzene | GC-MS | DIN ISO 10382 (2003-05) | 35 % |
| Pentachlorophenol | GC-MS | DIN ISO 14154 (2005-12) | 30 % |
| Aldrin, DDT, HCH-mixture | GC-MS | DIN ISO 10382 (2003-05) | 40 % |
| Polychlorinated biphenyls (PCB), per parameter | GC-MS | DIN ISO 10382 (2003-05), DIN EN 15308 (2008-05), DIN 38414-20 (1996-01) | 45 % |
| Explosive, per Parameter | HPLC | DIN ISO 11916-1 (2014-11) | 20 % |
| Mineral oil hydrocarbons | GC-FID | DIN ISO 16703 (2011-09), LAGA KW/04 (2009-12) | 30 % |
| Volatile aromatic hydrocarbons (BTEX), per parameter | GC-MS | DIN ISO 22155 (2016-07) | 40 % |
| Volatile aromatic halogenated hydrocarbons (CHC), per parameter | GC-MS | DIN ISO 22155 (2016-07) | 50 % |

Section 1.4

| Parameter | Measuring principle | Norm | Measurement uncertainties |
|-------------------------------------------------------------------------------|---------------------|------------------------|---------------------------|
| Polychlorinated dibenzodioxins (PCDD) / Polychlorinated dibenzofuranes (PCDF) | GC-HRMS | DIN 38414-24 (2000-10) | 45 % |