

# Deutsche Akkreditierungsstelle GmbH

## Annex to the Accreditation Certificate D-RM-11075-01-00 according to DIN EN ISO 17034:2017

**Valid from:** 04.12.2020

**Date of issue:** 16.12.2020

Holder of certificate:

**Bundesanstalt für Materialforschung und -prüfung (BAM)  
Reference Material Producer**

at the sites

**Unter den Eichen 87, 12205 Berlin  
Richard-Willstätter-Straße 11, 12489 Berlin  
Germany**

Reference material production in the fields:

**certified reference materials in the form of non-ferrous metals and alloys, ceramics and glass, soils and sediments, food, products and product components made of plastics, elastomers and textiles, ethanol/water solutions, aqueous solutions of stable isotopes, lubricants and fuels as well as porous materials**

**The reference material producer maintains an up-to-date list of certified reference materials in the accredited area**

*The management system requirements in DIN EN ISO 17034 are written in language relevant to operations of reference material producer and operate generally in accordance with the principles of DIN EN ISO 9001.*

*The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.  
<https://www.dakks.de/en/content/accredited-bodies-dakks>*

**Annex to the accreditation certificate D-RM-11075-01-00**

| Product                         | Characteristic                                       | Range                    | Characterization strategy/ methods                                                                                                     |
|---------------------------------|------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Non-ferrous metals and alloys * | Element contents                                     | 0,1 mg/kg – 997 g/kg     | b and c) /<br>FAAS, ET AAS,<br>HG AAS, CV AAS, ICP-<br>OES, ICP-MS, IDMS,<br>GDMS, XRF,<br>spectrophotometry,<br>gravimetry, titration |
| Ceramics and glass              | Element contents                                     | 0,05 mg/kg –<br>800 g/kg | b und c) /<br>FAAS, ET AAS,<br>ICP-MS, ICP-OES,<br>XRF, gravimetry,<br>coulometry,<br>Comb.-IR, TGHE,<br>titration                     |
| Soils and sediments             | Environmentally relevant element contents            | (1 – 1000) mg/kg         | b und c) /<br>CV AAS, CV AFS, ET<br>AAS, FAAS,<br>HG AAS, ICP-MS, ICP-<br>OES                                                          |
|                                 | Total cyanide contents                               | (1 – 100) mg/kg          | b und c) /<br>DIN ISO 11262                                                                                                            |
|                                 | PAH contents*                                        | (0,1 – 200) mg/kg        | b und c) /<br>GC-MS,<br>HPLC-DAD/FLD                                                                                                   |
|                                 | PCB contents *                                       | (0.2 – 5) mg/kg          | b und c) /<br>DIN EN 16167                                                                                                             |
|                                 | MKW- contents (sum parameter according to ISO 16703) | (900 – 9000) mg/kg       | b und c) /<br>GC-FID                                                                                                                   |
| Food *                          | Contents of organic contaminants and                 | (0,5 – 1000) µg/kg       | b und c) /                                                                                                                             |

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|---------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------|
|                                                                                                         | residues                                      |                                                                   | HPLC-MS/MS, HPLC-FLD, HPLC-UV                   |
| Products and product components made of plastics, elastomers and textiles                               | Contents of organic pollutants                | (0,1 – 100) mg/kg                                                 | b und c) / HPLC-MS/MS; GC-MS(/MS)               |
| Ethanol/water solutions *                                                                               | Ethanol contents                              | (0,0 - 3,5) g/l                                                   | e) / Gravimetry, GC-FID, Karl-Fischer-titration |
| Aqueous solutions of stable isotopes *                                                                  | Amount of substance ratios of stable isotopes | (0,2 - 0,99) mol/mol                                              | a, b und c) / Gravimetry, TIMS, MC-ICP-MS       |
| Lubricants and fuels                                                                                    | Mass ratios and mass fractions                | (0.01 – 1) g/g                                                    | e) / GC-FID, gravimetry                         |
| Porous materials *<br>(e.g. oxides, glass, ceramics, zeolithe, carbon, metals, metal organic compounds) | BET specific surfaces                         | (0,01 – 3000) m <sup>2</sup> /g                                   | c) / Gas adsorption                             |
|                                                                                                         | Specific pore volumes                         | (0,1 – 2,0) cm <sup>3</sup> /g<br>(100 – 3000) mm <sup>3</sup> /g | c) / Gas adsorption<br>Hg intrusion             |
|                                                                                                         | Pore diameters                                | (0,1 - 100) nm<br>(5 – 100 000) nm                                | c) / Gas adsorption<br>Hg intrusion             |

\* entries present in CMC database

a) using a single reference measurement procedure (as defined in ISO/IEC Guide 99) in a single laboratory according to ISO 17034 paragraph 7.12.3 Note 1a)

b) characterization of a non-operationally defined measurand using two or more methods of demonstrable accuracy in one or more competent laboratories according to ISO 17034 paragraph 7.12.3 Note 1b)

c) characterization of an operationally-defined measurand using a network of competent laboratories according to ISO 17034 paragraph 7.12.3 Note 1c)

e) characterization based on mass or volume of ingredients used in the preparation of the RM according to ISO 17034 paragraph 7.12.3 Note 1e)

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**Abbreviations used:**

|         |                                                                       |
|---------|-----------------------------------------------------------------------|
| BET     | Surface determination (according to Brunauer, Emmett and Teller)      |
| CMC     | Calibration and measurement capability (entry in annex C of CIPM-MRA) |
| CV AAS  | Cold vapour atomic absorption spectrometry                            |
| CV AFS  | Cold vapour atomic fluorescence spectrometry                          |
| DAD     | Diode array detector                                                  |
| DIN     | Deutsches Institut für Normung e.V.                                   |
| EPA     | Environmental Protection Agency                                       |
| ET AAS  | Electrothermal atomic absorption spectrometry                         |
| FAAS    | Flame atomic absorption spectrometry                                  |
| FID     | Flame ionization detector                                             |
| FLD     | Fluorescence detector                                                 |
| GC      | Gas chromatography                                                    |
| GDMS    | Glow discharge mass spectrometry                                      |
| HG AAS  | Hydride generation atomic absorption spectrometry                     |
| HPLC    | High pressure liquid chromatography                                   |
| ICP-OES | Optical emission spectrometry with inductively coupled plasma         |
| ICP-MS  | Mass spectrometry with inductively coupled plasma                     |
| IDMS    | Isotope dilution mass spectrometry                                    |
| IR      | Infrared                                                              |
| ISO     | International Standardisation Organisation                            |
| MC      | Multicup                                                              |
| PAH     | Polycyclic aromatic hydrocarbons                                      |
| PCB     | Polychlorinated biphenyls                                             |
| PCP     | Pentachlorophenol                                                     |
| TGHE    | Carrier gas hot extraction                                            |
| TIMS    | Thermal ions mass spectrometry                                        |
| UV      | Ultraviolet                                                           |
| XRF     | X-Ray fluorescence spectrometry                                       |