

ERM[®] catalogue

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www.erm-crm.org

European Commission

Directorate-General Joint Research Centre
Institute for Reference Materials and Measurements

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Introduction to ERM[®]

Introducing a new brand of certified reference materials

Three major European producers have combined forces to introduce a new brand of certified reference materials to ensure reliability and comparability of the results of measurements.

ERM[®] are certified reference materials, which undergo uncompromising peer evaluation and offer highest quality and reliability.

They are a major tool for improving the confidence in, and the mutual recognition of test results and certificates in a global market. ERM[®] branded materials comply with modern metrological requirements, thus ensuring traceability of measurement results.

What is the ERM[®] concept?

The ERM[®] concept is a joint collaboration of three European reference materials producers who guarantee to:

- Use the most advanced principles currently available described in ISO Guides 34 and 35 for the production of certified reference materials (CRMs)
- Demonstrate rigorous homogeneity and stability for all materials and guarantee the certified value for every single unit over the complete shelf life of the materials
- Be transparent in their approaches to the production of certified reference materials.

Who are the partners?

Present partners of the ERM[®] concept are three major European reference materials producers:

- Joint Research Centre, Institute for Reference Materials and Measurements (JRC-IRMM) of the European Commission's Directorate General Joint Research Centre, Belgium
<http://irmm.jrc.ec.europa.eu>
- Bundesanstalt für Materialforschung und -prüfung (BAM), Germany
www.bam.de
- LGC Standards, United Kingdom
www.lgcstandards.com

What are the key benefits of the ERM[®] concept for CRM users?

- Uncompromising peer-review of CRMs by the ERM[®] Technical Committee ensures highest quality and reliability
- Full transparency of the certification principles and the evaluation report provides valuable insight to help analysts get the maximum benefit from the use of the material
- Clearly defined and stated traceability of the certified values ensures applicability of the materials to the respective analytical problem
- Internationally recognised values underpinned through the participation of the producing institutes in key comparisons organised by the Bureau International des Poids et Mesures.

How to find out more about ERM[®]

Please visit www.erm-crm.org

ERM[®] coding convention

ERM[®] materials are organised into six different categories (groups) that in turn contain several subcategories. Each group has been assigned a letter and a second letter defines each subgroup in the main groups. The following table summarises the different ERM[®] groups and subgroups:

General Category	Letter	Subcategory	Letter	ERM [®] code
Non-matrix materials certified for purity and concentration, activity	A	Solid or liquid inorganic compounds and elements (pure and solutions)	A	AAXXX
		Gases (pure and mixtures)	B	ABXXX
		Solid or liquid small organic molecules (pure and solutions)	C	ACXXX
		Organic macromolecules	D	ADXXX
		Isotopically labeled materials	E	AEXXX
		Others	Z	AZXXX
Food/Agriculture and related matrix materials certified for composition	B	Potable water and beverages	A	BAXXX
		Animal matter	B	BBXXX
		Plant/vegetation matter	C	BCXXX
		Processed food and foodstuffs not covered above	D	BDXXX
		Animal feeding stuffs	E	BEXXX
		GM materials	F	BFXXX
		Others	Z	BZXXX
Environmental and related matrix materials certified for composition	C	Waters (river, sea, ground)	A	CAXXX
		Waste, effluents and leachates	B	CBXXX
		Soils, sediments, sludges	C	CCXXX
		Plant/vegetation matter	D	CDXXX
		Animal bioindicator matter	E	CEXXX
		Fly ash, fuel ash, incinerator ash	F	CFXXX
		Others	Z	CZXXX
Health-related matrix materials certified for composition	D	Human body fluids: serum, urine, etc	A	DAXXX
		Human tissue: hair, bone, teeth, etc	B	DBXXX
		Medicinal plants certified for composition	C	DCXXX
		Others	Z	DZXXX
Industrial and engineering materials certified for composition	E	Ferrous alloys	A	EAXXX
		Non-ferrous alloys	B	EBXXX
		Polymers, plastics	C	ECXXX
		Glasses, ceramics	D	EDXXX
		Minerals, ores, rocks, clays	E	EEXXX
		Fuels, coal, diesel	F	EFXXX
		Semiconductors	G	EGXXX
		Others	Z	EZXXX
Materials certified for physical properties	F	Mechanical properties (e.g. hardness, impact toughness, viscosity)	A	FAXXX
		Optical properties (e.g. wavelength and absorbance materials)	B	FBXXX
		Thermal properties (e.g. thermal conductivity, calorific value)	C	FCXXX
		Morphological properties (e.g. particle size, surface area)	D	FDXXX
		Others	Z	FZXXX

How to order

To order materials or for further information please contact the relevant organisation below.

ERM® produced by BAM

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Materials listed by group

Environmental and related matrix materials certified for composition

Animal bioindicator matter

ERM-CE195 available from IRMM

Matrix Bovine blood

Form: Powder **unit size:** 5,75 mL when reconstituted

Lyophilised blood for validating Pb and Cd determinations in blood.

Pb	416	± 9	µg/L
Cd	5,06	± 0,15	µg/L

ERM-CE196 available from IRMM

Matrix Bovine blood

Form: Powder **unit size:** 5,75 mL when reconstituted

Lyophilised blood for validating Pb and Cd determinations in blood.

Cd	12,33	± 0,20	µg/L
Pb	772	± 11	µg/L

ERM-CE278k available from IRMM

Matrix Mussel tissue

Form: Lyophilised powder **unit size:** 8 g

Material for method performance control and validation

Ag	0,044	± 0,016	mg/kg
Hg	0,071	± 0,007	mg/kg
Cd	0,336	± 0,025	mg/kg
Ni	0,69	± 0,15	mg/kg
Cr	0,73	± 0,22	mg/kg
Se	1,62	± 0,12	mg/kg
Fe	161	± 8	mg/kg
Sr	19,0	± 1,2	mg/kg
Pd	2,18	± 0,18	mg/kg
Rb	2,46	± 0,16	mg/kg
Mn	4,88	± 0,24	mg/kg
Cu	5,98	± 0,27	mg/kg
As	6,7	± 0,4	mg/kg
Zn	71	± 4	mg/kg

ERM-CE464 available from IRMM

Matrix Tuna fish

Form: Powder **unit size:** 15 g

Material for method performance control and validation

Hg, total	5,24	± 0,10	mg/kg
Methylmercury	5,50	± 0,17	mg/kg

Animal bioindicator matter

ERM-CE477 available from IRMM

Matrix Mussel tissue

Form: Powder **unit size:** 14 g

Material for method performance control and validation

Monobutyltin	1,50	± 0,28	mg/kg
Dibutyltin	1,54	± 0,12	mg/kg
Tributyltin	2,20	± 0,19	mg/kg

Others

ERM-CZ100 available from IRMM

Matrix Fine dust

Form: Powder **unit size:** 500 mg

PM10 like fine dust for quality control, method validation and demonstration of proficiency.

Dibenzo[a,h]anthracene	0,18	± 0,04	mg/kg
Benzo[k]fluoranthene	0,67	± 0,06	mg/kg
Benzo[a]pyrene	0,72	± 0,05	mg/kg
Benzo[j]fluoranthene	0,75	± 0,14	mg/kg
Benzo[a]anthracene	0,91	± 0,07	mg/kg
Indeno[1,2,3-c,d]pyrene	1,07	± 0,10	mg/kg
Benzo[b]fluoranthene	1,42	± 0,14	mg/kg
Sum of benzo[b]fluoranthene, benzo[k]fluoranthene and benzo[j]fluoranthene	2,84	± 0,21	mg/kg

ERM-CZ120 available from IRMM

Matrix Fine dust

Form: Powder **unit size:** 500 mg

PM10 like fine dust for quality control, method validation and demonstration of proficiency.

Cd	0,90	± 0,22	mg/kg
Pb	113	± 17	mg/kg
Ni	58	± 7	mg/kg
As	7,1	± 0,7	mg/kg

Environmental and related matrix materials certified for composition

Plant/vegetation matter

ERM-CD100 available from BAM

Matrix Wood

Form: Wood shavings, < 1 **unit size:** 74 g

Heavy metals and Pentachlorophenol in wood

Hg/mass fraction	0,60	± 0,14	mg/kg
Cu/mass fraction	22,9	± 1,7	mg/kg
Cd/mass fraction	3,02	± 0,24	mg/kg
As/mass fraction	3,1	± 0,5	mg/kg
Cr/mass fraction	36,4	± 2,6	mg/kg
Pb/mass fraction	39	± 4	mg/kg
Pentachlorophenol/mass fraction	7,9	± 0,6	mg/kg

ERM-CD200 available from IRMM

Matrix Bladderwrack

Form: Powder **unit size:** 5 g

This material is intended for quality control and assessment of method performance. As any reference material, it can also be used for control charts or validation studies.

Hg	0.0186	± 0.0016	mg/kg
Se	0.088	± 0.010	mg/kg
Pb	0.51	± 0.06	mg/kg
Cd	0.95	± 0.06	mg/kg
Cu	1.71	± 0.18	mg/kg
Zn	25.3	± 1.7	mg/kg
As	55	± 4	mg/kg

ERM-CD281 available from IRMM

Matrix Rye grass

Form: Dry powder **unit size:** 10 g

Certified reference material for analysis of elements in grass and similar plant materials.

Hg	0,0164	± 0,0022	mg/kg
Se	0,023	± 0,004	mg/kg
As	0,042	± 0,01	mg/kg
Sb	0,042	± 0,007	mg/kg
Sn	0,062	± 0,011	mg/kg
Cd	0,12	± 0,007	mg/kg
Pb	1,67	± 0,11	mg/kg
Cu	10,2	± 0,5	mg/kg
Ni	15,2	± 0,6	mg/kg
Mo	2,22	± 0,12	mg/kg
Cr	24,8	± 1,3	mg/kg
Zn	30,5	± 1,1	mg/kg
B	5,5	± 0,5	mg/kg
Mn	82	± 4	mg/kg

Soils, sediments, sludges

ERM-CC007a available from BAM

Matrix Soil

Form: Powder **unit size:** 103 g

Intended to assure the correct implementation of the own analytical method or of the analytical method according to E DIN ISO 10382 or to verify the performance of method modifications. Sieving fraction < 250 µ of an industrially contaminated soil substrate.

delta-HCH	16,5 (ind.)	± 2,5	µg/kg
o,p'-DDD	18 (ind.)	± 4	µg/kg
β-HCH	1570	± 210	µg/kg
gamma-HCH	21,4	± 2,6	µg/kg
alpha-HCH	219	± 23	µg/kg
o,p'-DDT	340	± 50	µg/kg
p,p'-DDE	380	± 60	µg/kg
p,p'-DDT	960	± 140	µg/kg

ERM-CC008 available from BAM

Matrix Soil

Form: Powder **unit size:** 30 g

Pentachlorophenol in soil

PCP	2,04	± 0,18	mg/kg
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ERM-CC009 available from BAM

Matrix Soil

Form: Powder **unit size:** 30 g

Intended for research, validation of analytical procedures for the determination of Pentachlorophenol (PCP) in soil according to E DIN ISO 14154 by GC-ECD or alternative methods and for quality assurance in analytical laboratories.

Pentachlorophenol	2,91	± 0,23	mg/kg
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ERM-CC010 available from BAM

Matrix Soil

Form: Powder **unit size:** 5,7 g

absorbed organically bound halogens

AOX	1349	± 59	mg/kg
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ERM-CC011 available from BAM

Matrix Soil

Form: Powder **unit size:** 4,2 g

absorbed organically bound halogens

AOX	80,4	± 6,9	mg/kg
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ERM-CC012 available from BAM

Matrix Soil

Form: Powder **unit size:** 6,5 g

absorbed organically bound halogens

AOX	102,3	± 7,8	mg/kg
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Environmental and related matrix materials certified for composition

Soils, sediments, sludges

ERM-CC013a available from BAM

Matrix Soil

Form: Powder **unit size:** 81 g

Intended for validation of analytical procedures for the determination of polycyclic aromatic hydrocarbons (PAH) in soil according to ISO 13877 by HPLC and alternative procedures using GC-MS, and quality assurance in analytical laboratories.

Fluorene	1.14	± 0,11	mg/kg
Anthracene	1.41	± 0,22	mg/kg
Phenanthrene	12.0	± 0,6	mg/kg
Fluoranthene	12.9	± 0,7	mg/kg
Naphthalene	2.4	± 0,5	mg/kg
Benzo[k]fluoranthene	3.4	± 0,4	mg/kg
Benzo[g,h,i]perylene	4.6	± 0,5	mg/kg
Benzo[a]pyrene	4.9	± 0,7	mg/kg
Indeno[1,2,3-cd]pyrene	5.2	± 1,0	mg/kg
Chrysene	5.3	± 0,8	mg/kg
Benzo[a]anthracene	5.6	± 0,5	mg/kg
Benzo[b]fluoranthene	7.1	± 1,0	mg/kg
Pyrene	9.6	± 0,3	mg/kg

ERM-CC016 available from BAM

Matrix Waste

Form: Powder **unit size:** 83 g

Dried, homogenised and sieved waste mixture consisting of different real-world contaminated constituents. Certified for the mineral oil hydrocarbon content according to EN 14039 and ISO 16709 by means of gas chromatography GC-FID.

Total petrol hydrocarbons (TPH)	3010	± 220	mg/kg
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ERM-CC017 available from BAM

Matrix Soil

Form: Air dried soil materia **unit size:** 81 g

sieving fraction < 125 µ of an industrially contaminated soil substrate.

Total petrol hydrocarbons (TPH)	6,6	± 0,5	kg/g
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Soils, sediments, sludges

ERM-CC018 available from BAM

Matrix Soil

Form: Powder, < 63 µm **unit size:** 55 g

Contaminated sandy soil.

Hg, aqua regia extractable	1,38	± 0,06	mg/kg
Cr, aqua regia extractable	129	± 6	mg/kg
V, aqua regia extractable	19,4	± 1,0	mg/kg
As, aqua regia extractable	22,9	± 1,3	mg/kg
Ni, aqua regia extractable	25,8	± 1,8	mg/kg
Pb, aqua regia extractable	289	± 1,0	mg/kg
Zn, aqua regia extractable	313	± 13	mg/kg
Cd, aqua regia extractable	5,4	± 0,5	mg/kg
Co, aqua regia extractable	5,9	± 0,4	mg/kg
Cu, aqua regia extractable	80	± 4	mg/kg

ERM-CC020 available from BAM

Matrix Contaminated river sediment

Form: Powder, < 63 µm **unit size:** 52 g

Contaminated river sediment.

Ni, aqua regia extractable	158	± 6	mg/kg
Cd, aqua regia extractable	20,8	± 0,5	mg/kg
Zn, aqua regia extractable	2030	± 40	mg/kg
Pb, aqua regia extractable	255	± 11	mg/kg
Hg, aqua regia extractable	27,4	± 0,6	mg/kg
Cr, aqua regia extractable	290	± 8	mg/kg
Co, aqua regia extractable	32,8	± 1,5	mg/kg
V, aqua regia extractable	53	± 4	mg/kg
As, aqua regia extractable	56,6	± 2,6	mg/kg
Cu, aqua regia extractable	560	± 11	mg/kg

Environmental and related matrix materials certified for composition

Soils, sediments, sludges

ERM-CC135 available from LGC

Matrix Contaminated soil

Form: Powder **unit size:** 50 g

A naturally contaminated soil from a UK brickworks site.

Be - extractable	1,4 (ind.)	± 0,4	mg/kg
Cu - total	107 (ind.)	± 5	mg/kg
V - total	139 1520	± 18	mg/kg
K - total	16300 (ind.)	± 2600	mg/kg
Na - total	1700 (ind.)	± 270	mg/kg
Hg - total	2,9 (ind.)	± 0,6	mg/kg
Co - extractable	20 (ind.)	± 4	mg/kg
Ca - extractable	21900 (ind.)	± 520	mg/kg
Al - extractable	22700 (ind.)	± 4600	mg/kg
Ca - total	23400 (ind.)	± 2900	mg/kg
Ni - total	291 (ind.)	± 22	mg/kg
Ba - total	305 (ind.)	± 37	mg/kg
Zn total	345 (ind.)	± 45	mg/kg
Na - extractable	362 (ind.)	± 44	mg/kg
Mn - total	390 (ind.)	± 40	mg/kg
Pb - extractable	391 (ind.)	± 16	mg/kg
Fe - extractable	40900 (ind.)	± 2700	mg/kg
Pb - total	411 (ind.)	± 26	mg/kg
Cr - total	455 (ind.)	± 59	mg/kg
Fe - total	47500 (ind.)	± 4600	mg/kg
K - extractable	5100 (ind.)	± 920	mg/kg
Mg - extractable	7000 (ind.)	± 580	mg/kg
V - extractable	78 (ind.)	± 11	mg/kg
Mg - total	9400 (ind.)	± 1200	mg/kg
Se - extractable	0,9	± 0,3	mg/kg
Cu - extractable	105	± 5	mg/kg
Ba - extractable	134	± 10	mg/kg
Ni - extractable	277	± 13	mg/kg
Hg - extractable	3,2	± 0,4	mg/kg
Zn - extractable	316	± 41	mg/kg
Cr - extractable	336	± 28	mg/kg
Mn - extractable	348	± 18	mg/kg

Soils, sediments, sludges

ERM-CC136 available from LGC

Matrix Sewage sludge

Form: Powder **unit size:** 25 g

This material is an aged sewage sludge obtained from a disused sewage works site at Heathrow, London, UK

Al - extractable	15100 (ind.)	± 5400	mg/kg
K - extractable	2030 (ind.)	± 844	mg/kg
Co - extractable	23,2 (ind.)	± 3,6	mg/kg
Mg - extractable	2820 (ind.)	± 540	mg/kg
Na - extractable	397 (ind.)	± 64	mg/kg
Ba - extractable	633 (ind.)	± 195	mg/kg
Zn - extractable	890 (ind.)	± 140	mg/kg
Ni - extractable	130	± 10	mg/kg
Fe - extractable	22200	± 780	mg/kg
Pb - extractable	341	± 18	mg/kg
Cr - extractable	399	± 32	mg/kg
Cu - extractable	464	± 21	mg/kg
Mn - extractable	544	± 32	mg/kg

ERM-CC141 available from IRMM

Matrix Loam soil

Form: Powder **unit size:** 24 g

Loam soil for demonstrating method performance and method validation.

Cd, aqua regia soluble	0,25	± 0,04	mg/kg
Cd, total	0,35	± 0,05	mg/kg
Hg, aqua regia soluble	0.08	± 0.008	mg/kg
Hg, total	0.083	± 0.017	mg/kg
Cu, aqua regia soluble	12,4	± 0,9	mg/kg
Cu, total	14,6	± 1,4	mg/kg
Ni, aqua regia soluble	21,9	± 1,6	mg/kg
Ni, total	26,4	± 2,4	mg/kg
Cr, aqua regia soluble	31	± 4	mg/kg
Pb, aqua regia soluble	32,2	± 1,4	mg/kg
Mn, aqua regia soluble	387	± 17	mg/kg
Pb, total	41	± 4	mg/kg
Mn, total	464	± 18	mg/kg
Zn, aqua regia soluble	50	± 4	mg/kg
Zn, total	57	± 4	mg/kg
As, aqua regia soluble	7,5	± 1,4	mg/kg
Co, aqua regia soluble	7,9	± 0,9	mg/kg
Co, total	8,5	± 0,5	mg/kg
Cr, total	86	± 8	mg/kg
As, total	9,9	± 1,5	mg/kg

Environmental and related matrix materials certified for composition

Soils, sediments, sludges

ERM-CC580	available from IRMM		
Matrix	Estuarine sediment		
Form:	Powder	unit size:	40 g
Material for method performance control and validation			
Methylmercury	0,0755	± 0,003 7	mg/kg
Hg, total	132	± 3	mg/kg

ERM-CC690	available from IRMM		
Matrix	Calcareous soil		
Form:	Powder	unit size:	70 g
Material for method performance control and validation			
Tm	0,232	± 0,026	mg/kg
Tb	0,50	± 0,063	mg/kg
Yb	1,57	± 0,19	mg/kg
U	1,90	± 0,23	mg/kg
Nd	19,1	± 2,2	mg/kg
Dy	2,90	± 0,28	mg/kg
La	24,4	± 1,7	mg/kg
Gd	3,2	± 0,33	mg/kg
Sm	3,50	± 0,37	mg/kg
Ce	49,1	± 2,5	mg/kg
Th	7,6	± 0,73	mg/kg
Sc	7,9	± 0,83	mg/kg

Solid or liquid inorganic compounds and elements (pure and solutions)

ERM-CA015a	available from LGC		
Matrix	Hard drinking water UK - Anions		
Form:	Liquid	unit size:	250 mL
Ammonium content (as NH ₄)			
Ammonium (as (NH ₄))	0.44		mg/L
Fluoride	1.3	± 0.1	mg/L
Chloride	247	± 8	mg/L
Sulfate (as SO ₄)	247	± 7	mg/L
Nitrate (as NO ₃)	45	± 3	mg/L

ERM-CA016a	available from LGC		
Matrix	Soft drinking water UK - Anions		
Form:	Liquid	unit size:	250 mL
Ammonium content (as NH ₄)			
Ammonium (as (NH ₄))	0.48		mg/L
Fluoride	1.5	± 0.1	mg/L
Chloride	250	± 7	mg/L
Sulfate (as SO ₄)	254	± 10	mg/L
Nitrate (as NO ₃)	48	± 3	mg/L

Waters (river, sea, ground)

ERM-CA011b	available from LGC		
Matrix	Hard drinking water		
Form:	Liquid	unit size:	250 mL
Certified reference material for analysis of elements in hard drinking water.			
Arsenic	10,15	± 0,34	µg/L
Barium	115,2	± 3,7	µg/L
Magnesium	14,78	± 0,48	µg/L
Iron	186	± 11	µg/L
Nickel	19,27	± 0,68	µg/L
Copper	1936	± 75	µg/L
Aluminium	209	± 11	µg/L
Sodium	22,77	± 0,78	µg/L
Lead	24,51	± 0,52	µg/L
Vanadium	4,75	± 0,34	µg/L
Cobalt	4,82	± 0,28	µg/L
Cadmium	4,88	± 0,19	µg/L
Strontium	471	± 21	µg/L
Chromium	48,2	± 1,6	µg/L
Manganese	48,3	± 1,6	µg/L
Beryllium	5,01	± 0,41	µg/L
Antimony	5,11	± 0,23	µg/L
Potassium	5,11	± 0,16	µg/L
Molybdenum	5,45	± 0,33	µg/L
Zinc	597	± 19	µg/L
Calcium	73,6	± 2,7	µg/L
Selenium	9,91	± 0,41	µg/L
Boron	952	± 48	µg/L

Environmental and related matrix materials certified for composition

Waters (river, sea, ground)

ERM-CA022a available from LGC

Matrix Soft drinking water

Form: Solution **unit size:** 250 mL

A soft drinking water certified for a range of metals at levels close to the drinking water regulation limits.

Se	10,6 (ind.)	± 1,2	µg/L
B	1070 (ind.)	± 50	µg/L
K	370 (ind.)	± 31	µg/L
Mg	1,01	± 0,04	mg/L
As	10,3	± 1,3	µg/L
Ba	127	± 13	µg/L
Ni	20,5	± 1,6	µg/L
Fe	201	± 2	µg/L
Al	204	± 10	µg/L
Cu	2100	± 70	µg/L
Pb	26,0	± 0,9	µg/L
Cd	5,26	± 0,21	µg/L
Na	5,84	± 0,14	mg/L
Cr	50,8	± 2,7	µg/L
Mn	52,5	± 3,9	µg/L
Zn	628	± 4	µg/L
Ca	7,33	± 0,25	mg/L

ERM-CA408 available from IRMM

Matrix Simulated rainwater

Form: Liquid **unit size:** 95 mL

Simulated rainwater certified for major elements, pH and conductivity for quality control, method validation and demonstration of proficiency.

Mg	0,145	± 0,022	mg/L
F	0,194	± 0,008	mg/L
NH ₄	0,910	± 0,028	mg/L
SO ₄	1,00	± 0,04	mg/L
CL	1,96	± 0,07	mg/L
Conductivity at 20 °C	18,7	± 1,8	µS/cm
NO ₃	2,01	± 0,09	mg/L
o-PO ₄	2,01	± 0,05	mg/L
pH at 20 °C	6,3	± 0,6	dimensionless

Waters (river, sea, ground)

ERM-CA615 available from IRMM

Matrix Groundwater

Form: Water in ampoule **unit size:** 100 mL

Groundwater for demonstrating method performance and method validation.

Hg	0,037	± 0,004	µg/L
Cd	0,106	± 0,011	µg/L
Mn	107	± 5	µg/L
Ni	25,3	± 1,1	µg/L
Fe	5,11	± 0,26	mg/L
Pb	7,1	± 0,6	µg/L
As	9,9	± 0,7	µg/L

ERM-CA616 available from IRMM

Matrix Groundwater

Form: Liquid **unit size:** 95 mL

Groundwater certified for major elements, pH and conductivity for quality control, method validation and demonstration of proficiency

Mg	10,1	± 0,3	mg/L
o-PO ₄	2,24	± 0,10	mg/L
Na	27,9	± 0,8	mg/L
Ca	42,6	± 1,4	mg/L
Conductivity at 20 °C	426	± 5	µS/cm
Cl	44,6	± 0,9	mg/L
K	5,79	± 0,15	mg/L
pH at 20 °C	7,12	± 0,18	dimensionless

ERM-CA713 available from IRMM

Matrix Effluent wastewater

Form: Liquid **unit size:** 100 mL

An effluent wastewater water certified for a range of metals intended for method validation and demonstration of proficiency.

Hg	1,84	± 0,11	µg/L
As	10,8	± 0,3	µg/L
Cu	101	± 7	µg/L
Cr	20,9	± 1,3	µg/L
Se	4,9	± 1,1	µg/L
Fe	445	± 27	µg/L
Pb	49,7	± 1,7	µg/L
Cd	5,09	± 0,20	µg/L
Ni	50,3	± 1,4	µg/L
Mn	95	± 4	µg/L

Food/Agriculture and related matrix materials certified for composition

Animal feeding stuffs

ERM-BE375 available from IRMM

Matrix Compound feed

Form: Powder **unit size:** 150 g

Compound feed for demonstrating method performance and method validation.

Aflatoxin G2	<0,2		µg/kg
Aflatoxin B2	0,20	± 0,04	µg/kg
Aflatoxin G1	0,4	± 0,1	µg/kg
Aflatoxin B1	2,6	± 0,4	µg/kg

ERM-BE376 available from IRMM

Matrix Compound feed

Form: Powder **unit size:** 75 g

Dried compound feed with naturally incurred aflatoxins.

Aflatoxin B2	0,68	± 0,10	µg/kg
Aflatoxin B1	12,9	± 1,8	µg/kg
Aflatoxin G1	5,2	± 0,8	µg/kg

Animal matter

ERM-BB124 available from IRMM

Matrix Lyophilised pork muscle

Form: Powder **unit size:** 10 g

Lyophilised pork muscle from pigs that have been administered nitroimidazole drugs. The material is certified by intercomparison of expert laboratories for its content of the parent drugs or their hydroxi metabolites. This material is intended to be used

Dimetridazole	<0,25		µg/kg
2-hydroxymethyl-1-methyl-5-nitroimidazole	0,69	± 0,09	µg/kg
Hydroxyipronidazole	1,67	± 0,12	µg/kg
Metronidazole	1,93	± 0,15	µg/kg
Ronidazole	2,09	± 0,25	µg/kg
Hydroxymetronidazole	6,2	± 0,9	µg/kg

ERM-BB130 available from IRMM

Matrix Pork muscle

Form: Lyophilised pork mu **unit size:** 7,5 g

Intended for research, validation of analytical procedures for the determination of chloramphenicol in pork muscle.

Chloramphenicol	0,230	± 0,021	µg/kg
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Animal matter

ERM-BB184 available from IRMM

Matrix Bovine muscle

Form: Lyophilised powder **unit size:** 7 g

Material primarily intended for use in the validation of methods of analysis for elements in foodstuffs. It can also be used for monitoring the performance of a method and demonstrating method proficiency.

Hg	0,0018	± 0,0010	mg/kg
Cd	0,0022	± 0,0004	mg/kg
As	0,0234	± 0,0026	mg/kg
Mn	0,276	± 0,013	mg/kg
Se	0,45	± 0,04	mg/kg
Zn	146	± 7	mg/kg
Cu	2,31	± 0,09	mg/kg
Fe	75	± 4	mg/kg

ERM-BB186 available from IRMM

Matrix Pig kidney

Form: Lyophilised powder **unit size:** 10 g

Material primarily intended for use in the validation of methods of analysis for elements in foodstuffs. It can also be used for monitoring the performance of a method and demonstrating method proficiency.

As	0,008	± 0,006	mg/kg
Hg	0,023	± 0,011	mg/kg
Pb	0,040	± 0,005	mg/kg
Cd	1,09	± 0,05	mg/kg
Se	10,3	± 0,9	mg/kg
Zn	134	± 5	mg/kg
Fe	255	± 13	mg/kg
Cu	36,5	± 1,8	mg/kg
Mn	7,26	± 0,25	mg/kg

Food/Agriculture and related matrix materials certified for composition

Animal matter

ERM-BB350 available from IRMM

Matrix Fish oil

Form: Liquid **unit size:** 5 mL

Fish oil certified for polychlorinated biphenyls (PCB) for quality control, method validation and demonstration of proficiency.

PCB101 (2,2',4,5,5'-pentachlorobiphenyl)	111	± 5	ng/g
PCB138 (2,2',3,4,4',5'-hexachlorobiphenyl)	137	± 10	ng/g
PCB156 (2,3,3',4,4',5'-hexachlorobiphenyl)	20,1	± 1,3	ng/g
PCB28 (2,4,4'-trichlorobiphenyl)	21,3	± 1,1	ng/g
PCB183 (2,2',3,4,4',5',6'-heptachlorobiphenyl)	22,5	± 1,8	ng/g
PCB153 (2,2',4,4',5,5'-hexachlorobiphenyl)	220	± 11	ng/g
PCB074 (2,4,4',5-tetrachlorobiphenyl)	23	± 1,9	ng/g
PCB194(2,2',3,3',4,4',5,5'-octachlorobiphenyl)	23,4	± 1,5	ng/g
PCB105 (2,3,3',4,4'-pentachlorobiphenyl)	25,8	± 2,1	ng/g
PCB177 (2,2',3,3',4,5',6'-heptachlorobiphenyl)	25,8	± 2,0	ng/g
PCB52 (2,2',5,5'-tetrachlorobiphenyl)	37,4	± 2,2	ng/g
PCB196(2,2',3,3',4,4',5,6'-octachlorobiphenyl)	41	± 7	ng/g
PCB110 (2,3,3',4',6-pentachlorobiphenyl)	54,1	± 2,8	ng/g
PCB099 (2,2',4,4',5-pentachlorobiphenyl)	62	± 6	ng/g
PCB180 (2,2',3,4,4',5,5'-heptachlorobiphenyl)	67	± 4	ng/g
PCB187 (2,2',3,4',5,5',6'-heptachlorobiphenyl)	67	± 5	ng/g
PCB118 (2,3',4,4',5-pentachlorobiphenyl)	84	± 4	ng/g
PCB149 (2,2',3,4',5',6-hexachlorobiphenyl)	88	± 9	ng/g

Animal matter

ERM-BB384 available from IRMM

Matrix Pork muscle

Form: Lyophilised powder **unit size:** 18 g

Material for demonstrating and monitoring method proficiency of the measurements for proximates and major elements in cereals. As CRM, the material is ideally suited as final step in the introduction of the respective standard methods in a laboratory.

Ca	0,164	± 0,021	mg/g
Mg	1,03	± 0,04	mg/g
Na	1,86	± 0,15	mg/g
Kjeldahl nitrogen	14,2	± 0,4	g/100g
Ash at 550 oC	4,51	± 0,19	g/100g
P	8,7	± 0,5	mg/g
Total fat	8,99	± 0,2	g/100g

ERM-BB386 available from IRMM

Matrix Bovine urine

Form: Freeze-dried urine **unit size:** equivalent to 5.2 g fresh urine

This material is a blank material and is intended to be used for method performance control and validation purposes.

Hexestrol	<0,4	not applicable	µg/kg
Dienoestrol	<0,6	not applicable	µg/kg
Diethylstilbestrol	<0,6	not applicable	µg/kg

ERM-BB389 available from IRMM

Matrix Bovine urine

Form: Freeze-dried urine **unit size:** equivalent to 5.2 g fresh urine

This material is intended to be used for method performance control and validation purposes (trueness determination).

Diethylstilbestrol	1,1	± 0,5	µg/kg
Dienoestrol	5,5	± 1,4	µg/kg
Hexestrol	6,1	± 0,9	µg/kg

Food/Agriculture and related matrix materials certified for composition

Animal matter

ERM-BB422 available from IRMM

Matrix Fish muscle

Form: Lyophilised powder **unit size:** 10 g

Material primarily intended for use in the validation of methods of analysis for elements in foodstuffs. It can also be used for monitoring the performance of a method and demonstrating method proficiency.

Cd	0,0075	± 0,0018	mg/kg
Mn	0,368	± 0,028	mg/kg
Hg	0,601	± 0,030	mg/kg
Se	1,33	± 0,13	mg/kg
I	1,4	± 0,4	mg/kg
Cu	1,67	± 0,16	mg/kg
As	12,7	± 0,7	mg/kg
Zn	16,0	± 1,1	mg/kg
Fe	9,4	± 1,4	mg/kg

ERM-BB430 available from IRMM

Matrix Pork fat

Form: Solid fat **unit size:** 5 g

Spiked pork fat intended for use in the validation and ongoing monitoring of methods of analysis for the determination of pesticides in animal matrices.

gamma-Hexachlorocyclohexane (HCH)		± 0.31	mg/kg
Dieldrin		± 0.05	mg/kg
Endrin		± 0.016	mg/kg
beta-Hexachlorocyclohexane (HCH)	0.109	± 0.010	mg/kg
Hexachlorobenzene	0.193	± 0.017	mg/kg
beta-Heptachlorepoxyde	0.213	± 0.016	mg/kg
p,p'-DDD	0.222	± 0.022	mg/kg
alpha-Hexachlorocyclohexane (HCH)	0.25	± 0.04	mg/kg
p,p'-DDE	0.38	± 0.09	mg/kg
p,p'-DDT	0.48	± 0.07	mg/kg

Animal matter

ERM-BB444 available from IRMM

Matrix Natural pork fat

Form: Solid fat **unit size:** 5 g

PBDE 47	3,7 (ind.)		µg/kg
Gamma-HCH	5,7 (ind.)		µg/kg
Sum PCB	<14	n.a.	µg/kg
PCB 28	<2	n.a.	µg/kg
PCB 52	<2	n.a.	µg/kg
PCB 153	<2	n.a.	µg/kg
PCB 180	<2	n.a.	µg/kg
PCB 101	<2	n.a.	µg/kg
PCB 118	<2	n.a.	µg/kg
PCB 138	<2	n.a.	µg/kg

ERM-BB445 available from IRMM

Matrix Spiked pork fat

Form: Solid fat **unit size:** 5 g

PBDE 47	3,9 (ind.)		µg/kg
Gamma-HCH	5,6 (ind.)		µg/kg
PCB 101	12,5	± 1,2	µg/kg
PCB 180	12,6	± 0,9	µg/kg
PCB 118	12,7	± 1,3	µg/kg
PCB 52	12,9	± 0,9	µg/kg
PCB 153	13,1	± 1,1	µg/kg
PCB 138	14,6	± 1,6	µg/kg
PCB 28	14,8	± 1,3	µg/kg
Sum PCB	93	± 7	µg/kg

ERM-BB446 available from IRMM

Matrix Spiked pork fat

Form: Solid fat **unit size:** 5 g

Gamma-HCH	4,6 (ind.)		µg/kg
PBDE 47	6,1 (ind.)		µg/kg
Sum PCB	207	± 11	µg/kg
PCB 52	25,5	± 1,8	µg/kg
PCB 28	29,6	± 2,1	µg/kg
PCB 180	29,8	± 2,5	µg/kg
PCB 101	30	± 4	µg/kg
PCB 118	30,2	± 2,7	µg/kg
PCB 153	30,8	± 2,4	µg/kg
PCB 138	32	± 4	µg/kg

Food/Agriculture and related matrix materials certified for composition

Animal matter

ERM-BB492_493 available from IRMM

Matrix Partially skimmed milk powder

Form: Powder **unit size:** 5,5 g

Material for method validation and demonstrating method proficiency. The material is supplied as set of 1 sample of ERM-BB492 and 1 sample of ERM-BB493.

BB493:	<5	± 11	µg/kg
Oxytetracycline			
BB492:	101	± 11	µg/kg
Oxytetracycline			

ERM-BB501a available from LGC

Matrix Processed meat

Form: Fresh **unit size:** 180 g

Certified reference material for analysis of proximates, chloride, nitrate and hydroxyproline in meat products.

Sodium Nitrate	0,286 (ind.)	± 0.043	g/kg
Salt	23,9 (ind.)	± 0.7	g/kg
Nitrate	0,209	± 0.032	g/kg
Chloride	14,5	± 0.5	g/kg
Total Fat	151	± 7	g/kg
Nitrogen	23,0	± 0.7	g/kg
Hydroxyproline	3,3	± 0.3	g/kg
Ash	33,2	± 0.9	g/kg
Moisture	618	± 7	g/kg

GM materials

ERM-BF410ak available from IRMM

Matrix Soya beans

Form: Powder **unit size:** 1 g

Roundup Ready (TM) soya powder

Roundup Ready (TM) soya bean content	< 0.7		g/kg
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ERM-BF410bk available from IRMM

Matrix Soya beans

Form: Powder **unit size:** 1 g

Roundup Ready (TM) soya powder

Roundup Ready (TM) soya bean content	1.0	± 0.5	g/kg
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ERM-BF410dk available from IRMM

Matrix Soya bean

Form: Powder **unit size:** 1 g

CRM for the quality assurance of GMO detection methods

Roundup-Ready soya bean content	10,0	± 1,0	g/kg
Roundup Ready (TM) soya bean content	10.0	± 1.0	g/kg

GM materials

ERM-BF410gk available from IRMM

Matrix Soya beans

Form: Powder **unit size:** 1 g

Roundup Ready (TM) soya powder

Roundup Ready (TM) soya bean content	100	± 7	g/kg
Roundup-Ready (TM) soya bean content	100	± 7	g/kg

ERM-BF411a available from IRMM

Matrix Maize

Form: Powder **unit size:** 1 g

CRM for the quality assurance of GMO detection methods

Bt-176 maize content	< 0,14		g/kg
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ERM-BF411b available from IRMM

Matrix Maize

Form: Powder **unit size:** 1 g

CRM for the quality assurance of GMO detection methods

Bt-176 maize content	1,00	± 0,29	g/kg
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ERM-BF411c available from IRMM

Matrix Maize

Form: Powder **unit size:** 1 g

CRM for the quality assurance of GMO detection methods

Bt-176 maize content	5,0	± 0,6	g/kg
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ERM-BF411d available from IRMM

Matrix Maize

Form: Powder **unit size:** 1 g

CRM for the quality assurance of GMO detection methods

Bt-176 maize content	10,0	± 0,8	g/kg
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ERM-BF411e available from IRMM

Matrix Maize

Form: Powder **unit size:** 1 g

CRM for the quality assurance of GMO detection methods

Bt-176 maize content	20,0	± 1,1	g/kg
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ERM-BF411f available from IRMM

Matrix Maize

Form: Powder **unit size:** 1 g

CRM for the quality assurance of GMO detection methods

Bt-176 maize content	50,0	± 1,8	g/kg
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Food/Agriculture and related matrix materials certified for composition

GM materials

ERM-BF412a available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Bt-11 maize content < 0,12 g/kg

ERM-BF412b available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Bt-11 maize content 0,98 ± 0,29 g/kg

ERM-BF412c available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Bt-11 maize content 4,9 ± 0,6 g/kg

ERM-BF412d available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Bt-11 maize content 9,8 ± 0,9 g/kg

ERM-BF412e available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Bt-11 maize content 19,6 ± 1,3 g/kg

ERM-BF412f available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Bt-11 maize content 48,9 ± 2,1 g/kg

ERM-BF413ak available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 MON 810 maize powder
 MON 810 maize < 0.9 n.a. g/kg
 mass fraction

GM materials

ERM-BF413ck available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 MON 810 maize powder
 MON 810 maize 4.9 ± 1.0 g/kg
 mass fraction

ERM-BF413ek available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 MON 810 maize powder
 MON 810 copy 0.77 ± 0.08 %
 number ratio
 MON 810 maize 19.8 ± 1.5 g/kg
 mass fraction

ERM-BF413gk available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 MON 810 maize powder
 MON 810 maize 99 ± 5 g/kg
 mass fraction

ERM-BF414a available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 GA21 maize content < 0,8 g/kg

ERM-BF414b available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 GA21 maize content 1,0 ± 0,8 g/kg

ERM-BF414c available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 GA21 maize content 4,9 ± 1,0 g/kg

ERM-BF414d available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 GA21 maize content 9,9 ± 1,1 g/kg

Food/Agriculture and related matrix materials certified for composition

GM materials

ERM-BF414e available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 GA21 maize content 17,2 ± 1,2 g/kg

ERM-BF414f available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 GA21 maize content 42,9 ± 1,4 g/kg

ERM-BF415a available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 NK 603 maize content < 0,4 g/kg

ERM-BF415b available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 NK 603 maize content 1,0 ± 0,4 g/kg

ERM-BF415c available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 NK 603 maize content 4,9 ± 0,5 g/kg

ERM-BF415d available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 NK 603 maize content 9,8 ± 0,7 g/kg

ERM-BF415e available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 NK 603 maize content 19,6 ± 0,9 g/kg

ERM-BF415f available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 NK 603 maize content 49,1 ± 1,3 g/kg

GM materials

ERM-BF416a available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MON 863 maize < 1 g/kg content

ERM-BF416b available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MON 863 maize 1 -0,3; +1,0 g/kg content

ERM-BF416c available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MON 863 maize 9,8 -0,7; +1,2 g/kg content

ERM-BF416d available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MON 863 maize 98,5 -2,2; +2,5 g/kg content

ERM-BF417a available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MON 863 x MON 810 < 1 g/kg maize content

ERM-BF417b available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MON 863 x MON 810 1 -0,2; +1,0 g/kg maize content

ERM-BF417c available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MON 863 x MON 810 9,8 -0,7; +1,2 g/kg maize content

Food/Agriculture and related matrix materials certified for composition

GM materials

ERM-BF417d available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MON 863 x MON 810 98,5 -2,0; +2,4 g/kg
 maize content

ERM-BF418a available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 1507 maize < 0,5 g/kg

ERM-BF418b available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 1507 maize 1 -0,2 / +0,6 g/kg

ERM-BF418c available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 1507 maize 9,9 -0,6; +0,8 g/kg

ERM-BF418d available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 1507 maize 98,6 -1,7; +2,0 g/kg

ERM-BF419a available from IRMM
Matrix Sugar beet
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 H7-1 sugar beet 0 0 g/kg

ERM-BF419b available from IRMM
Matrix Sugar beet
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 H7-1 sugar beet 1000 0 g/kg

GM materials

ERM-BF420a available from IRMM
Matrix Maize seed powder
Form: Powder **unit size:** 1 g
 Event 3272 maize Mass fraction genetically modified
 organisms
 Event 3272 maize <1,3 g/kg

ERM-BF420b available from IRMM
Matrix Maize seed powder
Form: Powder **unit size:** 1 g
 Event 3272 maize Mass fraction genetically modified
 organisms
 Event 3272 maize 9,8 ± 1,2 g/kg

ERM-BF420c available from IRMM
Matrix Maize seed powder
Form: Powder **unit size:** 1 g
 Event 3272 maize Mass fraction genetically modified
 organisms
 Event 3272 maize 98 ± 8 g/kg

ERM-BF421a available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Number fraction of 0,0 ± 0 n/a
 EH92-527-1 potato
 Identity Potato without the EH92-5

ERM-BF421b available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Number fraction of 100,0 ± 0 n/a
 EH92-527-1 potato
 Identity EH92-527-1 potato

ERM-BF422a available from IRMM
Matrix Cotton seed
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Number fraction of 281-24-236 x 3006-
 210-23 cotton seed <0,5 n/a g/kg

Food/Agriculture and related matrix materials certified for composition

GM materials

ERM-BF422b available from IRMM
Matrix Cotton seed
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Number fraction of 281-24-236 x 3006-210-23 cotton seed >975 n/a g/kg

ERM-BF422c available from IRMM
Matrix Cotton seed
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Number fraction of 281-24-236 x 3006-210-23 cotton seed 10,0 ± 1,7 g/kg

ERM-BF422d available from IRMM
Matrix Cotton seed
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 Number fraction of 281-24-236 x 3006-210-23 cotton seed 100 ± 16 g/kg

ERM-BF423a available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MIR604 < 0,9 g/kg

ERM-BF423b available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MIR604 1,0 -0.3 ;+1.0 g/kg

ERM-BF423c available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MIR604 9,8 -0.9 ;+1.3 g/kg

ERM-BF423d available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 MIR604 98,5 -2,6 ;+2,9 g/kg

GM materials

ERM-BF424a available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 59122 maize <1,2 n/a g/kg

ERM-BF424b available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 59122 maize 1.0 0,2 - 1,2 g/kg

ERM-BF424c available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 59122 maize 9.9 0,8 - 1,4 g/kg

ERM-BF424d available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 59122 maize 98.7 5,8 - 5,9 g/kg

ERM-BF425a available from IRMM
Matrix Soya
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 356043 soya <0,5 g/kg

ERM-BF425b available from IRMM
Matrix Soya
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 356043 soya 1,0 ± 0,4 g/kg

ERM-BF425c available from IRMM
Matrix Soya
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 356043 soya 10,0 ± 1,1 g/kg

ERM-BF425d available from IRMM
Matrix Soya
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 356043 soya 100 ± 9 g/kg

Food/Agriculture and related matrix materials certified for composition

GM materials

ERM-BF426a available from IRMM
Matrix Soya seed powder
Form: Powder **unit size:** 1 g
 305423 Soya Mass fraction of genetically modified organisms
 305423 soya < 0.8 g/kg

ERM-BF426b available from IRMM
Matrix Soya seed powder
Form: Powder **unit size:** 1 g
 305423 Soya Mass fraction of genetically modified organisms
 305423 soya 5,0 ± 0,8 g/kg

ERM-BF426c available from IRMM
Matrix Soya seed powder
Form: Powder **unit size:** 1 g
 305423 Soya Mass fraction of genetically modified organisms
 305423 soya 10,0 ± 1,0 g/kg

ERM-BF426d available from IRMM
Matrix Soya seed powder
Form: Powder **unit size:** 1 g
 305423 Soya Mass fraction of genetically modified organisms
 305423 soya 100 ± 7 g/kg

ERM-BF427a available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 98140 maize mass fraction of genetically modified organisms
 98140 Maize <0,4 n.a. g/kg

ERM-BF427b available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 98140 maize mass fraction of genetically modified organisms
 98140 Maize 5,0 ± 0,6 g/kg

ERM-BF427c available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 98140 maize mass fraction of genetically modified organisms
 98140 Maize 20,0 ± 0,8 g/kg

GM materials

ERM-BF427d available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 98140 maize mass fraction of genetically modified organisms
 98140 Maize 100 ± 4 g/kg

ERM-BF428a available from IRMM
Matrix Cotton
Form: Powder **unit size:** 1 g
 GHB119 cotton mass fraction of genetically modified organisms
 GHB119 Cotton mass fraction <0,2 n.a. g/kg

ERM-BF428b available from IRMM
Matrix Cotton
Form: Powder **unit size:** 1 g
 GHB119 cotton mass fraction of genetically modified organisms
 GHB119 Cotton mass fraction 10 ± 4 g/kg

ERM-BF428c available from IRMM
Matrix Cotton
Form: Powder **unit size:** 1 g
 GHB119 cotton mass fraction of genetically modified organisms
 GHB119 Cotton mass fraction 100 ± 11 g/kg

ERM-BF429a available from IRMM
Matrix Cotton
Form: Powder **unit size:** 1 g
 T304-40 cotton mass fraction of genetically modified organisms.
 9814T304-40 COTTON mass fraction <0,4 n.a. g/kg

ERM-BF429b available from IRMM
Matrix Cotton
Form: Powder **unit size:** 1 g
 T304-40 cotton mass fraction of genetically modified organisms.
 9814T304-40 COTTON mass fraction 10,0 ± 1,3 g/kg

Food/Agriculture and related matrix materials certified for composition

GM materials

ERM-BF429c available from IRMM
Matrix Cotton
Form: Powder **unit size:** 1 g
 T304-40 cotton mass fraction of genetically modified organisms.
 9814T304-40 100 ± 11 g/kg
 COTTON mass fraction

ERM-BF430a available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 g
 BPS-A1020-5 ppotato powder
 AM04-1020 potato 0 g/kg
 mass fraction

ERM-BF430b available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 g
 BPS-A1020-5 ppotato powder
 AM04-1020 potato 1000 g/kg
 mass fraction

ERM-BF430c available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 g
 BPS-A1020-5 ppotato powder
 AM04-1020 potato 10.0 ± 1.4 g/kg
 mass fraction

ERM-BF430d available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 g
 BPS-A1020-5 ppotato powder
 AM04-1020 potato 40 ± 5 g/kg
 mass fraction

ERM-BF430e available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 g
 BPS-A1020-5 potato powder
 AM04-1020 potato 100 ± 12 g/kg
 mass fraction

GM materials

ERM-BF431a available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 vial of 1 g
 This material is intended to be used for calibration or quality control of methods for the detection of genetically modified food.
 AV43-6-G7 mass 0 Zero g/kg
 fraction

ERM-BF431b available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 vial of 1 g
 This material is intended to be used for calibration or quality control of methods for the detection of genetically modified food.
 AV43-6-G7 mass 1000 Zero g/kg
 fraction

ERM-BF431c available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 vial of 1 g
 This material is intended to be used for calibration or quality control of methods for the detection of genetically modified food.
 AV43-6-G7 mass 9.9 1.3 g/kg
 fraction

ERM-BF431d available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 vial of 1 g
 This material is intended to be used for calibration or quality control of methods for the detection of genetically modified food.
 AV43-6-G7 mass 40 5 g/kg
 fraction

ERM-BF431e available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 vial of 1 g
 This material is intended to be used for calibration or quality control of methods for the detection of genetically modified food.
 AV43-6-G7 mass 99 10 g/kg
 fraction

ERM-BF432a available from IRMM
Matrix Ground soya seed
Form: Powder **unit size:** 1 g
 This material is intended to be used for calibration or quality control of methods for the detection of genetically modified food.
 DAS-68416-4 soya <0,3 not applicable/g/kg

Food/Agriculture and related matrix materials certified for composition

GM materials

ERM-BF432b available from IRMM
Matrix Ground soya seed
Form: Powder **unit size:** 1 g
 This material is intended to be used for calibration or quality control of methods for the detection of genetically modified food.
 DAS-68416-4 soya 5,0 ± 0,6 g/kg

ERM-BF432c available from IRMM
Matrix Ground soya seed
Form: Powder **unit size:** 1 g
 This material is intended to be used for calibration or quality control of methods for the detection of genetically modified food.
 DAS-68416-4 soya 10,0 ± 1,7 g/kg

ERM-BF432d available from IRMM
Matrix Ground soya seed
Form: Powder **unit size:** 1 g
 This material is intended to be used for calibration or quality control of methods for the detection of genetically modified food.
 DAS-68416-4 soya 100 ± 13 g/kg

ERM-BF433a available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-40278-9 maize <0.3 --- g/kg

ERM-BF433b available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-40278-9 maize 5.0 ± 0.6 g/kg

ERM-BF433c available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-40278-9 maize 10.0 ± 0.9 g/kg

ERM-BF433d available from IRMM
Matrix Maize
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-40278-9 maize 100 ± 8 g/kg

GM materials

ERM-BF434a available from IRMM
Matrix Rapeseed
Form: Powder **unit size:** 1 g
 GMO material for method validation and demonstration of method proficiency
 73496 rapeseed mass fraction <0.04 g/kg

ERM-BF434b available from IRMM
Matrix Rapeseed
Form: Powder **unit size:** 1 g
 GMO material for method validation and demonstration of method proficiency
 73496 rapeseed mass fraction >988 g/kg

ERM-BF434c available from IRMM
Matrix Rapeseed
Form: Powder **unit size:** 1 g
 GMO material for method validation and demonstration of method proficiency
 73496 rapeseed mass fraction 1.00 ± 0.15 g/kg

ERM-BF434d available from IRMM
Matrix Rapeseed
Form: Powder **unit size:** 1 g
 GMO material for method validation and demonstration of method proficiency
 73496 rapeseed mass fraction 10.0 ± 1.4 g/kg

ERM-BF434e available from IRMM
Matrix Rapeseed
Form: Powder **unit size:** 1 g
 GMO material for method validation and demonstration of method proficiency
 73496 rapeseed mass fraction 100 ± 12 g/kg

ERM-BF435a available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 g
 PH05-026-0048 mass fraction <0.4 g/kg

Food/Agriculture and related matrix materials certified for composition

GM materials

ERM-BF435b available from IRMM
Matrix Potato
Form: Powder **unit size:** 1 g
 PH05-026-0048 Positive for event PH05-005 g/kg
 Identity

ERM-BF436a available from IRMM
Matrix Soya powder
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-44406-6 soya <0.06 g/kg
 mass fraction

ERM-BF436b available from IRMM
Matrix Soya powder
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-44406-6 soya >986 g/kg
 mass fraction

ERM-BF436c available from IRMM
Matrix Soya powder
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-44406-6 soya 1.00 ± 0.14 g/kg
 mass fraction

ERM-BF436d available from IRMM
Matrix Soya powder
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-44406-6 soya 10.0 ± 1.0 g/kg
 mass fraction

ERM-BF436e available from IRMM
Matrix Soya powder
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-44406-6 soya 100 ± 9 g/kg
 mass fraction

ERM-BF437a available from IRMM
Matrix Soya powder
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-81419-2 mass <0.07 g/kg
 fraction

GM materials

ERM-BF437b available from IRMM
Matrix Soya powder
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-81419-2 mass >986 g/kg
 fraction

ERM-BF437c available from IRMM
Matrix Soya powder
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-81419-2 mass 0.99 ± 0.12 g/kg
 fraction

ERM-BF437d available from IRMM
Matrix Soya powder
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-81419-2 mass 9.9 ± 1.5 g/kg
 fraction

ERM-BF437e available from IRMM
Matrix Soya powder
Form: Powder **unit size:** 1 g
 CRM for the quality assurance of GMO detection methods
 DAS-81419-2 mass 100 ± 9 g/kg
 fraction

Plant/vegetation matter

ERM-BC084a available from LGC
Matrix Tomato paste
Form: **unit size:** 50 g
 Material intended for use in the validation of methods for the determination of tin lead and cadmium in a fruit or vegetable based material.
 Total Solids 290 (ind.) g/kg
 Cadmium 0,112 ± 0,007 mg/kg
 Lead 0,316 ± 0,021 mg/kg
 Tin 225 ± 11 mg/kg

ERM-BC190 available from IRMM
Matrix Rapeseed
Form: Whole **unit size:** 20 g
 Material for validating methods for the determination of glucosinolates and calibration of XRF method according to the ISO procedure.
 Glucosinolate, total 23 ± 4 mmol/kg
 S 4,72 ± 0,22 g/kg

Food/Agriculture and related matrix materials certified for composition

Plant/vegetation matter

ERM-BC210a	available from LGC		
Matrix	Wheat flour		
Form:	Powder	unit size:	15 g
Total selenium content			
Selenium	17.23	± 0.91	mg/kg
Selenomethionine	27.4	± 2.6	mg/kg

ERM-BC211	available from IRMM		
Matrix	Rice		
Form:	Powder	unit size:	10 g
CRM for the quality assurance and method validation of methods for As speciation.			
Dimethylarsinic acid	119	± 13	µg/kg
Sum of arsenite and arsenate	124	± 11	µg/kg
As, total	260	± 13	µg/kg

ERM-BC366	available from IRMM		
Matrix	Rapeseed		
Form:	Whole	unit size:	20 g
Material for validating methods for the determination of glucosinolates and calibration of XRF method according to the ISO procedure.			
Glucosinolate, total	11,9	± 1,3	mmol/kg
S	3,31	± 0,17	g/kg

ERM-BC367	available from IRMM		
Matrix	Rapeseed		
Form:	Whole	unit size:	20 g
Material for validating methods for the determination of glucosinolates and calibration of XRF method according to the ISO procedure.			
S	10,3	± 0,5	g/kg
Glucosinolate, total	99	± 9	mmol/kg

Plant/vegetation matter

ERM-BC381	available from IRMM		
Matrix	Rye flour		
Form:	Powder	unit size:	37 g
Material for demonstrating and monitoring method proficiency of the measurements for proximates and major elements in cereals. As CRM, the material is ideally suited as final step in the introduction of the respective standard methods in a laboratory.			

Kjeldahl nitrogen	0,221	± 0,025	g/100g
P	0,32	± 0,04	mg/g
Ca	0,567	± 0,013	mg/g
Starch	1,08	± 0,11	g/100g
Ash at 550 oC	1,36	± 0,16	g/100g
Total fat	1,562	± 0,014	g/100g
Mg	3,35	± 0,11	mg/g
K	72,2	± 1,9	mg/g

ERM-BC382	available from IRMM		
Matrix	Wheat flour		
Form:	Powder	unit size:	37 g
Material for demonstrating and monitoring method proficiency of the measurements for proximates and major elements in cereals. As CRM, the material is ideally suited as final step in the introduction of the respective standard methods in a laboratory.			
Ca	0,21	± 0,018	mg/g
Mg	0,247	± 0,010	mg/g
Ash at 550 oC	0,60	± 0,10	g/100g
P	1,19	± 0,07	mg/g
Total fat	1,39	± 0,17	g/100g
Kjeldahl nitrogen	1,851	± 0,017	g/100g
K	1,88	± 0,08	mg/g
Starch	81,2	± 1,7	g/100g

ERM-BC402a	available from LGC		
Matrix	Potato powder		
Form:	Powder	unit size:	110 g
"Material primarily intended for use in the validation of methods of analysis for iodine in foodstuffs. It can also be used for monitoring the performance of a method.			
Iodine	1,86	± 0,24	mg/kg

Food/Agriculture and related matrix materials certified for composition

Plant/vegetation matter

ERM-BC514 available from IRMM

Matrix Haricot beans

Form: Powder **unit size:** 25 g

Materials for proofing the accuracy of dietary fibre determinations according to various standard methods.

Dietary fibre, Englyst (GC)	19,8	± 1,0	g/ 100 g
Dietary fibre, Englyst (colorimetry)	20,1	± 0,6	g/ 100 g
Dietary fibre, Upsala	23,7	± 1,5	g/ 100 g
Dietary fibre, AOAC 1990	25,6	± 0,5	g/ 100 g
Dietary fibre, AOAC 1992 MES-TRIS	25,9	± 1,5	g/ 100 g

ERM-BC515 available from IRMM

Matrix Carrot

Form: Powder **unit size:** 25 g

Materials for proofing the accuracy of dietary fibre determinations according to various standard methods.

Dietary fibre, Englyst (colorimetry)	25,2	± 1,2	g/ 100 g
Dietary fibre, Englyst (GC)	27,1	± 0,6	g/ 100 g
Dietary fibre, AOAC 1992 MES-TRIS	29,5	± 0,4	g/ 100 g
Dietary fibre, Upsala	29,8	± 1,1	g/ 100 g
Dietary fibre, AOAC 1990	31,1	± 0,6	g/ 100 g

ERM-BC516 available from IRMM

Matrix Apple

Form: Powder **unit size:** 25 g

Materials for proofing the accuracy of dietary fibre determinations according to various standard methods.

Dietary fibre, Englyst (colorimetry)	13,4	± 0,5	g/ 100 g
Dietary fibre, Englyst (GC)	13,7	± 0,5	g/ 100 g
Dietary fibre, AOAC 1992 MES-TRIS	14,9	± 1,0	g/ 100 g
Dietary fibre, Upsala	16,2	± 0,8	g/ 100 g
Dietary fibre, AOAC 1990	16,4	± 0,4	g/ 100 g

Plant/vegetation matter

ERM-BC517 available from IRMM

Matrix Full fat soya flour

Form: Powder **unit size:** 25 g

Materials for proofing the accuracy of dietary fibre determinations according to various standard methods.

Dietary fibre, Englyst (GC)	11,9	± 0,7	g/ 100 g
Dietary fibre, Englyst (colorimetry)	12,3	± 0,8	g/ 100 g
Dietary fibre, AOAC 1992 MES-TRIS	12,4	± 2,1	g/ 100 g
Dietary fibre, AOAC 1990	12,6	± 0,5	g/ 100 g
Dietary fibre, Upsala	12,8	± 0,9	g/ 100 g

ERM-BC600 available from BAM

Matrix Wheat flour

Form: Solid **unit size:** 81 g

Nialenol (NIV) in wheat flour. Intended for analytical quality control and method validation.

Nivalenol mass fraction	1000	± 130	µg/kg
Deoxynivalenol mass fraction	102	± 11	µg/kg
Zearalenone mass fraction	90	± 8	µg/kg

ERM-BC716 available from IRMM

Matrix Maize

Form: Ground **unit size:** 60 g

Material for method performance control and validation

Zearalenone	< 5		µg/kg
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ERM-BC717 available from IRMM

Matrix Maize

Form: Powder **unit size:** 60 g

Deoxynivalenol			µg/kg
Nivalenol			µg/kg
Nivalenol	53	± 10	µg/kg
Deoxynivalenol	673	± 87	µg/kg
Zearalenone	83	± 9	µg/kg
Zearalenone	83	± 9	µg/kg

Food/Agriculture and related matrix materials certified for composition

Potable water and beverages

ERM-BA003a available from LGC
Matrix Wine - Nominal 15 % ABV (Alcohol by volume)
Form: Liquid **unit size:** 250 mL
 The primary intended use of this material is for the validation and quality control of methods for the determination of the alcohol content of alcoholic beverages.
 Alcoholic strength 14.47 ± 0.1 % ABV

ERM-BA005 available from LGC
Matrix Lager
Form: Liquid **unit size:** 330 mL
 % ABV (alcohol by volume). Material for analytical quality control and method validation.
 Alcoholic strength 5,07 ± 0,03 % ABV

ERM-BA006a available from LGC
Matrix Brandy
Form: Liquid **unit size:** 50 mL
 % ABV (alcohol by volume). Material for analytical quality control and method validation.
 Actual alcoholic strength 37,83 ± 0,05 % ABV
 Actual alcoholic strength 40,12 +0,009 / -0,11% ABV
 Apparent density in air of the obscured spirit 950,38 ± 0,07 kg/m3

Processed food and foodstuffs not covered above

ERM-BD011 available from LGC
Matrix Orange juice
Form: Solution **unit size:** 3 mL
 A solution to enable analysts to carry out accurate, traceable calibration of analytical instrumentation used to measure the sucrose content of fruit juices
 Degrees Brix 1,26 ± 0,08
 Refractive Index 1,3348 ± 0,0002

ERM-BD013 available from LGC
Matrix Orange juice
Form: Solution **unit size:** 3 mL
 A solution to enable analysts to carry out accurate, traceable calibration of analytical instrumentation used to measure the sucrose content of fruit juices
 Refractive Index 1,3673 ± 0,0002
 Degrees Brix 22,07 ± 0,08

Processed food and foodstuffs not covered above

ERM-BD014 available from LGC
Matrix Orange juice
Form: Solution **unit size:** 3 mL
 A solution to enable analysts to carry out accurate, traceable calibration of analytical instrumentation used to measure the sucrose content of fruit juices
 Refractive Index 1,432 ± 0,0005
 Degrees Brix 55,55 ± 0,19

ERM-BD015 available from LGC
Matrix Orange juice
Form: Solution **unit size:** 3 mL
 A solution to enable analysts to carry out accurate, traceable calibration of analytical instrumentation used to measure the sucrose content of fruit juices
 Refractive Index 1,4529 ± 0,0006
 Degrees Brix 64,73 ± 0,22

ERM-BD150 available from IRMM
Matrix Skimmed milk powder
Form: Powder **unit size:** 20 g
 Skimmed milk powder certified for a range of essential and trace elements intended for method validation and demonstration of proficiency

Cd	0.0114	± 0.0029	mg/kg
Pb	0.019	± 0.004	mg/kg
Hg	0.06	± 0.007	mg/kg
Se	0.188	± 0.014	mg/kg
Mn	0.289	± 0.018	mg/kg
Cu	1.08	± 0.06	mg/kg
Mg	1.26	± 0.10	g/kg
I	1.73	± 0.14	mg/kg
P	11.0	± 0.6	g/kg
Ca	13.9	± 0.8	g/kg
K	17.0	± 0.7	g/kg
Na	4.18	± 0.19	g/kg
Fe	4.6	± 0.5	mg/kg
Zn	44.8	± 2.0	mg/kg
Cl	9.7	± 2.0	g/kg

Food/Agriculture and related matrix materials certified for composition

Processed food and foodstuffs not covered above

ERM-BD151 available from IRMM

Matrix Skimmed milk powder

Form: Powder **unit size:** 20 g

Spiked skimmed milk powder certified for a range of essential and trace elements intended for method validation and demonstration of proficiency

Cd	0.106	± 0.013	mg/kg
Se	0.19	± 0.04	mg/kg
Pb	0.207	± 0.014	mg/kg
Mn	0.29	± 0.03	mg/kg
Hg	0.52	± 0.04	mg/kg
Mg	1.26	± 0.07	g/kg
I	1.78	± 0.17	mg/kg
P	11.0	± 0.6	g/kg
Ca	13.9	± 0.7	g/kg
K	17.0	± 0.8	g/kg
Na	4.19	± 0.23	g/kg
Zn	44.9	± 2.3	mg/kg
Cu	5.00	± 0.23	mg/kg
Fe	53	± 4	mg/kg
Cl	9.8	± 1.2	g/kg

ERM-BD272 available from BAM

Matrix Crispbread

Form: Solid **unit size:** 68 g

Acrylamide in crispbread. Intended for analytical quality control and method validation.

Acrylamide mass content	0,98	± 0,09	mg/kg
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ERM-BD273 available from IRMM

Matrix Toasted bread

Form: Powder **unit size:** 30 g

Method validation and quality control processes

Acrylamide	425	± 29	ng/g
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ERM-BD274 available from BAM

Matrix Rusk

Form: Solid **unit size:** 48 g

Acrylamide in rusk. Intended for analytical quality control and method validation.

Acrylamide mass content	74	± 7	µg/kg
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Processed food and foodstuffs not covered above

ERM-BD282 available from IRMM

Matrix Whole milk powder

Form: Powder **unit size:** 30 g

Material for demonstration of method performance for the determination of aflatoxin M1 in mil powder.

Aflatoxin M1	< 0,02		µg/kg
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ERM-BD283 available from IRMM

Matrix Whole milk powder

Form: Powder **unit size:** 30 g

Material for demonstration of method performance for the determination of aflatoxin M1 in mil powder.

Aflatoxin M2	0,111	± 0,018	µg/kg
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ERM-BD284 available from IRMM

Matrix Whole milk powder

Form: Powder **unit size:** 30 g

Material for demonstration of method performance for the determination of aflatoxin M1 in mil powder.

Aflatoxin M3	0,44	± 0,06	µg/kg
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ERM-BD475 available from BAM

Matrix Roasted coffee

Form: Solid **unit size:** 64 g

Ochratoxin A (OTA) in roasted coffee. Intended for analytical quality control and method validation.

Ochratoxin A mass fraction	6,0	± 0,6	µg/kg
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ERM-BD476 available from BAM

Matrix Red wine

Form: Liquid **unit size:** 51 mL

Ochratoxin A (OTA) in red wine. Intended for analytical quality control and method validation.

Ochratoxin A mass concentration	0,52	± 0,11	µg/L
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Food/Agriculture and related matrix materials certified for composition

Processed food and foodstuffs not covered above

ERM-BD518 available from IRMM

Matrix Breakfast cereal

Form: Powder **unit size:** 25 g

Materials for proofing the accuracy of dietary fibre determinations according to various standards

Dietary fibre, Englyst (GC)	24,1	± 0,8	g/ 100 g
Dietary fibre, Englyst (colorimetry)	25	± 1,1	g/ 100 g
Dietary fibre, Upsala	27,6	± 1,8	g/ 100 g
Dietary fibre, AOAC 1990	30,2	± 0,8	g/ 100 g
Dietary fibre, AOAC 1992 MES-TRIS	30,5	± 0,6	g/ 100 g

ERM-BD600 available from IRMM

Matrix Milk powder

Form: Powder **unit size:** 100 g

This material is intended to be used for method performance control and validation purposes (trueness determination).

Total Folate	0,55	± 0,16	mg/kg
Niacin	8,0	± 2,8	mg/kg
Vitamins B12 (cyanocobalamin)	0,32	± 0,07	mg/kg
Vitamins B2 (riboflavin)	16,7	± 1,4	mg/kg
Vitamins A (all-trans-retinol)	3,8	± 0,6	mg/kg
Vitamins A (all-trans-retinol and 13-cis-retinol)	4,1	± 0,8	mg/kg
Vitamins B1 (thiamin)	4,5	± 0,6	mg/kg
Vitamins C (total ascorbate)	74	± 11	mg/kg
Vitamins E (alpha-tocopherol)	86	± 15	mg/kg

Health-related matrix materials certified for composition

Human body fluids: serum, urine, etc

ERM-DA110a available from LGC

Matrix Human Blood - Tacrolimus

Form: Liquid **unit size:** 1 mL

Subject to the commutability information given in the certificate, this reference material is intended for use in the calibration of instruments, the validation of new methods and monitoring the performance of methods commonly used in clinical laboratories to determine the tacrolimus content of human blood samples. It can also be used in the training and evaluation of staff.

Tacrolimus	7,41	± 0.25	µg/kg
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ERM-DA120a available from LGC

Matrix Human serum

Form: Frozen liquid **unit size:** 1,1 mL

Copper content.

Cu	1130	± 33	µg/kg
Se	64,1	± 3,0	µg/kg
Zn	658	± 33	µg/kg

ERM-DA192 available from IRMM

Matrix Human serum

Form: Powder **unit size:** 1,25 mL when reconstituted

Lyophilised serum for controlling and optimising the performance of cortisol assays.

Cortisol	273	± 6	nmol/L
Cortisol	98,8	± 2,0	µg/L

ERM-DA193 available from IRMM

Matrix Human serum

Form: Powder **unit size:** 1,25 mL when reconstituted

Lyophilised serum for controlling and optimising the performance of cortisol assays.

Cortisol	277	± 5	µg/L
Cortisol	763	± 14	nmol/L

ERM-DA200a available from LGC

Matrix Frozen Human Serum - Digoxin, High Level

Form: Liquid **unit size:** 1 mL

Frozen human serum containing digoxin at the upper decision level for digoxin monitoring. Suitable for use in method validation and method performance monitoring. Produced and certified according to the requirements of ISO Guide 34.

Digoxin	2,08	± 0,15	µg/kg
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Human body fluids: serum, urine, etc

ERM-DA201a available from LGC

Matrix Frozen Human Serum - Digoxin, Low Level

Form: Liquid **unit size:** 1 mL

Frozen human serum containing digoxin at the lower decision level for digoxin monitoring. Suitable for use in method validation and method performance monitoring. Produced and certified according to the requirements of ISO Guide 34.

Digoxin	0,845	± 0,05	µg/kg
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ERM-DA250a available from LGC

Matrix Human serum

Form: Liquid **unit size:** 1 mL

Creatinine and electrolytes (Ca, Mg, Li, K, Na) in frozen human serum. The material is intended for use in the validation and ongoing monitoring of analytical methods for the determination of creatinine and electrolytes in human blood samples. This material has been produced and certified according to the requirements of ISO Guide 34.

Calcium	123	± 5	mg/kg
Potassium	277	± 13	mg/kg
Sodium	3370	± 100	mg/kg
Creatinine	39	± 2	mg/kg
Magnesium	47	± 3	mg/kg
Lithium	6,6	± 0,4	mg/kg

ERM-DA251a available from LGC

Matrix Human serum

Form: Liquid **unit size:** 1 mL

Creatinine and electrolytes (Ca, Mg, Li, K, Na) in frozen human serum. The material is intended for use in the validation and ongoing monitoring of analytical methods for the determination of creatinine and electrolytes in human blood samples. This material has been produced and certified according to the requirements of ISO Guide 34.

Potassium	136	± 6	mg/kg
Magnesium	19	± 3	mg/kg
Creatinine	22	± 2	mg/kg
Sodium	2740	± 120	mg/kg
Lithium	4,5	± 0,4	mg/kg
Calcium	71	± 3	mg/kg

Health-related matrix materials certified for composition

Human body fluids: serum, urine, etc

ERM-DA252a available from LGC

Matrix Human serum

Form: Liquid **unit size:** 1 mL

Creatinine in frozen human serum (low level - 3ppm). The material is intended for use in the validation and ongoing monitoring of analytical methods for the determination of creatinine in human blood samples. This material has been produced and certified according to the requirements of ISO Guide 34.

Lithium	0,19 (ind.)		mmol/L
Magnesium	0,34 (ind.)		mmol/L
Calcium	1,5 (ind.)		mmol/L
Potassium	1,7 (ind.)		mmol/L
Sodium	106 (ind.)		mg/kg
Creatinine	3,1	± 0,2	mg/kg

ERM-DA253a available from LGC

Matrix Human serum

Form: Liquid **unit size:** 1 mL

Creatinine in frozen human serum (high level - 50 ppm). The material is intended for use in the validation and ongoing monitoring of analytical methods for the determination of creatinine in human blood samples. This material has been produced and certified according to the requirements of ISO Guide 34.

Lithium	1,2 (ind.)		mmol/L
Magnesium	1,5 (ind.)		mmol/L
Sodium	145 (ind.)		mg/kg
Calcium	2,5 (ind.)		mmol/L
Potassium	6,2 (ind.)		mmol/L
Creatinine	50	± 2	mg/kg

ERM-DA345a available from LGC

Matrix Human serum

Form: Frozen liquid **unit size:** 0.8 mL

Certified reference material for male level testosterone in frozen human serum, for use in clinical analysis

Testosterone	18,9 (ind.)	± 0.7	nmol/L
Testosterone	5,58	± 0.20	µg/kg

ERM-DA346a available from LGC

Matrix Human serum

Form: Frozen liquid **unit size:** 0.8 mL

Certified reference material for female level testosterone in frozen human serum, for use in clinical analysis

Testosterone	0,86 (ind.)	± 0.12	nmol/L
Testosterone	0,25	± 0.04	µg/kg

Human body fluids: serum, urine, etc

ERM-DA347 available from IRMM

Matrix Human serum

Form: Powder **unit size:** 1 mL when reconstituted

Lyophilised serum for controlling and optimising the performance of progesteron assays.

Progesterone	10,13	± 0,21	nmol/L
Progesterone	3,19	± 0,07	µg/L

Health-related matrix materials certified for composition

Human body fluids: serum, urine, etc

ERM-DA451 available from IRMM

Matrix Human serum

Form: Fresh frozen **unit size:** 34 x 1 mL

Fresh sera intended for the evaluation/verification of in vitro test systems for serum cortisol by method comparison with the ID-GC/MS method. Each serum is certified for its cortisol content.

Serum 30	114	± 5	nmol/L
Serum 18	146	± 6	nmol/L
Serum 04	152	± 6	nmol/L
Serum 08	163	± 7	nmol/L
Serum 19	166	± 7	nmol/L
Serum 22	180	± 7	nmol/L
Serum 16	211	± 8	nmol/L
Serum 26	215	± 9	nmol/L
Serum 10	230	± 9	nmol/L
Serum 15	246	± 10	nmol/L
Serum 12	261	± 10	nmol/L
Serum 33	264	± 10	nmol/L
Serum 29	265	± 11	nmol/L
Serum 06	278	± 11	nmol/L
Serum 09	287	± 11	nmol/L
Serum 03	288	± 11	nmol/L
Serum 28	299	± 12	nmol/L
Serum 25	315	± 12	nmol/L
Serum 05	329	± 13	nmol/L
Serum 11	334	± 13	nmol/L
Serum 01	361	± 14	nmol/L
Serum 17	366	± 14	nmol/L
Serum 24	384	± 15	nmol/L
Serum 23	387	± 15	nmol/L
Serum 34	390	± 15	nmol/L
Serum 13	430	± 17	nmol/L
Serum 02	432	± 17	nmol/L
Serum 27	497	± 19	nmol/L
Serum 07	515	± 20	nmol/L
Serum 32	623	± 24	nmol/L
Serum 14	626	± 24	nmol/L
Serum 31	764	± 29	nmol/L
Serum 20	83	± 4	nmol/L
Serum 21	89	± 4	nmol/L

Human body fluids: serum, urine, etc

ERM-DA470k available from IRMM

Matrix Human serum

Form: Powder **unit size:** 1 mL when reconstituted

The material can be used for calibration of immunochemical tests and for testing method performance

Complement 4	0,162	± 0,007	g/L
Transthyretin	0,220	± 0,018	g/L
alpha1-acid glycoprotein	0,617	± 0,013	g/L
Immunoglobulin M	0,723	± 0,027	g/L
Haptoglobin	0,889	± 0,021	g/L
Complement 3c	1,00	± 0,04	g/L
alpha1-antitrypsin	1,12	± 0,03	g/L
alpha2-macroglobulin	1,43	± 0,06	g/L
Immunoglobulin A	1,80	± 0,05	g/L
Transferrin	2,36	± 0,08	g/L
Albumin	37,2	± 1,2	g/L
Immunoglobulin G	9,17	± 0,18	g/L

ERM-DA471 available from IRMM

Matrix Human serum

Form: Lyophilised serum **unit size:** 1 mL when reconstituted

The material can be used for calibration of immunochemical tests and for testing method performance.

Cystatin C	5,48	± 0,15	mg/L
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ERM-DA474/IFCC available from IRMM

Matrix Human serum

Form: Frozen serum **unit size:** 1 mL

CRP in human serum

C-reactive protein (CRP)	41.2	± 2,5	mg/L
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Human tissue: hair, bone, teeth, etc.

ERM-DB001 available from IRMM

Matrix Human hair

Form: Powder **unit size:** 3.5 g

Human hair certified for a range of trace metals intended for method validation and demonstration of method proficiency.

As	0,044	± 0,006	mg/kg
Cd	0,125	± 0,007	mg/kg
Hg	0,365	± 0,028	mg/kg
Pb	2,14	± 0,20	mg/kg
Zn	209	± 12	mg/kg
Se	3,24	± 0,24	mg/kg
Cu	33	± 4	mg/kg

Industrial and engineering materials certified for composition

Ceramics

ERM-ED102 available from BAM

Matrix Boron carbide

Form: Powder **unit size:** 100 g

Impurities, main and minor components and isotopic abundance of B4C powder

C free	0,51 (ind.)	± 0,12	%
D 10	21,5 (ind.)		µm
Mg	3,2 (ind.)	± 1,0	mg/kg
W	3,6 (ind.)	± 2,1	mg/kg
D 50	33,6 (ind.)		µm
D 90	51,4 (ind.)		µm
D 97	60,4 (ind.)		µm
B2O3	0,075	± 0,023	%
O	0,10	± 0,04	%
B soluble	0,116	± 0,013	%
N	0,209	± 0,026	%
Co	0,39	± 0,09	mg/kg
Mn	10,4	± 0,5	mg/kg
Al	157	± 5	mg/kg
10B	19,907	± 0,014	%
Cu	2,2	± 0,4	mg/kg
C total	21,01	± 0,28	%
Si	268	± 22	mg/kg
Zr	48,9	± 2,3	mg/kg
Cr	5,6	± 1,2	mg/kg
Na	6,3	± 0,9	mg/kg
Fe	686	± 22	mg/kg
B total	78,47	± 0,31	%
Ni	8,0	± 1,6	mg/kg
Ti	96	± 5	mg/kg
Ca	97	± 8	mg/kg

Ceramics

ERM-ED103 available from BAM

Matrix Boron nitride

Form: Powder **unit size:** 50 g

Impurities, main and minor components of BN powder

Co	<0.1		mg/kg
H2O	<0.1		%
C	0.018	± 0.002	%
d50	11.28		µm
d90	29.74		µm
d10	4.22		µm
	5.02		m*m/g
B2O3 adherent	0.07	± 0.014	%
O	0.68	± 0.19	%
Na	12.3	± 0.9	mg/kg
Fe	15.0	± 2.1	mg/kg
Si	17	± 4	mg/kg
Ca	273	± 13	mg/kg
Cr	4.7	± 1.1	mg/kg
Ti	4.9	± 0.7	mg/kg
B total	43.5	± 0.5	%
N	55.6	± 0.6	%
Mg	56	± 4	mg/kg
Al	7.0	± 1.4	mg/kg

Industrial and engineering materials certified for composition

Fuels, coal, diesel

ERM-EF001 available from IRMM

Matrix Biodiesel

Form: Liquid **unit size:** 27 mL

05) Triglyceride content	<0.1	-----	%
07) Water content	0.0205	± 0.0024	%
14) Methanol	0.041	± 0.016	%
04) Diglyceride content	0.136	± 0.015	%
11) Acid value	0.184	± 0.015	mgKOH/g
06) Total glycerol content	0.187	± 0.009	%
03) Monoglyceride content	0.65	± 0.04	%
12) Iodine value	112	± 4	giodine/100 g
13) Flash point	181	± 14	°C
09) Viscosity (at 40 °C)	4.465	± 0.005	mm ² /s
02) Linolenic acid methyl ester content	8.82	± 0.16	%
08) Density (at 15 °C)	883.2	± 0.04	kg/m ³
10) Oxidation stability (at 110 °C)	9.8	± 0.5	h
01) Ester content	98.9	± 1.7	%

ERM-EF104 available from IRMM

Matrix Gas oil

Form: Solution **unit size:** 8 mL

Material for check method performance in connection with Directive 94/62/EC (Packaging Directive).

S	1,019	± 0,019	g/kg
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ERM-EF211 available from IRMM

Matrix Petrol

Form: Liquid **unit size:** 19 mL

Petrol certified for its S mass fraction. The material is intended assure the correct implementation of one's own or standardised analytical method in connection with the legislation for S in petrol.

S	48,8	± 1,7	mg/kg
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ERM-EF212a available from LGC

Matrix Petrol

Form: Liquid **unit size:** 19 mL

Petrol certified for its S mass fraction. The material is intended assure the correct implementation of one's own or standardised analytical method in connection with the legislation for S in petrol.

S	20,2	± 1,1	mg/kg
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Fuels, coal, diesel

ERM-EF213 available from BAM

Matrix Petrol

Form: Liquid **unit size:** 19 mL

Petrol certified for its S mass fraction. The material is intended assure the correct implementation of one's own or standardised analytical method in connection with the legislation for S in petrol.

S	9,1	± 0,8	mg/kg
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ERM-EF317 available from IRMM

Matrix Gas oil

Form: Liquid **unit size:** 20 mL

The main purpose of the material is to assess method performance, i.e. for checking accuracy of analytical results. As any reference material, it can also be used for control charts or validation studies.

SY124 content	0,117 (ind.)	± 0,015	mg/L
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SY124 content	0,141	± 0,018	mg/kg
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ERM-EF318 available from IRMM

Matrix Gas oil

Form: Liquid **unit size:** 20 mL

The main purpose of the material is to assess method performance, i.e. for checking accuracy of analytical results. As any reference material, it can also be used for control charts or validation studies.

SY124 content	5,84 (ind.)	± 0,28	mg/L
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SY124 content	7	± 0,4	mg/kg
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Industrial and engineering materials certified for composition

Fuels, coal, diesel

ERM-EF411

available from IRMM

Matrix Hard coal

Form: Coarse powder **unit size:** 50 g

Coal material for method validation and demonstration of method proficiency

Hg	0.079	± 0.015	mg/kg
Tl	0.24	± 0.07	mg/kg
Sb	1.5	± 0.4	mg/kg
Zn	13	± 4	mg/kg
V	22	± 7	mg/kg
Co	3.5	± 0.8	mg/kg
S	0.598	± 0.017	g/100 g
N	1.43	± 0.10	g/100 g
Net calorific value (NCV)	28.0	± 0.4	MJ/kg
Gross calorific value (GCV)	29.0	± 0.4	MJ/kg
Volatile matter	38.1	± 1.0	g/100 g
H	4.80	± 0.14	g/100 g
Se	5.1	± 1.0	mg/kg
C	71.4	± 1.0	g/100 g
Ash	8.3	± 0.7	g/100 g
Cl	99	± 19	mg/kg

Fuels, coal, diesel

ERM-EF412

available from IRMM

Matrix Brown coal

Form: Powder **unit size:** 50 g

Coal material for method validation and demonstration of method proficiency

Cd	0.012	± 0.004	mg/kg
Sb	0.024	± 0.004	mg/kg
Pb	0.25	± 0.05	mg/kg
Cu	0.68	± 0.22	mg/kg
Zn	0.99	± 0.18	mg/kg
Mg	3.73	± 0.16	g/kg
Hg	0.070	± 0.011	mg/kg
S	0.360	± 0.023	g/100 g
V	0.57	± 0.04	mg/kg
N	0.74	± 0.06	g/100 g
Se	0.96	± 0.14	mg/kg
Na	2.20	± 0.12	g/kg
K	229	± 18	mg/kg
Net calorific value (NCV)	24.98	± 0.25	MJ/kg
Gross calorific value (GCV)	26.02	± 0.22	MJ/kg
Ash	4.11	± 0.23	g/100 g
H	4.88	± 0.15	g/100 g
Mn	48.6	± 1.9	mg/kg
Volatile matter	50.1	± 0.7	g/100 g
C	66.2	± 0.7	g/100 g
Ca	9.8	± 0.4	g/kg

ERM-EF413

available from IRMM

Matrix Furnace coke

Form: Coarse powder **unit size:** 50 g

Coal material for method validation and demonstration of method proficiency

Cl	0.35	± 0.13	g/kg
Mg	1.23	± 0.19	g/kg
Pb	8.41	± 1.6	mg/kg
S	0.58	± 0.12	g/100 g
Na	0.64	± 0.07	g/kg
N	1.10	± 0.07	g/100 g
Se	1.33	± 0.26	mg/kg
Zn	16.0	± 2.5	mg/kg
Ca	2.92	± 0.22	g/kg
Net calorific value (NCV)	29.4	± 0.5	MJ/kg
Gross calorific value (GCV)	29.5	± 0.4	MJ/kg
C	87.8	± 1.9	g/100 g

Industrial and engineering materials certified for composition

Fuels, coal, diesel

ERM-EF671 available from IRMM

Matrix Gas oil

Form: Liquid **unit size:** 8 mL

Material for check method performance in connection with Directive 94/62/EC (Packaging Directive).

S	0,452	± 0,009	g/kg
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ERM-EF672 available from IRMM

Matrix Gas oil

Form: Liquid **unit size:** 8 mL

Material for check method performance in connection with Directive 94/62/EC (Packaging Directive).

S	0,203	± 0,006	g/kg
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ERM-EF673a available from LGC

Matrix Gas oil

Form: Liquid **unit size:** 100 mL

Diesel fuel certified for sulfur at 50 ppm level. The material is intended for use in the development, validation or quality control of analytical methods for the determination of sulfur in diesel. This material has been produced and certified according to the requirements of ISO Guide 34.

S	52,4	± 1,3	mg/kg
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ERM-EF674a available from LGC

Matrix Gas oil

Form: Liquid **unit size:** 100 mL

Diesel fuel certified for sulfur at 10 ppm level. The material is intended for use in the development, validation or quality control of analytical methods for the determination of sulfur in diesel. This material has been produced and certified according to the requirements of ISO Guide 34.

S	11,0	± 0,9	mg/kg
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Glasses, ceramics

ERM-ED101 available from IRMM

Matrix Silicon nitride powder

Form: Powder **unit size:** 50 g

Impurities and beta-phase fraction in silicon nitride.

O	19,10 (ind.)	± 0,07	mass %
C	0,162	± 0,024	mass %
Ca	14,1	± 0,5	mg/kg
N	38,1	± 0,2	mass %
Mg	4,3	± 0,4	mg/kg
W	41,3	± 1,3	mg/kg
Co	43,5	± 0,8	mg/kg
Al	469	± 12	mg/kg
Beta-phase	7,43	± 0,09	mass %
Na	7,59	± 0,27	mg/kg
Fe	79,5	± 1,3	mg/kg

Non-ferrous alloys

ERM-EB101a available from BAM

Matrix PbCaSnAl

Form: Disc **unit size:** 4 x 4 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Ni/mass fraction	<0,6 (ind.)		mg/kg
Sb/mass fraction	<1,2 (ind.)		mg/kg
As/mass fraction	<2 (ind.)		mg/kg
P/mass fraction	<3 (ind.)		mg/kg
Al/mass fraction	0,0227	± 0,0009	%
Ca/mass fraction	0,136	± 0,007	%
Sn/mass fraction	0,294	± 0,006	%
Zn/mass fraction	1,0	± 0,8	mg/kg
Tl/mass fraction	10,2	± 0,6	mg/kg
Bi/mass fraction	165	± 7	mg/kg
Cu/mass fraction	24,3	± 1,1	mg/kg
Ag/mass fraction	29,0	± 1,1	mg/kg

Industrial and engineering materials certified for composition

Non-ferrous alloys

ERM-EB102a available from BAM

Matrix PbCaSn

Form: Disc **unit size:** 4 x 4 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Zn/mass fraction	<0,5 (ind.)		mg/kg
Te/mass fraction	<1,1 (ind.)		mg/kg
As/mass fraction	<2 (ind.)		mg/kg
In/mass fraction	<2 (ind.)		mg/kg
Sb/mass fraction	4 (ind.)	± 4	mg/kg
Ca/mass fraction	0,0635	± 0,0022	%
Sn/mass fraction	1,01	± 0,05	%
Cu/mass fraction	1,3	± 0,4	mg/kg
Al/mass fraction	124	± 11	mg/kg
Ag/mass fraction	170	± 6	mg/kg
Tl/mass fraction	30,2	± 1,5	mg/kg
Bi/mass fraction	73,7	± 2,6	mg/kg

ERM-EB103 available from BAM

Matrix PbSb1,6

Form: Disc **unit size:** 40 mm diameter, 30 mm thickness

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Te	1,9 (ind.)	± 0,6	mg/kg
S	5,4 (ind.)	± 1,2	mg/kg
As	0,097	± 0,004	%
Sn	0,183	± 0,026	%
Cd	0,20	± 0,08	mg/kg
Sb	1,64	± 0,06	%
Tl	15,2	± 0,7	mg/kg
Bi	158	± 4	mg/kg
Se	180	± 10	mg/kg
Ni	3,02	± 0,27	mg/kg
Ag	66	± 6	mg/kg
Cu	9,7	± 0,9	mg/kg

ERM-EB104 available from BAM

Matrix PbCaSn

Form: Disc **unit size:** 4 x 4 cm

The CRM is intended for establishing and checking the calibration of optical emission and X-ray spectrometers (excluding micro-analysis) for the analysis of samples of similar materials.

Ca/mass fraction	0,0530	± 0,0018	%
Sn/mass fraction	1,27	± 0,07	%

Non-ferrous alloys

ERM-EB105 available from BAM

Matrix PbCaSn

Form: Disc **unit size:** 4 x 4 cm

The CRM is intended for establishing and checking the calibration of optical emission and X-ray spectrometers (excluding micro-analysis) for the analysis of samples of similar materials.

Ca/mass fraction	0,0595	± 0,0016	%
Sn/mass fraction	1,43	± 0,07	%
Bi/mass fraction	133	± 5	mg/kg
Ag/mass fraction	32,1	± 0,9	mg/kg

ERM-EB106 available from BAM

Matrix PbCaSn

Form: Disc **unit size:** 4 x 4 cm

The CRM is intended for establishing and checking the calibration of optical emission and X-ray spectrometers (excluding micro-analysis) for the analysis of samples of similar materials.

Ca/mass fraction	0,0782	± 0,0026	%
Sn/mass fraction	1,72	± 0,05	%

Industrial and engineering materials certified for composition

Non-ferrous alloys

ERM-EB313 available from BAM

Matrix AlMg3

Form: Disc **unit size:** 6 x 2,5 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Ni	0,0278	± 0,0006	%
Cu	0,0931	± 0,0014	%
Ti	0,0947	± 0,0014	%
Cr	0,1224	± 0,0012	%
Zn	0,1580	± 0,0015	%
Si	0,363	± 0,007	%
Fe	0,391	± 0,003	%
Mn	0,495	± 0,003	%
Ga	121	± 5	µg/g
Sn	197	± 6	µg/g
V	290	± 6	µg/g
Mg	3,40	± 0,04	%
Zr	359	± 19	µg/g
Na	37,0	± 2,4	µg/g
Hg	4,1	± 0,4	µg/g
Pb	43,3	± 2,8	µg/g
Mo	5,3	± 1,2	µg/g
Be	5,5	± 0,2	µg/g
Ca	5,7	± 0,8	µg/g
Li	6,04	± 0,10	µg/g
Tl	6,4	± 0,4	µg/g
As	7,2	± 0,7	µg/g
Cd	7,4	± 0,4	µg/g
Sb	8,7	± 1,9	µg/g
Bi	95	± 8	µg/g

Non-ferrous alloys

ERM-EB316 available from BAM

Matrix AlSi12

Form: Disc **unit size:** 5 x 3 cm

Non-ferrous alloy

Sn/mass fraction	106 (ind.)	± 11	mg/kg
Ca/mass fraction	11,3 (ind.)	± 1,4	mg/kg
Ag/mass fraction	183 (ind.)	± 10	mg/kg
Hg/mass fraction	35 (ind.)	± 7	mg/kg
Sb/mass fraction	56 (ind.)	± 5	mg/kg
Ni/mass fraction	0,0235	± 0,0011	%
Cu/mass fraction	0,0297	± 0,0008	%
Mg/mass fraction	0,045	± 0,004	%
Zn/mass fraction	0,0611	± 0,0012	%
Ti/mass fraction	0,0790	± 0,0015	%
Fe/mass fraction	0,1054	± 0,0021	%
Mn/mass fraction	0,204	± 0,004	%
Ga/mass fraction	105	± 5	mg/kg
Si/mass fraction	11,98	± 0,20	%
Bi/mass fraction	140	± 7	mg/kg
Be/mass fraction	2,95	± 0,17	mg/kg
Cd/mass fraction	20,8	± 1,5	mg/kg
Sr/mass fraction	260	± 7	mg/kg
Zr/mass fraction	32,8	± 0,7	mg/kg
Cr/mass fraction	59,3	± 2,6	mg/kg
Pb/mass fraction	87	± 7	mg/kg
V/mass fraction	98	± 7	mg/kg

ERM-EB322 available from IRMM

Matrix Zinc

Form: Disc **unit size:** 6 x 3 cm

Material for the calibration of optical emission spectrometry.

Pb	15,0	± 0,5	mg/kg
Cd	15,08	± 0,30	mg/kg
Fe	19,1	± 0,8	mg/kg
Tl	5,28	± 0,30	mg/kg
Sn	5,6	± 0,6	mg/kg
Cu	5,89	± 0,15	mg/kg

Industrial and engineering materials certified for composition

Non-ferrous alloys

ERM-EB323 available from IRMM

Matrix Zinc

Form: Disc **unit size:** 6 x 3 cm

Material for the calibration of optical emission spectrometry.

Tl	10,8	± 0,5	mg/kg
Fe	11,3	± 0,7	mg/kg
Sn	18,7	± 0,7	mg/kg
Cu	18,9	± 0,4	mg/kg
Pb	48,6	± 0,9	mg/kg
Cd	6,51	± 0,21	mg/kg

ERM-EB324 available from IRMM

Matrix Zinc

Form: Disc **unit size:** 6 x 3 cm

Material for the calibration of optical emission spectrometry.

Tl	19,9	± 0,5	mg/kg
Pb	26,1	± 0,5	mg/kg
Cd	48,6	± 1,1	mg/kg
Fe	58,5	± 1,6	mg/kg
Sn	9,8	± 0,5	mg/kg
Cu	9,87	± 0,18	mg/kg

ERM-EB325 available from IRMM

Matrix Zinc

Form: Disc **unit size:** 6 x 3 cm

Material for the calibration of optical emission spectrometry.

Pb	142	± 9	mg/kg
Tl	36,8	± 1,2	mg/kg
Sn	46,1	± 2,0	mg/kg
Cu	47,5	± 2,0	mg/kg
Fe	56,1	± 3,3	mg/kg
Cd	94,7	± 2,5	mg/kg

Non-ferrous alloys

ERM-EB374 available from BAM

Matrix CuSn8

Form: Disc **unit size:** 4 x 3 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Al	<1 (ind.)		µg/g
Cd	<1 (ind.)		µg/g
Cr	<1 (ind.)		µg/g
Mg	<1 (ind.)		µg/g
Ti	<1 (ind.)		µg/g
Zr	<1 (ind.)		µg/g
Co	<1 (ind.)		µg/g
Te	<1 (ind.)		µg/g
Si	<10 (ind.)		µg/g
Se	<2 (ind.)		µg/g
S	13 (ind.)	± 5	µg/g
Bi	2,2 (ind.)	± 1,3	µg/g
As	4,3 (ind.)	± 1,2	µg/g
Sb	6,3 (ind.)	± 1,4	µg/g
P	0,1697	± 0,0023	%
Ag	12,1	± 1,3	µg/g
Ni	32,7	± 1,3	µg/g
Mn	4,3	± 0,3	µg/g
Fe	40	± 4	µg/g
Zn	40,4	± 1,9	µg/g
Sn	7,6	± 0,13	%
Pb	8,3	± 0,9	µg/g
Cu	92,22	± 0,04	%

Industrial and engineering materials certified for composition

Non-ferrous alloys

ERM-EB375

available from BAM

Matrix CuZn39Pb3

Form: Disc

unit size: 4 x 3 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Ni	0,1053	± 0,0015	%
Fe	0,207	± 0,004	%
Sn	0,2090	± 0,0024	%
Sb	122	± 4	µg/g
Ag	166	± 4	µg/g
Co	196,4	± 2,8	µg/g
Pb	2,90	± 0,03	%
Si	211	± 14	µg/g
Mn	222	± 3	µg/g
As	231	± 4	µg/g
Al	270	± 5	µg/g
Zn	38,02	± 0,08	%
Te	53,8	± 2,4	µg/g
Cu	58,32	± 0,05	%
Bi	68,6	± 2,5	µg/g
Cd	85,9	± 2,1	µg/g

Non-ferrous alloys

ERM-EB377

available from BAM

Matrix CuSn6

Form: Disc

unit size: 4 x 3 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Cd	<1 (ind.)		µg/g
Mg	<1 (ind.)		µg/g
Te	<1 (ind.)		µg/g
Ti	<1 (ind.)		µg/g
As	<10 (ind.)		µg/g
P	<10 (ind.)		µg/g
Co	<2 (ind.)		µg/g
Si	134 (ind.)		µg/g
S	6,8 (ind.)	± 0,8	µg/g
Zn	100,6	± 3,0	µg/g
Fe	104,2	± 2,7	µg/g
Ni	107,4	± 1,5	µg/g
Sb	13,0	± 1,3	µg/g
Bi	42,2	± 1,5	µg/g
Pb	44,9	± 2,3	µg/g
Al	45,1	± 1,2	µg/g
Sn	5,92	± 0,13	%
Se	55	± 4	µg/g
Ag	64,4	± 1,1	µg/g
Cr	66,9	± 2,1	µg/g
Mn	92,1	± 2,1	µg/g
Cu	94,04	± 0,05	%

Industrial and engineering materials certified for composition

Non-ferrous alloys

ERM-EB378 available from BAM

Matrix CuSn6

Form: Disc **unit size:** 4 x 3 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Al	<1 (ind.)		µg/g
Bi	<1 (ind.)		µg/g
Si	<10 (ind.)		µg/g
Se	<2 (ind.)		µg/g
Mn	0,74 (ind.)	± 0,24	µg/g
Zr	1,70 (ind.)	± 0,09	µg/g
Ti	29,4 (ind.)	± 4	µg/g
Pb	4,2 (ind.)	± 0,7	µg/g
Zn	7,3 (ind.)	± 1,0	µg/g
S	9,1 (ind.)	± 1,9	µg/g
Cd	100,7	± 2,2	µg/g
Ni	18,3	± 0,9	µg/g
Fe	182	± 7	µg/g
Ag	26,6	± 1,3	µg/g
Mg	28,7	± 0,8	µg/g
Cr	311	± 5	µg/g
Sn	5,74	± 0,21	%
P	602	± 23	µg/g
Sb	86,1	± 2,6	µg/g
Co	89	± 5	µg/g
Cu	94,13	± 0,04	%
As	99,5	± 2,5	µg/g

Non-ferrous alloys

ERM-EB383 available from BAM

Matrix Pure copper

Form: Disc **unit size:** 4 x 3 cm

Non-ferrous alloy

Si/mass fraction	< 10		mg/kg
Zr/mass fraction	< 9		mg/kg
Bi/mass fraction	1,02	± 0,09	mg/kg
Cr/mass fraction	1,03	± 0,09	mg/kg
Se/mass fraction	1,16	± 0,9	mg/kg
Mn/mass fraction	1,24	± 0,05	mg/kg
Pb/mass fraction	1,31	± 0,20	mg/kg
Co/mass fraction	1,37	± 0,05	mg/kg
Te/mass fraction	1,40	± 0,16	mg/kg
Sb/mass fraction	1,44	± 0,17	mg/kg
Cd/mass fraction	1,48	± 0,015	mg/kg
Ti/mass fraction	1,56	± 0,16	mg/kg
As/mass fraction	1,93	± 0,15	mg/kg
Fe/mass fraction	10,9	± 0,5	mg/kg
Al/mass fraction	2,3	± 0,6	mg/kg
Mg/mass fraction	2,37	± 0,29	mg/kg
S/mass fraction	2,8	± 0,14	mg/kg
Ni/mass fraction	3,59	± 0,21	mg/kg
Sn/mass fraction	4,7	± 0,6	mg/kg
Ag/mass fraction	4,70	± 0,20	mg/kg
Zn/mass fraction	7,8	± 0,4	mg/kg

Industrial and engineering materials certified for composition

Non-ferrous alloys

ERM-EB384 available from BAM

Matrix Pure copper

Form: Disc **unit size:** 4 x 3 cm

Non-ferrous alloy

Zr/mass fraction	< 9		mg/kg
Sn/mass fraction	10,2	± 0,9	mg/kg
Ag/mass fraction	10,3	± 0,4	mg/kg
Sb/mass fraction	12,0	± 0,4	mg/kg
Zn/mass fraction	12,7	± 2,1	mg/kg
Al/mass fraction	13,0	± 0,8	mg/kg
Mg/mass fraction	14,6	± 0,5	mg/kg
Ti/mass fraction	2,10	± 0,23	mg/kg
Bi/mass fraction	3,34	± 0,22	mg/kg
Co/mass fraction	3,88	± 0,16	mg/kg
Cd/mass fraction	3,95	± 0,09	mg/kg
Fe/mass fraction	32,8	± 1,9	mg/kg
S/mass fraction	4,1	± 1,0	mg/kg
Se/mass fraction	4,24	± 0,19	mg/kg
Si/mass fraction	5,0	± 0,7	mg/kg
As/mass fraction	5,0	± 0,4	mg/kg
Ni/mass fraction	5,7	± 0,4	mg/kg
Pb/mass fraction	5,7	± 0,5	mg/kg
Cr/mass fraction	6,53	± 0,21	mg/kg
Mn/mass fraction	6,88	± 0,15	mg/kg
Te/mass fraction	7,0	± 0,5	mg/kg

Non-ferrous alloys

ERM-EB385 available from BAM

Matrix Copper

Form: Disc **unit size:** 4 x 3 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Zr	<7 (ind.)		µg/g
Si	7,2 (ind.)	± 1,5	µg/g
Te	10,0	± 0,4	µg/g
Mn	10,1	± 0,2	µg/g
Pb	11,3	± 0,5	µg/g
As	11,4	± 0,8	µg/g
Ni	11,9	± 0,8	µg/g
P	12,9	± 1,0	µg/g
Sn	18,0	± 0,9	µg/g
Sb	19,9	± 0,8	µg/g
Ag	28,6	± 0,8	µg/g
Al	28,6	± 2,5	µg/g
Mg	29,1	± 1,3	µg/g
Ti	3,83	± 0,17	µg/g
S	31,3	± 1,5	µg/g
Fe	45,4	± 1,4	µg/g
Cd	5,8	± 0,3	µg/g
Bi	5,81	± 0,17	µg/g
Zn	57,9	± 4,0	µg/g
Co	6,93	± 0,15	µg/g
Se	7,2	± 0,5	µg/g
Cr	9,81	± 0,20	µg/g

Industrial and engineering materials certified for composition

Non-ferrous alloys

ERM-EB386 available from BAM

Matrix Copper

Form: Disc **unit size:** 4 x 3 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Si	14,3 (ind.)	± 4,3	µg/g
Zr	8,9 (ind.)	± 1,7	µg/g
Se	11,6	± 0,3	µg/g
Cr	12,4	± 0,7	µg/g
Mn	13,3	± 0,2	µg/g
S	21,9	± 2,1	µg/g
Pb	23,4	± 1,2	µg/g
As	24,2	± 1,0	µg/g
Ni	25,0	± 1,0	µg/g
Sn	28,3	± 0,8	µg/g
Sb	31,2	± 1,1	µg/g
Ti	33,1	± 1,3	µg/g
Mg	36,1	± 1,2	µg/g
Al	36,5	± 2,5	µg/g
Te	38,3	± 0,9	µg/g
Ag	47,4	± 1,2	µg/g
Zn	49,5	± 1,6	µg/g
Co	5,2	± 0,14	µg/g
Fe	64,7	± 1,8	µg/g
P	7,2	± 0,7	µg/g
Cd	7,8	± 0,4	µg/g
Bi	9,6	± 0,5	µg/g

ERM-EB387 available from BAM

Matrix CuZn20Ni5

Form: Disc **unit size:** 4 x 3 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Pb	10,8	± 2,1	µg/g
Zn	19,57	± 0,19	%
Sn	30,1	± 2,8	µg/g
Ni	5,02	± 0,09	%
Fe	617	± 22	µg/g
Cu	75,18	± 0,16	%
Mn	796	± 9	µg/g

Non-ferrous alloys

ERM-EB388 available from BAM

Matrix CuAl5Zn5Sn

Form: Disc **unit size:** 4 x 3 cm

Cylindrical samples in block form have been especially designed for spark and X-ray fluorescence spectrometers.

Sn	0,86	± 0,06	%
Fe	303	± 15	µg/g
Zn	4,81	± 0,12	%
Al	4,97	± 0,05	%
Mn	512	± 15	µg/g
Ni	73,6	± 6,9	µg/g
Cu	89,27	± 0,17	%
Pb	9,7	± 2,0	µg/g

ERM-EB389 available from BAM

Matrix CuNi25

Form: Disc **unit size:** 4 x 3 cm

Non-ferrous alloy

Al/mass fraction	123 (ind.)	± 10	mg/kg
C/mass fraction	216 (ind.)	± 24	mg/kg
B/mass fraction	23 (ind.)	± 6	mg/kg
S/mass fraction	308 (ind.)	± 23	mg/kg
Si/mass fraction	349 (ind.)	± 37	mg/kg
Mg/mass fraction	0.067	± 0.009	%
Zr/mass fraction	0.098	± 0.011	%
Fe/mass fraction	0.107	± 0.006	%
Zn/mass fraction	0.1125	± 0.0026	%
Mn/mass fraction	0.415	± 0.011	%
Cr/mass fraction	153	± 6	mg/kg
Cd/mass fraction	16	± 3	mg/kg
Ni/mass fraction	24.7	± 0.5	%
Sn/mass fraction	262	± 34	mg/kg
Bi/mass fraction	44	± 10	mg/kg
Sb/mass fraction	46	± 5	mg/kg
Ti/mass fraction	660	± 18	mg/kg
Cu/mass fraction	74.3	± 0.5	%
Co/mass fraction	770	± 28	mg/kg
P/mass fraction	93	± 17	mg/kg
Pb/mass fraction	98	± 23	mg/kg

Industrial and engineering materials certified for composition

Non-ferrous alloys

ERM-EB503a available from LGC

Matrix Unused automobile catalyst

Form: Powder **unit size:** 100 g

An unused automobile catalyst certified for concentration of platinum and palladium and with an indicative value for rhodium.

Rhodium	220 (ind.)		mg/kg
Platinum	1880	± 30	mg/kg
Palladium	2780	± 80	mg/kg

ERM-EB504 available from BAM

Matrix Car catalyst

Form: Powder **unit size:** 250 g

Industrial and engineering materials certified for composition.

Pt/mass fraction	1777	± 15	mg/kg
Pd/mass fraction	279	± 6	mg/kg
Rh/mass fraction	338	± 4	mg/kg

ERM-EB530b available from IRMM

Matrix Al-0.1%Au, foil

Form: Wire **unit size:** 1 m x 0.5 mm

This material is intended as a neutron flux monitor for KONA.

Au	1005	± 7	mg/kg
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ERM-EB530c available from IRMM

Matrix Al-0.1%Au, foil

Form: Wire **unit size:** 1 m x 1 mm

This material is intended as a neutron flux monitor for KONA.

Au	1005	± 7	mg/kg
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Others

ERM-EZ505 available from BAM

Matrix Electronic scrap

Form: Powder **unit size:** 200 g

Industrial and engineering materials certified for composition

Ni/mass fraction	0,470	± 0,008	%
Cu/mass fraction	15,10	± 0,11	%
Au/mass fraction	292	± 4	mg/kg
Be/mass fraction	68,8	± 2,3	mg/kg
Ag/mass fraction	692	± 13	mg/kg
Pt/mass fraction	8,5	± 0,8	mg/kg
Pd/mass fraction	90,5	± 2,4	mg/kg
In/mass fraction	91	± 7	mg/kg

Polymers, plastics

ERM-EC590 available from IRMM

Matrix Polyethylene

Form: Granulate **unit size:** 20 g

Polymer granulate for validating Br and PBDE measurements in connection with the RoHS directive.

Sb	0,756 (ind.)		g/kg
BDE-154 (2,2',4,4',5,6'-HexaBDE)	0,026	± 0,007	g/kg
BDE-153 (2,2',4,4',5,5'-HexaBDE)	0,047	± 0,013	g/kg
BDE-100 (2,2',4,4',6-PentaBDE)	0,063	± 0,016	g/kg
BDE-197+ BDE-204	0,076	± 0,015	g/kg
BDE-183 (2,2',3,4,4',5,6'-HeptaBDE)	0,132	± 0,012	g/kg
BDE-047 (2,2',4,4'-TetraBDE)	0,23	± 0,04	g/kg
BDE-099 (2,2',3,4,4'-PentaBDE)	0,30	± 0,06	g/kg
BB-209 (DecaBB)	0,63	± 0,10	g/kg
BDE-209 (DecaBDE)	0,65	± 0,10	g/kg
Br	2,13	± 0,09	g/kg

ERM-EC591 available from IRMM

Matrix Polypropylene

Form: Granulate **unit size:** 20 g

Polymer granulate for validating Br and PBDE measurements in connection with the RoHS directive.

Sb	0,713 (ind.)		g/kg
BDE-028 (2,4,4'-TriBDE)	0,0025	± 0,0006	g/kg
BDE-154 (2,2',4,4',5,6'-HexaBDE)	0,026	± 0,006	g/kg
BDE-153 (2,2',4,4',5,5'-HexaBDE)	0,044	± 0,010	g/kg
BDE-197+ BDE-204	0,052	± 0,009	g/kg
BDE-100 (2,2',4,4',6-PentaBDE)	0,066	± 0,007	g/kg
BDE-183 (2,2',3,4,4',5,6'-HeptaBDE)	0,087	± 0,008	g/kg
BDE-047 (2,2',4,4'-TetraBDE)	0,245	± 0,023	g/kg
BDE-099 (2,2',3,4,4'-PentaBDE)	0,32	± 0,04	g/kg
BB-209 (DecaBB)	0,74	± 0,08	g/kg
BDE-209 (DecaBDE)	0,78	± 0,09	g/kg
Br	2,08	± 0,07	g/kg

Industrial and engineering materials certified for composition

Polymers, plastics

ERM-EC680k available from IRMM

Matrix Low-density polyethylene

Form: Granulate **unit size:** 100 g

LDPE granulate fortified with inorganic pigments. The materials is intended for method validation and demonstration of analytical proficiency.

Zn	137 (ind.)	± 20	mg/kg
Sn	15,3 (ind.)	± 2,8	mg/kg
Sb	10,1	± 1,6	mg/kg
Cl	102,2	± 3,0	mg/kg
Pb	13,6	± 0,5	mg/kg
Cd	19,6	± 1,4	mg/kg
Cr	20,2	± 1,1	mg/kg
As	4,1	± 0,5	mg/kg
Hg	4,64	± 0,20	mg/kg
S	76	± 4	mg/kg
Br	96	± 4	g/kg

Semiconductors

ERM-EG001 available from BAM/IRMM

Matrix Silicon

Form: Piece **unit size:** 1 piece

Antimony implanted silicon

Area density of the sum Si, O and Sb atoms in oxide layer	5,9 (ind.)	± 0,7	atoms/1017 cm-2
Area density of the sum of Si and Sb in the layer corresponding to the width of the Sb distribution (full width at half maximum)	6,5 (ind.)	± 0,8	atoms/1017 cm-2
Area density of the sum of Si, O and Sb in the layer corresponding to the projected range of Sb distribution	9,9 (ind.)	± 1,1	atoms/1017 cm-2
n(121Sb)/n(123Sb)	1,435	± 0,006	mol/mol
Sb	4,81	± 0,06	atoms/1016 cm-2

Materials certified for physical properties

Mechanical properties (e.g hardness, impact toughness, viscosity)

ERM-FA001	available from BAM		
Matrix Polystyrene			
Form: Granulate	unit size: 1 g		
Polymer			
Polystyrene/viscosity	42,37	± 0,83	mL/g
Polystyrene/molar mass	87600	± 2245	g/mol

ERM-FA002	available from BAM		
Matrix Polystyrene			
Form: Granulate	unit size: 1 g		
Polymer			
Polystyrene/molar mass	205600	± 3075	g/mol
Polystyrene/viscosity	68,38	± 0,79	mL/g

ERM-FA003	available from BAM		
Matrix Polymethylmethacrylate			
Form: Powder	unit size: 1 g		
Polymer			
Polymethylmethacrylate/molar mass	107050	± 2500	g/mol
Polymethylmethacrylate /viscosity	31,48	± 1,21	mL/g

ERM-FA004	available from BAM		
Matrix Polyethyleneoxide			
Form: Powder	unit size: 1 g		
Polymer			
Polyethyleneoxide/viscosity	14,28	± 0,54	mL/g
Polyethyleneoxide/molar mass	6065	± 90	g/mol

ERM-FA005	available from BAM		
Matrix Polystyrene			
Form: Granulate	unit size: 1 g		
Polymer			
Polystyrene/viscosity	104,28	± 2,3	mL/g
Polystyrene/molar mass	349800	± 9700	g/mol

ERM-FA006	available from BAM		
Matrix Polymethylmethacrylate			
Form: Powder	unit size: 1 g		
Polymer			
Polymethylmethacrylate/molar mass	365500	± 10800	g/mol
Polymethylmethacrylate/viscosity	90,63	± 1,05	mL/g

Mechanical properties (e.g hardness, impact toughness, viscosity)

ERM-FA007	available from BAM		
Matrix Polymethylmethacrylate			
Form: Powder	unit size: 1 g		
Polymer			
Polymethylmethacrylate/molar mass	360200	± 9800	g/mol
Polymethylmethacrylate/viscosity	84,80	± 1,82	mL/g

ERM-FA008	available from BAM		
Matrix Polyethyleneoxide			
Form: Powder	unit size: 1 g		
Polymer			
Polyethyleneoxide/molar mass	11400	± 150	g/mol
Polyethyleneoxide/viscosity	20,91	± 1,12	mL/g

ERM-FA013bk	available from IRMM		
Matrix Charpy specimens			
Form: Set of five bars	unit size: Set of five bars		
Material for direct verification of Charpy impact toughness machines according to ISO-148 and EN45001.			
Absorbed energy (KV) at 0°C	26,1	± 1,1	J
Absorbed energy (KV) at 20°C	27,8	± 0,9	J

ERM-FA013bl	available from IRMM		
Matrix Charpy specimens			
Form: Set of five bars	unit size: Set of 5 steel bars		
Material for direct verification of Charpy impact toughness machines according to ISO-148 and EN45001.			
Absorbed energy (KV) (nominal)	27,7	± 0,9	J

ERM-FA015x	available from IRMM		
Matrix Charpy specimens			
Form: Set of five bars	unit size: Set of 5 steel bars		
Material for direct verification of Charpy impact toughness machines according to ISO-148 and EN45001.			
Absorbed energy (KV) (nominal)	81,1	± 2,4	J

ERM-FA016bc	available from IRMM		
Matrix Charpy specimens for 120 J nominal			
Form: Set of five bars	unit size: Set of five bars		
Material for instrument qualification according to EN 10045-2			
Impact toughness	109,7	± 3	J

Materials certified for physical properties

Mechanical properties (e.g hardness, impact toughness, viscosity)

ERM-FA415ac available from IRMM

Matrix Charpy specimens

Form: Set of 5 bars **unit size:** 5 bars

This material is intended for direct verification of Charpy impact pendulums according to ISO-148

Absorbed energy (KV)	150	± 6	J
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ERM-FA415v available from IRMM

Matrix Charpy specimens

Form: Set of five bars **unit size:** Set of 5 steel bars

Material for direct verification of Charpy impact toughness machines according to ISO-148 and EN45001.

Absorbed energy (KV) (nominal)	156	± 7	J
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Morphological properties (e.g Particle size, surface area)

ERM-FD100 available from IRMM

Matrix Suspension of silica nanoparticles

Form: Suspension 1 % m/ **unit size:** 9 mL

Material for demonstration of method proficiency and method validation.

Intensity-weighted mean diameter by DLS	19,0	± 0,6	nm
Number-based modal diameter by SEM/TEM	19,4	± 1,3	nm
Intensity-based modal diameter by CLS	20,1	± 1,3	nm
Intensity-weighted mean diameter by SAXS	21,8	± 0,7	nm
Zeta Potential	-43ENP	± 22	mV
Volume-weighted mean diameter by SAXS	20,4ENP	± 1,6	nm

Morphological properties (e.g Particle size, surface area)

ERM-FD102 available from IRMM

Matrix Suspension of silica nanoparticles

Form: suspension **unit size:** 9 mL

The intended use is to check the performance of instruments and/or methods that characterise the particle size distribution of nanoparticles (particle size ranging from approximately 1 nm to approximately 100 nm) that are either suspended in a liquid medium or deposited on a suitable substrate. The certified values that have been assigned are regarded as reliable estimates of the true values and ERM-FD102 can therefore be used for calibration purposes

Number-weighted modal maximum particle height - polulation 1	16.9		nm
Scattering intensity-weighted harmonic mean hydrodynamic diameter - polulation 1	17		nm
Scattering intensity-weighted modal hydrodynamic diameter - polulation 1	17.1		nm
Mass-weighted modal Stokes' diameter - polulation 1	18		nm
Effective particle density	2		g/cm3
Number-weighted modal hydrodynamic diameter - polulation 2	78		nm
Number-weighted median hydrodynamic diameter - polulation 2	79.2		nm
Number-weighted modal maximum particle height - polulation 2	80		nm
Number-weighted mean hydrodynamic diameter - polulation 2	82		nm
Scattering intensity-weighted modal hydrodynamic diameter - polulation 2	84		nm
Scattering intensity-weighted harmonic mean hydrodynamic diameter - polulation 2	84.8		nm
Mass-weighted modal Stokes' diameter - polulation 2	88		nm
Scattering intensity-weighted arithmetic mean hydrodynamic diameter - polulation 1	17.8	± 1.5	nm

Materials certified for physical properties

Morphological properties (e.g Particle size, surface area)

Number-weighted modal area-equivalent diameter - population 1	18.2	± 1.6	nm
Number-weighted median area-equivalent diameter - population 1	18.3	± 1.7	nm
Extinction intensity-weighted modal Stokes' diameter - population 1	23.9	± 2.0	nm
Number-weighted median area-equivalent diameter - population 2	83.3	± 2.3	nm
Number-weighted modal area-equivalent diameter - population 2	84	± 2.1	nm
Extinction intensity-weighted modal Stokes' diameter - population 2	88	± 7	nm
Scattering intensity-weighted arithmetic mean hydrodynamic diameter - population 2	88.5	± 2.2	nm

ERM-FD107 available from BAM

Matrix Zeolite

Form: Pellets **unit size:** 10 g

Intended for calibration and checking of instruments for the determination of the specific surface area, the specific pore volume, and the pore radius by means of the gas adsorption method.

Specific micropore volume	0,217	± 0,004	cm ³ /g
Median pore width	0,86	± 0,03	nm

Morphological properties (e.g Particle size, surface area)

ERM-FD120

available from BAM

Matrix Alumina

Form: Beads **unit size:** 15 g

Intended for the calibration and checking of porosimeters by means of the whole pressure volume curves of the Hg intrusion method.

Pressure-volume curve (mercury intrusion curve) between 0.1 MPa and 400 MPa

Null (ind.)

Diameter-volume curve (cumulative pore volume curve) between 3.7 nm and 14708 nm

Null (ind.)

Mean pore diameter d ₅₀	228,0	± 5,9	nm
Most frequent pore diameter dp,m	232,2	± 8,8	nm
Pore volume at 100 MPa	545,0	± 12,2	mm ³ /g
Pore volume at 195 MPa	546,7	± 12,7	mm ³ /g
Pore volume at 200 MPa	546,8	± 12,7	mm ³ /g
Pore volume at 395 MPa	548,1	± 13,1	mm ³ /g

ERM-FD121

available from BAM

Matrix Glass

Form: Beads **unit size:** 15 g

Intended for the calibration and checking of porosimeters by means of the whole pressure volume curves of the Hg intrusion method.

Pressure-volume curve (mercury intrusion curve) between 0.1 MPa and 400 Mpa

Null (ind.)

Diameter-volume curve (cumulative pore volume curve) between 3.7 nm and 14708 nm

Null (ind.)

Mean pore diameter d ₅₀	15,1	± 0,2	nm
Most frequent pore diameter dp,m	15,3	± 0,2	nm
Pore volume at 100 MPa	621,8	± 12,9	mm ³ /g
Pore volume at 200 MPa	621,9	± 12,9	mm ³ /g
Pore volume at 195 MPa	621,9	± 12,9	mm ³ /g
Pore volume at 395 MPa	624,6	± 13,4	mm ³ /g

Materials certified for physical properties

Morphological properties (e.g Particle size, surface area)

ERM-FD122 available from BAM

Matrix Glass

Form: Beads **unit size:** 10 g

Intended for the calibration and checking of porosimeters by means of the whole pressure volume curves of the Hg intrusion method.

Pressure-volume curve (mercury intrusion curve) between 0.1 MPa and 400 MPa	Null (ind.)		
Diameter-volume curve (cumulative pore volume curve) between 3.7 nm and 14708 nm	Null (ind.)		
Mean pore diameter d50	139,0	± 3,7	nm
Most frequent pore diameter dp,m	140,2	± 3,9	nm
Pore volume at 100 MPa	919,7	± 16,8	mm ³ /g
Pore volume at 195 MPa	922,5	± 17,5	mm ³ /g
Pore volume at 200 MPa	922,6	± 17,5	mm ³ /g
Pore volume at 395 MPa	924,4	± 17,2	mm ³ /g

ERM-FD123 available from BAM

Matrix Alpha-alumina ceramics

Form: Tubes **unit size:** 6 pieces

Material intended for the calibration and checking of porosimeters by means of the whole pressure volume curves of the Hg intrusion method.

Pressure-volume curve between 0.28-1.41 MPa	Null (ind.)		
Pressure p50	0,483	± 0,024	MPa
Diameter d50	3,05	± 0,16	nm
Specific pore volume VP, 1.4MPa at 1.4 MPa	99,5	± 3,5	mm ³ /g

Morphological properties (e.g Particle size, surface area)

ERM-FD304 available from IRMM

Matrix Colloidal silica in aqueous solution

Form: Liquid **unit size:** 9 mL

The intended use of this material is to check the performance of instruments and/or methods that characterise the particle size distribution of nanoparticles suspended in a liquid medium.

Number-based modal diameter by SEM/TEM	27,8 (ind.)	± 1,5	nm
Intensity-weighted mean diameter by DLS	33,0	± 3,0	nm
Intensity-based modal diameter by CLS	42,1	± 0,6	nm

Optical properties (e.g. Wavelength and absorbance materials)

ERM-FB010 available from LGC

Matrix Holmium/neodymium oxides solution

Form: Solution **unit size:** 1 cuvette

UV/visible wavelength location of 16 peaks in the spectral range 219 to 865 nm at three spectral bandwidths (0.5, 1 and 2 nm)

ERM-FB011 available from LGC

Matrix Sodium nitrate/cobalt chloride/nickel chloride solution

Form: Solution **unit size:** 4 cuvettes

UV-visible absorbance at four wavelengths (299, 395, 512.5 and 719 nm) at a 1 nm bandwidth

ERM-FB012 available from LGC

Matrix Polystyrene in hexane

Form: Solution **unit size:** 5 x 1 mL

IR wavelength positions of positions of four peaks (3026, 1601.1, 1028.8 and 698 cm⁻¹) at 1nm bandwidth

True peak position	1028,8	± 0,4	cm ⁻¹
True peak position	1601,1	± 0,4	cm ⁻¹
True peak position	3026,0	± 0,4	cm ⁻¹
True peak position	698,0	± 0,4	cm ⁻¹

ERM-FB020 available from LGC

Matrix Holmium/neodymium oxides solution (for HPLC calibr)

Form: Solution **unit size:** 2 x 3 mL

UV/visible wavelength location of 7 peaks in the spectral range 241 to 797 nm at four spectral bandwidths (1, 4, 7 and 10 nm)

Materials certified for physical properties

Thermal properties

ERM-FC030a available from LGC

Matrix Phenyl salicylate

Form: Solid **unit size:** 0.25 g

This material is intended for use in calibration and checking of apparatus used for determining melting points of samples in glass capillary tubes.

Liquifaction point 41.82 ± 0.3 °C

Thermal properties (e.g thermal conductivity, calorific value)

ERM-FC021a available from LGC

Matrix Carbazole

Form: Solid **unit size:** 0,25 g

This material is intended for use in calibration and checking apparatus used for determining melting points of samples in glass capillary tubes.

Melting point 245,41 ± 0,29 °C

ERM-FC022a available from LGC

Matrix 2-Chloroanthraquinone

Form: Solid **unit size:** 0,25 g

This material is intended for use in calibration and checking apparatus used for determining melting points of samples in glass capillary tubes.

Melting point 209,73 ± 0,24 °C

ERM-FC023a available from LGC

Matrix p-Anisic acid

Form: Solid **unit size:** 0,25 g

This material is intended for use in calibration and checking apparatus used for determining melting points of samples in glass capillary tubes.

Melting point 183,5 ± 0,31 °C

ERM-FC024a available from LGC

Matrix Diphenylacetic acid

Form: Solid **unit size:** 0,25 g

This material is intended for use in calibration and checking apparatus used for determining melting points of samples in glass capillary tubes.

Melting point 147,26 ± 0,31 °C

ERM-FC025a available from LGC

Matrix Benzoic acid

Form: Solid **unit size:** 0,25 g

This material is intended for use in calibration and checking apparatus used for determining melting points of samples in glass capillary tubes.

Melting point 122,36 ± 0,26 °C

Thermal properties (e.g thermal conductivity, calorific value)

ERM-FC026a available from LGC

Matrix Acetanilide

Form: Solid **unit size:** 0,25 g

This material is intended for use in calibration and checking apparatus used for determining melting points of samples in glass capillary tubes.

Melting point 114,19 ± 0,28 °C

ERM-FC027a available from LGC

Matrix Benzil

Form: Solid **unit size:** 0,25 g

This material is intended for use in calibration and checking apparatus used for determining melting points of samples in glass capillary tubes.

Melting point 94,9 ± 0,24 °C

ERM-FC028a available from LGC

Matrix Naphthalene

Form: Solid **unit size:** 0,25 g

This material is intended for use in calibration and checking apparatus used for determining melting points of samples in glass capillary tubes.

Melting point 80,34 ± 0,22 °C

ERM-FC029a available from LGC

Matrix 4-Nitrotoluene

Form: Solid **unit size:** 0,25 g

This material is intended for use in calibration and checking apparatus used for determining melting points of samples in glass capillary tubes.

Melting point 51,66 ± 0,18 °C

ERM-FC032 available from LGC

Matrix n-nonane

Form: Liquid **unit size:** 120 mL

This material is primarily intended for checking the performance of closed cup flash point apparatus.

Flash Point 32,5 ± 0,5 °C

ERM-FC033 available from LGC

Matrix n-decane

Form: Liquid **unit size:** 120 mL

This material is primarily intended for checking the performance of closed cup flash point apparatus.

Flash Point 50,0 ± 0,9 °C

Materials certified for physical properties

Thermal properties (e.g thermal conductivity, calorific value)

ERM-FC395k available from IRMM

Matrix Gas oil

Form: Liquid **unit size:** 2 x 27 mL

Gas oil certified for CFPP and CP for demonstrating method performance and instrument qualification

Cloud Point (CP) -7,2 ± 3,0 °C

Cold Filter PLugging Point (CFPP) -7,9 ± 1,6 °C

Non-matrix -materials certified for purity and concentration, activity

Isotopically labelled materials

ERM-AE042 available from IRMM
Matrix Nitric acid
Form: Solution **unit size:** 10 mL
 244Pu 3,7490E-09 ± 0,0076 E-9 mol/g

ERM-AE101 available from BAM
Matrix Boric acid solution
Form: Solution **unit size:** 30 mL
 Intended for calibration and validation of ICP-MS procedures for the determination of boron isotope amount ratios.

w(B)	1000 (ind.)	± 20	mg/kg
n(10B)/n(11B)	0,28197	± 0,00040	mol/mol
M(B)	10,790	± 0,00024	g/mol
m(10B)/m(B)	20,411	± 0,022	mass %
n(10B)/n(B)	21,995	± 0,024	%
n(11B)/n(B)	78,005	± 0,024	%
m(11B)/m(B)	79,589	± 0,022	mass %

ERM-AE102 available from BAM
Matrix Boric acid solution
Form: Solution **unit size:** 30 mL
 Intended for calibration and validation of ICP-MS procedures for the determination of boron isotope amount ratios.

w(B)	999 (ind.)	± 20	mg/kg
n(10B)/n(11B)	0,42485	± 0,00060	mol/mol
M(B)	10,712	± 0,00030	g/mol
m(10B)/m(B)	27,871	± 0,028	mass %
n(10B)/n(B)	29,817	± 0,030	%
n(11B)/n(B)	70,183	± 0,030	%
m(11B)/m(B)	72	± 0,028	mass %

ERM-AE102a available from BAM
Matrix Boric acid solution
Form: Liquid **unit size:** 20 mL
 Isotope reference material for boron, isotope abundance 10B: 30%

Mass fraction of B in solution w(B)	999	± 20	mg/kg
Isotope abundance 10B	0,29995	± 0,00027	
Isotope abundance ratio R(10B/11B)	0,4285	± 0,0006	
Isotope abundance 11B	0,70005	± 0,00027	
Molar mass of B in solution M(B)	10,71044	± 0,00027	g/mol
Isotope abundance ratio R(11B/10B)	2,3338	± 0,0030	

Isotopically labelled materials

ERM-AE103 available from BAM
Matrix Boric acid solution
Form: Solution **unit size:** 30 mL
 Intended for calibration and validation of ICP-MS procedures for the determination of boron isotope amount ratios.

w(B)	1000 (ind.)	± 20	mg/kg
n(10B)/n(11B)	0,9895	± 0,0014	mol/mol
M(B)	10,514	± 0,00034	g/mol
m(10B)/m(B)	47,368	± 0,034	mass %
n(10B)/n(B)	49,737	± 0,034	%
n(11B)/n(B)	50,263	± 0,034	%
m(11B)/m(B)	52,632	± 0,034	mass %

ERM-AE104 available from BAM
Matrix Boric acid solution
Form: Solution **unit size:** 30 mL
 Intended for calibration and validation of ICP-MS procedures for the determination of boron isotope amount ratios.

w(B)	999 (ind.)	± 20	mg/kg
n(10B)/n(11B)	0,45966	± 0,00062	mol/mol
M(B)	10,696	± 0,00029	g/mol
m(10B)/m(B)	29,481	± 0,028	mass %
n(10B)/n(B)	31,491	± 0,029	%
n(11B)/n(B)	68,509	± 0,029	%
m(11B)/m(B)	70,519	± 0,028	mass %

ERM-AE104a available from BAM
Matrix Boric acid solution
Form: Liquid **unit size:** 20 mL

Isotope reference material for boron, isotope abundance 10B: 31.5%

Mass fraction of B in solution w(B)	1000	± 20	mg/kg
Isotope abundance 10B	0,31488	± 0,00028	
Isotope abundance ratio R(10B/11B)	0,4596	± 0,0006	
Isotope abundance 11B	0,68512	± 0,00028	
Molar mass of B in solution M(B)	10,6956	± 0,00028	g/mol
Isotope abundance ratio R(11B/10B)	2,1758	± 0,0028	

Non-matrix -materials certified for purity and concentration, activity

Isotopically labelled materials

ERM-AE120 available from BAM

Matrix Boric acid solution

Form: Liquid **unit size:** 20 mL

Isotope reference material for boron, $\delta^{11}\text{B}$: -20‰

Isotope abundance 10B	0,20150	$\pm 0,00021$	
Isotope abundance ratio R(10B/11B)	0,25236	$\pm 0,00033$	
Isotope abundance 11B	0,79850	$\pm 0,00021$	
Molar mass of B in solution M(B)	10,80853	$\pm 0,00021$	g/mol
Mass fraction of B in solution w(B)	100,0	$\pm 2,0$	mg/kg
Isotope abundance ratio R(11B/10B)	3,963	$\pm 0,006$	
$\delta^{11}\text{B}$ NIST 951 in ‰	20,2	$\pm 0,6$	‰

ERM-AE121 available from BAM

Matrix Boric acid solution

Form: Liquid **unit size:** 20 mL

Isotope reference material for boron, $\delta^{11}\text{B}$: -20‰

Isotope abundance 10B	0,19506	$\pm 0,00021$	
Isotope abundance ratio R(10B/11B)	0,24233	$\pm 0,00032$	
Isotope abundance 11B	0,80494	$\pm 0,00021$	
Molar mass of B in solution M(B)	10,81495	$\pm 0,00021$	g/mol
Mass fraction of B in solution w(B)	100,0	$\pm 2,0$	mg/kg
Isotope abundance ratio R(11B/10B)	4,127	$\pm 0,006$	
$\delta^{11}\text{B}$ NIST 951 in ‰	19,9	$\pm 0,6$	‰

ERM-AE122 available from BAM

Matrix Boric acid solution

Form: Liquid **unit size:** 20 mL

Isotope reference material for boron, $\delta^{11}\text{B}$: +40‰

Isotope abundance 10B	0,19213	$\pm 0,00020$	
Isotope abundance ratio R(10B/11B)	0,23782	$\pm 0,00031$	
Isotope abundance 11B	0,80787	$\pm 0,00020$	
Molar mass of B in solution M(B)	10,81787	$\pm 0,00020$	g/mol
Mass fraction of B in solution w(B)	100,0	$\pm 2,0$	mg/kg
Isotope abundance ratio R(11B/10B)	4,205	$\pm 0,006$	
$\delta^{11}\text{B}$ NIST 951 in ‰	39,7	$\pm 0,6$	‰

Isotopically labelled materials

ERM-AE633 available from IRMM

Matrix Nitric acid

Form: Solution **unit size:** 4 mL

63Cu	5,998E-06	$\pm 0,036 \text{ E-6}$	mol/g
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ERM-AE637 available from IRMM

Matrix Nitric acid

Form: Solution **unit size:** 4 mL

24Mg	7,9137E-07	$\pm 0,0030 \text{ E-7}$	mol/g
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ERM-AE638 available from IRMM

Matrix Nitric acid

Form: Solution **unit size:** 4 mL

26Mg	8,574E-07	$\pm 0,034 \text{ E-7}$	mol/g
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ERM-AE639 available from IRMM

Matrix Hydrochloric acid

Form: Solution **unit size:** 5 mL

202Hg	1,1891E-08	$\pm 0,0050 \text{ E-8}$	mol/g
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ERM-AE640 available from IRMM

Matrix Hydrochloric acid

Form: Solution **unit size:** 5 mL

202Hg	1,471E-08	$\pm 0,011 \text{ E-8}$	mol/g
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ERM-AE641 available from IRMM

Matrix Water

Form: Solution **unit size:** 4 mL

35Cl	1,8959E-05	$\pm 0,015 \text{ E-6}$	mol/g
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ERM-AE642 available from IRMM

Matrix Water

Form: Solution **unit size:** 4 mL

37Cl	4,375E-06	$\pm 0,0026 \text{ E-4}$	mol/g
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ERM-AE647 available from IRMM

Matrix Nitric acid

Form: Solution **unit size:** 4 mL

63Cu	1,34974E-04	$\pm 0,0073 \text{ E-4}$	mol/g
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Non-matrix -materials certified for purity and concentration, activity

Isotopically labelled materials

ERM-AE649 available from IRMM
Matrix Nitric acid
Form: Solution **unit size:** 5 mL

205TI 8,3688E-04 ± 0,0027E-4 mol/g

ERM-AE701 available from IRMM
Matrix Nitric acid
Form: Solution **unit size:** 25 mL

ERM AE701 is a set of calcium isotope mixtures with certified isotope amount ratios.

n(41Ca)/n(40Ca)	1,01140E-06	± 1,011 E-6	mol %
n(41Ca)/n(40Ca)	1,0181E-08	± 1,018 E-8	mol %
n(41Ca)/n(40Ca)	1,0235E-07	± 1,023 E-7	mol %
n(41Ca)/n(40Ca)	1,0479E-09	± 1,047 E-9	mol %
n(41Ca)/n(40Ca)	1,0520E-10	± 1,052 E-10	mol %
n(41Ca)/n(40Ca)	1,0524E-13	± 1,052 E-13	mol %
n(41Ca)/n(40Ca)	1,0549E-12	± 1,054 E-12	mol %
n(41Ca)/n(40Ca)	1,0913E-11	± 1,091 E-11	mol %

Organic macromolecules

ERM-AD149 available from IRMM
Matrix Purified material
Form: Powder **unit size:** 0.5 mL when reconstituted

The material was calibrated against the WHO reference materials and can be used to calibrate any batch of thromboplastin used for the determination of the coagulation time of blood plasma.

Thromboplastin	1,257	± 0,013	slope
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Organic macromolecules

ERM-AD413 available from IRMM
Matrix Pure materials and synthetic mixtures
Form: Frozen solution **unit size:** 0.5 mL

The CRM is intended to be used for the calibration of the method ISO 21570:2005(E) D 2 for the quantification of the MON 810 event.

Plasmid DNA fragments of MON 810 maize, ratio between 2 fragments in plasmid	1,00 (ind.)	± 0,06	
Plasmid DNA fragments of MON 810 maize, ratio between 2 fragments in plasmid	1,04 (ind.)	± 0,06	
Plasmid DNA fragments of MON 810 maize, fragment of 5' plant-P35S junction DNA / plasmid	1		uncertainty negligible
Plasmid DNA fragments of MON 810 maize, fragment of hmg DNA / plasmid	1		uncertainty negligible

ERM-AD415 available from IRMM
Matrix pDNA in buffer
Form: Frozen liquid **unit size:** 500 mL

Plasmid calibrant for quantification of NK603 maize

Fragment of 3' insertion-specific DNA /plasmid	1	negligible	dimensionless
Fragment of hmg DNA /plasmid	1	negligible	dimensionless

ERM-AD425 available from IRMM
Matrix 356043 soybean DNA fragment
Form: Solution **unit size:** 500 uL solution

The CRM is intended to be used as a calibrant exclusively with the quantification method described in the certification report and the method validated by the EU-RL for GM food and feed.

Fragment 5' insert-to-plant junction DNA /plasmid	1	negligible	dimensionless
Fragment of le1 DNA /plasmid	1	negligible	dimensionless

Non-matrix -materials certified for purity and concentration, activity

Organic macromolecules

ERM-AD427 available from IRMM

Matrix 98140 maize DNA fragment

Form: Solution **unit size:** 500 uL solution

The CRM is intended to be used for the calibration of measurements of the 98140 copy number ratios in GM food and feed for which the measurement uncertainty due to the calibrant is negligible.

Fragment 5' insert-to-plant junction DNA /plasmid	1	negligible	dimensionless
Fragment of hmg DNA /plasmid	1	negligible	dimensionless

ERM-AD452 available from IRMM

Matrix Lyophilised enzyme

Form: Powder **unit size:** 1 mL when reconstituted

Material to be used to standardise commercial testkits to the IFCC primary reference method.

Gamma-Glutamyltransferase	1,90	± 0,04	µkat/L
Gamma-Glutamyltransferase	114,1	± 2,4	U/L

ERM-AD454 available from IRMM

Matrix Lyophilised enzyme

Form: Powder **unit size:** 1 mL when reconstituted

Material to be used to standardise commercial testkits to the IFCC primary reference method.

Alanine aminotransferase	186	± 4	U/L
Alanine aminotransferase	3,09	± 0,07	µkat/L

ERM-AD455 available from IRMM

Matrix Lyophilised enzyme

Form: Powder **unit size:** 1 mL when reconstituted

Material to be used to standardise commercial testkits to the IFCC primary reference method.

Creatine kinase CK-MB	1,68	± 0,07	µkat/L
Creatine kinase CK-MB	101	± 4	U/L

Organic macromolecules

ERM-AD457/IFCC available from IRMM

Matrix Lyophilised enzyme

Form: Powder **unit size:** 2 g when reconstituted

Material to be used to standardise commercial testkits to the IFCC primary reference method.

Catalytic activity concentration in reconstituted material	1,74	± 0,05	µkat/L
Catalytic activity concentration in reconstituted material	104,6	± 2,7	U/L

ERM-AD623 available from IRMM

Matrix pDNA in buffer

Form: liquid frozen **unit size:** Set of 6 vials of 600 µL

Monitoring of chronic myelogenous leukaemia

Number of BCR-ABL b3a2 transcript	1	negligible	fragment/asmid
Number of BCR transcript	1	negligible	fragment/asmid
Number of GUSB transcript	1	negligible	fragment/asmid
Concentration AD623d	1.02E3	± 0.09E3	cp/µL
Concentration AD623c	1.03E4	± 0.10E4	cp/µL
Concentration AD623e	1.04E2	± 0.10E2	cp/µL
Concentration AD623b	1.08E5	± 0.11E5	cp/µL
Concentration AD623a	1.08E6	± 0.13E6	cp/µL
Concentration AD623f	10.0	± 1.5	cp/µL

Solid or liquid inorganic compounds and elements (pure and solutions)

ERM-AC057 available from IRMM

Matrix Acetonitrile

Form: Solution **unit size:** 4 mL

Material intended for the calibration of instrument (e.g. external calibration, standard addition). This material can also be used to assess own calibrants.

Aflatoxin B1	2,97 (ind.)	± 0,09	µg/mL
Aflatoxin B1	3,79	± 0,11	µg/g

Non-matrix -materials certified for purity and concentration, activity

Solid or liquid inorganic compounds and elements (pure and solutions)

ERM-AC058 available from IRMM

Matrix Acetonitrile

Form: Solution **unit size:** 4 mL

Material intended for the calibration of instrument (e.g. external calibration, standard addition). This material can also be used to assess own calibrants.

Aflatoxin B2	2,98 (ind.)	± 0,06	µg/mL
Aflatoxin B2	3,80	± 0,08	µg/g

ERM-AC059 available from IRMM

Matrix Acetonitrile

Form: Solution **unit size:** 4 mL

Material intended for the calibration of instrument (e.g. external calibration, standard addition). This material can also be used to assess own calibrants.

Aflatoxin G1	3,78	± 0,13	µg/g
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Solid or liquid small organic molecules (pure and solutions)

ERM-AC059 available from IRMM

Matrix Acetonitrile

Form: Solution **unit size:** 4 mL

Material intended for the calibration of instrument (e.g. external calibration, standard addition). This material can also be used to assess own calibrants.

Aflatoxin G1	2,96 (ind.)	± 0,10	µg/mL
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ERM-AC060 available from IRMM

Matrix Acetonitrile

Form: Solution **unit size:** 4 mL

Material intended for the calibration of instrument (e.g. external calibration, standard addition). This material can also be used to assess own calibrants.

Aflatoxin G2	2,98 (ind.)	± 0,06	µg/mL
Aflatoxin G2	3,80	± 0,07	µg/g

ERM-AC200a available from LGC

Matrix Digoxin

Form: Solid **unit size:** 500 mg

Primarily intended to enable analysts to carry out accurate, traceable calibration of analytical instrumentation

Purity	98	± 0,5	mass %
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Solid or liquid small organic molecules (pure and solutions)

ERM-AC213 available from IRMM

Matrix Acetonitrile/Toluene

Form: Liquid **unit size:** 2 mL

Calibration solution.

Benzo[c]fluorene	2,13	± 0,11	µg/g
Dibenzo[a,i]pyrene	2,37	± 0,15	µg/g
Cyclopenta[cd]pyrene	2,96	± 0,12	µg/g
Dibenz[a,h]anthracene	2,76	± 0,05	µg/g
Dibenzo[a,l]pyrene	2,85	± 0,10	µg/g
Benzo[a]pyrene	2,86	± 0,07	µg/g
Dibenzo[a,e]pyrene	2,97	± 0,10	µg/g
Indeno[1,2,3-cd]pyrene	3,04	± 0,05	µg/g
Benzo[b]fluoranthene	3,05	± 0,05	µg/g
Benzo[j]fluoranthene	3,05	± 0,10	µg/g
Chrysene	3,06	± 0,05	µg/g
Benzo[k]fluoranthene	3,06	± 0,08	µg/g
Benzo[ghi]perylene	3,07	± 0,05	µg/g
5-methylchrysene	3,08	± 0,07	µg/g
Benz[a]anthracene	3,09	± 0,04	µg/g

ERM-AC301 available from LGC

Matrix Butylated hydroxyanisole (BHA)

Form: Solid **unit size:** 0.5 g

Primarily intended to enable analysts to carry out accurate, traceable calibration of analytical instrumentation

Purity	99,2	± 0,6	mass %
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ERM-AC303a available from LGC

Matrix Leucomalachite Green

Form: Powder **unit size:** 100 mg

A pure material intended for use as a calibration standard for the determination of leucomalachite green in fish and other relevant matrices.

Mass fraction	98,8	± 0,8	mass %
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ERM-AC316a available from LGC

Matrix Solvent yellow 124

Form: Liquid **unit size:** 200 mg

A pure material intended for use as a calibration standard for the determination of solvent yellow 124 in fuel

Mass fraction	95	± 0,05	mass %
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Non-matrix -materials certified for purity and concentration, activity

Solid or liquid small organic molecules (pure and solutions)

ERM-AC401f available from LGC

Matrix Aqueous Ethanol - 80mg/100mL

Form: Liquid **unit size:** 25 mL

This material is intended for use as a reference material for the calibration and validation of methods for the determination of ethanol in biological fluids.

Ethanol content 80 ± 0,6 mg/100 mL

ERM-AC402b available from LGC

Matrix Aqueous ethanol - 107mg/100mL

Form: Liquid **unit size:** 25 mL

This material is intended for use as a reference material for the calibration and validation of methods for the determination of ethanol in biological fluids.

Ethanol content 106,5 ± 0,6 mg/100 mL

ERM-AC403d available from LGC

Matrix Aqueous Ethanol - 200mg/100mL

Form: Liquid **unit size:** 25 mL

This material is intended for use as a reference material for the calibration and validation of methods for the determination of ethanol in biological fluids.

Ethanol content 199,6 ± 0,6 mg/100 mL

ERM-AC404g available from LGC

Matrix Reference spirit - 5%ABV

Form: Liquid **unit size:** 5 x 50 mL

The primary intended use of this material is to validate analytical capability for determining alcoholic strength by densimetry and gas chromatography

Alcoholic Strength 4,98 ± 0,03 %ABV

Density in Air 990,02 ± 0,04 kg/m³

ERM-AC405c available from LGC

Matrix Reference spirit - 15%ABV

Form: Liquid **unit size:** 50 mL

The primary use of this reference material is for checking the calibration of automatic density meters commonly used in industry to determine alcoholic strength, and for checking method and analyst performance.

Alcoholic Strength 14,99 ± 0,04 %ABV

Density in Air 977,94 ± 0,05 kg/m³

Solid or liquid small organic molecules (pure and solutions)

ERM-AC406e available from LGC

Matrix Reference spirit - 40%ABV

Form: Liquid **unit size:** 50 mL

The primary use of this reference material is for checking the calibration of automatic density meters commonly used in industry to determine alcoholic strength, and for checking method and analyst performance.

Alcoholic Strength 40,04 ± 0,04 %ABV

Density in Air 946,91 ± 0,06 kg/m³

ERM-AC407c available from LGC

Matrix Reference spirit - 70%ABV

Form: Liquid **unit size:** 5 x 50 mL

The primary intended use of this material is to validate analytical capability for determining alcoholic strength by densimetry and gas chromatography

Alcoholic Strength 69,98 ± 0,04 %ABV

Density in Air 884,55 ± 0,07 kg/m³

ERM-AC510a available from LGC

Matrix Water

Form: Liquid **unit size:** 25 mL

Ethanol content

Ethanol content 49,6 ± 0,6 mg/100m

ERM-AC511a available from LGC

Matrix Water

Form: Liquid **unit size:** 25 mL

Ethanol content

Ethanol content 66,9 ± 0,6 mg/100m

ERM-AC699 available from IRMM

Matrix Acetonitrile

Form: Solution **unit size:** 4 mL

Calibrant

Zearalenone 9,95 ± 0,30 µg/mL

ERM-AC802b available from LGC

Matrix Nicotine

Form: Liquid **unit size:** 0.6 mL

Pure nicotine certified for purity.

Purity 99,7 ± 0,3 mass %

ERM-AC803a available from LGC

Matrix Theophylline

Form: Solid **unit size:** 500 mg

Pure theophylline certified for purity.

Purity 99,95 +0.05/-0.08 mass %

Non-matrix -materials certified for purity and concentration, activity

*Solid or liquid small organic molecules
(pure and solutions)*

ERM-AC820 available from LGC
Matrix PCB77
Form: Crystalline Powder **unit size:** 0.02 g
 Primarily intended to enable analysts to carry out accurate, traceable calibration of analytical instrumentation
 Purity 99,8 +0,2 / -0,3 mass %

ERM-AC821 available from LGC
Matrix PCB126
Form: Crystalline Powder **unit size:** 0,02 g
 Primarily intended to enable analysts to carry out accurate, traceable calibration of analytical instrumentation
 Purity 98,9 ± 0,3 mass %

ERM-AC822 available from LGC
Matrix PCB169
Form: Crystalline Powder **unit size:** 0.02 g
 Primarily intended to enable analysts to carry out accurate, traceable calibration of analytical instrumentation
 Purity 99,4 +0,6 / -1,4 mass %

*Solid or liquid small organic molecules
(pure and solutions)*

ERM-AC823 available from LGC
Matrix 2,2,4-trimethylpentane
Form: Liquid **unit size:** 1,2 mL
 Intended for methods validation purposes and for checking instrument calibration for the measurement of polychlorinated biphenyls.

2,3,3',4',5,6-hexachlorobiphenyl	689 (ind.)		µg/kg
2,3,3',4',6-pentachlorobiphenyl	690 (ind.)		µg/kg
2,2',3,3',4,4',5-heptachlorobiphenyl	693 (ind.)		µg/kg
2,2',3,3',4,4',5,5'-octachlorobiphenyl	693 (ind.)		µg/kg
2,2',3,4',5,5',6-heptachlorobiphenyl	693 (ind.)		µg/kg
2,2',3,4',5',6-hexachlorobiphenyl	695 (ind.)		µg/kg
2,4',5-trichlorobiphenyl	697 (ind.)		µg/kg
3,3',4,4'-tetrachlorobiphenyl	697 (ind.)		µg/kg
2,2',3,4,4',5'-hexachlorobiphenyl	676	± 30	µg/kg
2,2',4,5,5'-pentachlorobiphenyl	696	± 7	µg/kg
2,4,4'-trichlorobiphenyl	698	± 10	µg/kg
2,2',3,4,4',5,5'-heptachlorobiphenyl	698	± 13	µg/kg
2,2',4,4',5,5'-hexachlorobiphenyl	702	± 8	µg/kg
2,2',5,5'-tetrachlorobiphenyl	705	± 10	µg/kg
2,3',4,4',5-pentachlorobiphenyl	712	± 9	µg/kg

Non-matrix -materials certified for purity and concentration, activity

Isotopically labelled materials

ERM-AE123 available from BAM

Matrix

Form: liquid **unit size:** 20 mL

Isotope reference material for boron, isotope abundance 10B: 19.8 %

Boron	1063	± 20	mg/kg
Boron	0.19832	± 0.00022	
Boron	0.2474	± 0.0004	
Boron	0.80168	± 0.00022	
Boron	10.8117	± 0.00022	g/mol
Boron	4.042	± 0.006	

ERM-AE124 available from BAM

Matrix

Form: liquid **unit size:** 20 mL

Isotope reference material for boron, isotope abundance 10B: 96.0 %

Boron	1002	± 20	mg/kg
Boron	0.03994	± 0.00006	
Boron	0.0416	± 0.00006	
Boron	0.96006	± 0.00006	
Boron	10.05273	± 0.00006	g/mol
Boron	24.04	± 0.04	

Solid or liquid small organic molecules (pure and solutions)

ERM-AC406f available from LGC

Matrix Reference Spirit - 40 % ABV (Alcohol by Volume)

Form: Liquid **unit size:** 25 mL

The primary use of this reference material is for checking the calibration of automatic density meters commonly used in industry to determine alcoholic strength, and for checking method and analyst performance

Alcoholic Strength	39.98	± 0.04	% ABV
Density (in air)	947.01	± 0.06	kg/m ³

ERM-AC407d available from LGC

Matrix Reference Spirit - 70 % ABV (Alcohol by Volume)

Form: Liquid **unit size:** 25 mL

The primary use of this reference material is for checking the calibration of automatic density meters commonly used in industry to determine alcoholic strength, and for checking method and analyst performance

Alcoholic Strength	70.09	± 0.03	% ABV
Density (in air)	884.27	± 0.07	kg/m ³

Solid or liquid small organic molecules (pure and solutions)

ERM-AC409b available from LGC

Matrix Aqueous ethanol - 20 mg/100 mL

Form: Liquid **unit size:** 50 mL

This material is intended for use as a reference material for the calibration and validation of methods for the determination of ethanol in biological fluids.

Ethanol	20.1	± 0.6	mg/100 mL
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ERM-AC410a available from LGC

Matrix Reference Spirit - 40 % ABV (Alcohol by Volume)

Form: Liquid **unit size:** 50 mL

The primary use of this reference material is for checking the calibration of automatic density meters commonly used in industry to determine alcoholic strength, and for checking method and analyst performance

Alcoholic Strength	40.08	± 0.04	% ABV
Density (in air)	946.86	± 0.06	kg/m ³