

Key comparison CCM.M-K2

MEASURAND :

Mass

NOMINAL VALUES :

10 kg, 500 g, 20 g, 2 g and 100 mg

$x_{(rep) i}$: reported result obtained as the difference between the measurement of the mass standard carried out by laboratory i and its nominal value

u_i : combined standard uncertainty of $x_{(rep) i}$

Three sets of mass standards, designated as CA, CB and CC, were circulated.

For each set of mass standards the Pilot Laboratory, PTB, carried out two measurements: the first one before the circulation and the second one after the circulation, as indicated respectively by (1) and (2).

x_i : difference between the mass determined by laboratory i , $x_{(rep) i}$, and that determined by the Pilot Laboratory.

The Pilot's mass value is the average of the two results obtained before and after the circulation.

Nominal value	10 kg			500 g			20 g			
Lab i	$x_{(rep) i}$ / mg	u_i / mg	x_i / mg	$x_{(rep) i}$ / mg	u_i / mg	x_i / mg	$x_{(rep) i}$ / mg	u_i / mg	x_i / mg	Date of measure
Set of mass standards CA										
PTB (1)	-2.135	0.122	-0.006	-0.1801	0.0062	-0.0028	-0.0052	0.0023	-0.0009	Mar 98
NMIA	-2.200	0.340	-0.071	-0.1820	0.0200	-0.0047	-0.0053	0.0030	-0.0011	Jul 98
KRISS	-2.296	0.148	-0.167	-0.1719	0.0073	0.0054	-0.0029	0.0009	0.0014	Aug 98
NMIJ	-1.930	0.280	0.199	-0.1490	0.0080	0.0283	-0.0040	0.0020	0.0003	Sep 98
NIM	-1.700	0.500	0.429	-0.1700	0.0120	0.0073	-0.0015	0.0020	0.0028	Nov 98
PTB (2)	-2.123	0.122	0.006	-0.1745	0.0062	0.0028	-0.0033	0.0023	0.0010	Mar 99
Set of mass standards CB										
PTB (1)	-3.071	0.122	-0.019	-0.2149	0.0062	-0.0019	-0.0035	0.0023	0.0007	Mar 98
NPL	-3.200	0.150	-0.149	-0.2090	0.0074	0.0040	-0.0008	0.0009	0.0034	Aug 98
CENAM	-1.680	0.760	1.371	-0.1922	0.0094	0.0208	-0.0016	0.0021	0.0026	Sep 98
NRC	-1.200	0.970	1.851	-0.2062	0.0078	0.0068	-0.0015	0.0037	0.0027	Nov 98
NIST	-2.952	0.197	0.099	-0.2108	0.0081	0.0022	-0.0011	0.0010	0.0031	Dec 98
PTB (2)	-3.032	0.122	0.019	-0.2111	0.0062	0.0019	-0.0049	0.0023	-0.0007	Mar 99
Set of mass standards CC										
PTB (1)	-8.542	0.122	-0.023	-0.5135	0.0062	-0.0021	-0.0024	0.0023	0.0000	Mar 98
VSL	-8.900	1.100	-0.381	-0.5600	0.0200	-0.0487	0.0020	0.0040	0.0044	Jun 98
SMU	-6.870	0.860	1.649	-0.5140	0.0220	-0.0027	-0.0119	0.0035	-0.0095	Aug 98
METAS	-8.465	0.251	0.054	-0.5010	0.0151	0.0104	0.0064	0.0026	0.0088	Sep 98
LNE	-8.800	0.300	-0.281	-0.5140	0.0150	-0.0027	0.0037	0.0026	0.0061	Oct 98
INRIM	-8.760	0.228	-0.241	-0.4990	0.0076	0.0124	-0.0039	0.0038	-0.0015	Nov 98
PTB (2)	-8.496	0.122	0.023	-0.5092	0.0062	0.0021	-0.0024	0.0023	0.0000	Mar 99

Key comparison CCM.M-K2

MEASURAND :

Mass

NOMINAL VALUES :

10 kg, 500 g, 20 g, 2 g and 100 mg

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u_i : combined standard uncertainty of $x_{(rep) i}$

Three sets of mass standards, designated as CA, CB and CC, were circulated.

For each set of mass standards the Pilot Laboratory, PTB, carried out two measurements: the first one before the circulation and the second one after the circulation, as indicated respectively by (1) and (2).

x_i : difference between the mass determined by laboratory i , $x_{(rep) i}$, and that determined by the Pilot Laboratory.

The Pilot's mass value is the average of the two results obtained before and after the circulation.

Nominal value	2 g			100 mg			
Lab i	$x_{(rep) i}$ / mg	u_i / mg	x_i / mg	$x_{(rep) i}$ / mg	u_i / mg	x_i / mg	Date of measure
Set of mass standards CA							
PTB (1)	-0.0002	0.0007	0.0008	0.0000	0.0003	0.0002	Mar 98
NMIA	-0.0014	0.0006	-0.0004	-0.0005	0.0003	-0.0003	Jul 98
KRISS	0.0004	0.0004	0.0014	-0.0011	0.0001	-0.0009	Aug 98
NMIJ	0.0004	0.0005	0.0014	-0.0009	0.0002	-0.0007	Sep 98
NIM	-0.0008	0.0006	0.0002	-0.0007	0.0003	-0.0005	Nov 98
PTB (2)	-0.0018	0.0007	-0.0008	-0.0004	0.0003	-0.0002	Mar 99
Set of mass standards CB							
PTB (1)	-0.0036	0.0007	0.0003	-0.0002	0.0003	-0.0001	Mar 98
NPL	-0.0031	0.0002	0.0008	-0.0005	0.0004	-0.0004	Aug 98
CENAM	-0.0032	0.0006	0.0007	-0.0012	0.0004	-0.0011	Sep 98
NRC	-0.0004	0.0015	0.0035	-0.0003	0.0003	-0.0002	Nov 98
NIST	-0.0025	0.0004	0.0013	-0.0008	0.0001	-0.0006	Dec 98
PTB (2)	-0.0041	0.0007	-0.0003	-0.0001	0.0003	0.0001	Mar 99
Set of mass standards CC							
PTB (1)	0.0032	0.0007	0.0005	-0.0007	0.0003	0.0004	Mar 98
VSL	0.0010	0.0030	-0.0018	-0.0004	0.0008	0.0007	Jun 98
SMU	0.0034	0.0020	0.0007	-0.0002	0.0010	0.0009	Aug 98
METAS	0.0045	0.0010	0.0018	-0.0014	0.0003	-0.0004	Sep 98
LNE	0.0043	0.0010	0.0016	-0.0019	0.0004	-0.0008	Oct 98
INRIM	0.0012	0.0018	-0.0016	-0.0019	0.0008	-0.0009	Nov 98
PTB (2)	0.0023	0.0007	-0.0005	-0.0014	0.0003	-0.0004	Mar 99

Key comparison APMP.M.M-K6

MEASURAND : Mass
NOMINAL VALUES : 500 g, 20 g, 2 g and 100 mg

$x_{APMP\ i}$: reported result, obtained as the difference between the measurement of the mass standards carried out by laboratory *i* and the nominal value

$u_{APMP\ i}$: standard combined uncertainty ($k = 1$) of $x_{APMP\ i}$

As APMP.M.M-K6 Pilot laboratory, VMI-STAMEQ determined the mass of the travelling standards four times for Loop A of the comparison, and three times for Loop B of the comparison.

Lab <i>i</i>	$x_{APMP\ i}$ / mg	$u_{APMP\ i}$ / mg	$x_{APMP\ i}$ / mg	$u_{APMP\ i}$ / mg	$x_{APMP\ i}$ / mg	$u_{APMP\ i}$ / mg	$x_{APMP\ i}$ / mg	$u_{APMP\ i}$ / mg	Date of measurement
Nominal value	500 g		20 g		2 g		100 mg		
Loop A									
VMI-STAMEQ 1	0.213	0.0207	0.003	0.0022	0.0125	0.001	-0.006	0.001	May 2005
NMISA	0.17	0.125	0.006	0.0135	0.014	0.0065	-0.005	0.0025	June 2005
NMIA	0.228	0.024	0.0026	0.0032	0.0128	0.0011	-0.0046	0.00047	September 2005
VMI-STAMEQ 2	0.201	0.0374	0.0057	0.0029	0.0115	0.001	-0.008	0.001	November 2005
ITDI	0.265	0.043	0.013	0.011	0.006	0.01	0	0.009	December 2005
NIMT	0.237	0.038	-0.002	0.004	0.0112	0.0021	0.0021	0.0008	January 2006
VMI-STAMEQ 3	0.209	0.0374	-0.00074	0.0030	0.011	0.001	-0.005	0.001	April 2006
NIS	-	-	-0.018	0.009	-0.008	0.007	-0.0054	0.0028	July 2006
VMI-STAMEQ 4	0.198	0.0374	-0.0064	0.0030	0.0096	0.001	-0.006	0.001	November 2006
Loop B									
VMI-STAMEQ 1	0.148	0.0207	0.0005	0.0022	-0.004	0.001	0.0025	0.001	May 2005
MUSSD	0.1216	0.133	0.0182	0.013	-0.0049	0.007	-0.0026	0.0027	June 2005
NPLI	0.191	0.041	0.0099	0.0035	-0.0017	0.0006	0.0034	0.0005	October 2005
VMI-STAMEQ 2	0.139	0.0374	0.004	0.0041	-0.005	0.001	0.0028	0.001	December 2005
KIM-LIPI*	-	0.031	0.009	0.0037	-0.0023	0.0015	0.0049	0.00066	March 2006
VMI-STAMEQ 3	-4.45	0.0374	0.011	0.0036	-0.004	0.001	0.0034	0.001	October 2006

* Measurement results invalidated due to damage of the transfer standards

Artefacts of nominal value 1 kg are also measured in the framework of key comparison APMP.M.M-K6. This is reported together with CCM.M-K1 results.

Key comparison EUROMET.M.M-K2

MEASURAND : Mass
NOMINAL VALUES : 10 kg, 500 g, 20 g, 2 g and 100 mg

The results and uncertainties reported by the participants in EUROMET.M.M-K2 are given in Table 2 of the EUROMET.M.M-K2 Final Report.

Key comparison EUROMET.M.M-K2.1

MEASURAND : Mass
NOMINAL VALUES : 10 kg, 500 g, 20 g, 2 g and 100 mg

The results and uncertainties reported by the participants in EUROMET.M.M-K2.1 are given in Table 3 of the EUROMET.M.M-K2.1 Final Report.

Key comparison APMP.M.M-K2

MEASURAND : Mass
NOMINAL VALUES : 10 kg, 500 g, 20 g, 2 g and 100 mg

The results and uncertainties reported by the participants in APMP.M.M-K2 are given in Table 1 of the APMP.M.M-K2 Final Report.

Key comparison APMP.M.M-K2.1

MEASURAND : Mass
NOMINAL VALUES : 500 g, 20 g, 2 g and 100 mg

The results and uncertainties reported by the participants in APMP.M.M-K2.1 are given in Table 1 of the APMP.M.M-K2.1 Final Report.

Key comparison EURAMET.M.M-K2.2

MEASURAND : Mass
NOMINAL VALUES : 500 g, 20 g, 2 g and 100 mg

The results and uncertainties reported by the participants in EURAMET.M.M-K2.2 are given in Table 10 of the EURAMET.M.M-K2.2 Final Report.

Key comparison EURAMET.M.M-K2.3

MEASURAND : Mass
NOMINAL VALUES : 10 kg, 500 g, and 20 g

The results and uncertainties reported by the participants in EURAMET.M.M-K2.3 are given in Table 2 of the EURAMET.M.M-K2.3 Final Report.

Key comparison EURAMET.M.M-K2.5

MEASURAND : Mass
NOMINAL VALUES : 10 kg

The results and uncertainties reported by the participants in EURAMET.M.M-K2.5 are given in Table 7 of the EURAMET.M.M-K2.5 Final Report.

Key comparison CCM.M-K2

MEASURAND : Mass
NOMINAL VALUES : 10 kg, 500 g, 20 g, 2 g and 100 mg

The key comparison reference value, x_R , is evaluated as the median of the x_i values.
Its standard uncertainty is denoted u_R (see Appendix 1 of the CCM.M-K2 Final Report).

	Nominal value				
	10 kg	500 g	20 g	2 g	100 mg
x_R / mg	0.03	0.005	0.0027	0.0007	-0.0004
u_R /mg	0.12	0.004	0.0011	0.0004	0.0002

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of terms: $D_i = (x_i - x_R)$ and U_i , its expanded uncertainty (at a 95% level of confidence), both expressed in mg. Detailed information on the evaluation of U_i may be found in Section 5 of the CCM.M-K2 Final Report.

The degree of equivalence between two laboratories is given by a pair of terms: $D_{ij} = D_i - D_j = (x_i - x_j)$ and U_{ij} , its expanded uncertainty (at a 95% level of confidence), both expressed in mg. Detailed information on the evaluation of U_{ij} may be found in Section 6 of the CCM.M-K2 Final Report.

Linking APMP.M.M-K6 results to CCM.M-K2 results

The APMP.M.M-K6 results were analyzed and linked to the CCM.M-K2 results using Generalised Least-Squares (sometimes known as Gauss-Markov) estimation (see Section 7 of the APMP.M.M-K6 Final Report).

This analysis directly combines the APMP comparison results with the CCM.M-K2 results of the linking laboratory, NMIA (CSIRO-NML at the time of the CCM.M-K2 key comparison), to estimate:

- the degree of equivalence of each laboratory i participant in APMP.M.M-K6 relative to the CCM.M-K2 key comparison reference value, D_i and U_i , and
- the degrees of equivalence between pairs of laboratories i and j both participant in APMP.M.M-K6, D_{ij} and U_{ij} , U_i and U_{ij} being the expanded uncertainties ($k = 2$) of D_i and D_{ij} respectively.

The pair-wise degrees of equivalence inside APMP.M.M-K6 are given on pages 15 and 16 of the APMP.M.M-K6 Final Report.

Artefacts of nominal value 1 kg are also measured in the framework of key comparison APMP.M.M-K6. This is reported together with CCM.M-K1 results.

MEASURAND : Mass NOMINAL VALUES : 10 kg, 500 g, 20 g, 2 g and 100 mg

Linking key comparisons EUROMET.M.M-K2 and EUROMET.M.M-K2.1

The linking process is explained in the Appendices A of the EUROMET.M.M-K2 and EUROMET.M.M-K2.1 Final Reports.

The degree of equivalence of laboratory i participant in EUROMET.M.M-K2 and K2.1 with respect to the CCM.M-K2 key comparison reference value, is given by a pair of terms: D_i and its expanded uncertainty (at a 95% level of confidence), U_i , both expressed in mg. These are computed as explained in the Appendices A of the EUROMET.M.M-K2 and EUROMET.M.M-K2.1 Final Reports.

The degrees of equivalence between any of the laboratories participating in EUROMET.M.M-K2 or K2.1 and those participating in CCM.M-K2 are not computed.

The pair-wise degrees of equivalence inside EUROMET.M.M-K2 are given in Table 6 to 10 of the EUROMET.M.M-K2 Final Report.

The pair-wise degrees of equivalence inside EUROMET.M.M-K2.1 are given in Table 7 to 11 of the EUROMET.M.M-K2.1 Final Report.

Linking key comparison APMP.M.M-K2

The linking process is explained in section 7.3 of the APMP.M.M-K2 Final Report.

The degree of equivalence of laboratory i participant in APMP.M.M-K2 with respect to the CCM.M-K2 key comparison reference value, is given by a pair of terms: D_i and its expanded uncertainty ($k = 2$), U_i , both expressed in mg.

These are computed as explained in section 7.3 of the APMP.M.M-K2 Final Report.

The degrees of equivalence between two laboratories participating in APMP.M.M-K2 are given by a pair of terms both expressed in mg: $D_{ij} = D_i - D_j$, and its expanded uncertainty ($k = 2$) U_{ij} .

The degrees of equivalence between any of the laboratories participating in APMP.M.M-K2 and those participating in CCM.M-K2 are not computed.

Linking key comparison APMP.M.M-K2.1

The linking process is explained in section 6.2 of the APMP.M.M-K2.1 Final Report.

The degree of equivalence of laboratory i participant in APMP.M.M-K2.1 with respect to the CCM.M-K2 key comparison reference value, is given by a pair of terms: D_i and its expanded uncertainty ($k = 2$), U_i , both expressed in mg.

These are computed as explained in section 6.2 of the APMP.M.M-K2.1 Final Report.

No pair-wise degrees of equivalence involving APMP.M.M-K2.1 participants have been computed.

MEASURAND : Mass
NOMINAL VALUES : 10 kg, 500 g, 20 g, 2 g and 100 mg

Linking key comparison EURAMET.M.M-K2.2

The link is made through the EUROMET.M.M-K2 key comparison using BEV and EIM results in both comparisons (see Section 5 of the EURAMET.M.M-K2.2 Final Report)

No pair-wise degrees of equivalence involving EURAMET.M.M-K2.2 participants have been computed.

Linking key comparison EURAMET.M.M-K2.3

The link is made through the EUROMET.M.M-K2 key comparison using EIM results in both comparisons (see Section 7 of the EURAMET.M.M-K2.3 Final Report)

The pair-wise degrees of equivalence inside EURAMET.M.M-K2.3 are given in Table 5 of the EURAMET.M.M-K2.3 Final Report.

MEASURAND : Mass
NOMINAL VALUES : 10 kg

Linking key comparison EURAMET.M.M-K2.5

The link is made through the PTB results having participated in both comparisons (see page 6 of the EURAMET.M.M-K2.5 Final Report).

No pair-wise degrees of equivalence involving EURAMET.M.M-K2.2 participants have been computed.

Key comparisons CCM.M-K2, EUROMET.M.M-K2, EUROMET.M.M-K2.1, APMP.M.M-K2, EURAMET.M.M-K2.3, and EURAMET.M.M-K2.5

MEASURAND : Mass

NOMINAL VALUE : 10 kg

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.03	0.34
NMIA	-0.10	0.72
KRISS	-0.19	0.38
NMIJ	0.17	0.61
NIM	0.40	1.03
NPL	-0.18	0.39
CENAM	1.34	1.54
NRC	1.82	1.96
NIST	0.07	0.46
VSL	-0.41	2.21
SMU	1.62	1.74
METAS	0.03	0.56
LNE	-0.31	0.65
INRIM	-0.27	0.52

Lab *i* ↓

	D_i	U_i
	/ mg	
IPQ	-	-
CEM	-0.21	1.07
SMD	-0.40	1.24
VSL	0.52	1.58
NML(IE)	1.22	2.33
EIM	0.06	1.91
UME	6.43	1.12
INM(RO)	0.56	0.87
BIM	1.43	26.01
MKEH	0.60	0.92
JV	0.40	1.82
SP	-0.29	1.56
MIKES	-0.04	1.36
METROSERT	-0.80	6.45
LNMC	-0.18	3.47
DFM	-0.79	1.58
PTB	-0.03	0.30
CMI	0.28	3.06
GUM	1.48	2.28
VMT	2.18	3.26
SMU	0.74	1.06
BEV	-0.05	1.50
METAS	0.04	0.51
INRIM	-0.27	0.47
MIRS	0.01	1.60

Lab *i* ↓

	D_i	U_i
	/ mg	
MSA	-0.67	2.50
INPL	0.73	1.22
DZM	-0.95	2.98
UME	3.93	1.74
VSL	-0.41	1.58
METROSERT	0.04	1.47
LNMC	0.24	1.73
DMDM	0.03	2.00
JV	-	-
NIS	-0.06	0.92
EIM	0.23	1.17

Lab *i* ↓

	D_i	U_i
	/ mg	
NPLI	0.351	2.486
CMS/ITRI	-0.649	2.754
NMIA	-0.083	0.756
NMISA	1.793	2.391
KIM-LIPI	1.201	1.875
KRISS	-0.198	0.448
SCL	-0.999	2.527
NIMT	-0.199	1.624
A*STAR	-0.199	1.841
MSL	-0.399	1.583
NML-SIRIM	-0.199	2.373

Lab *i* ↓

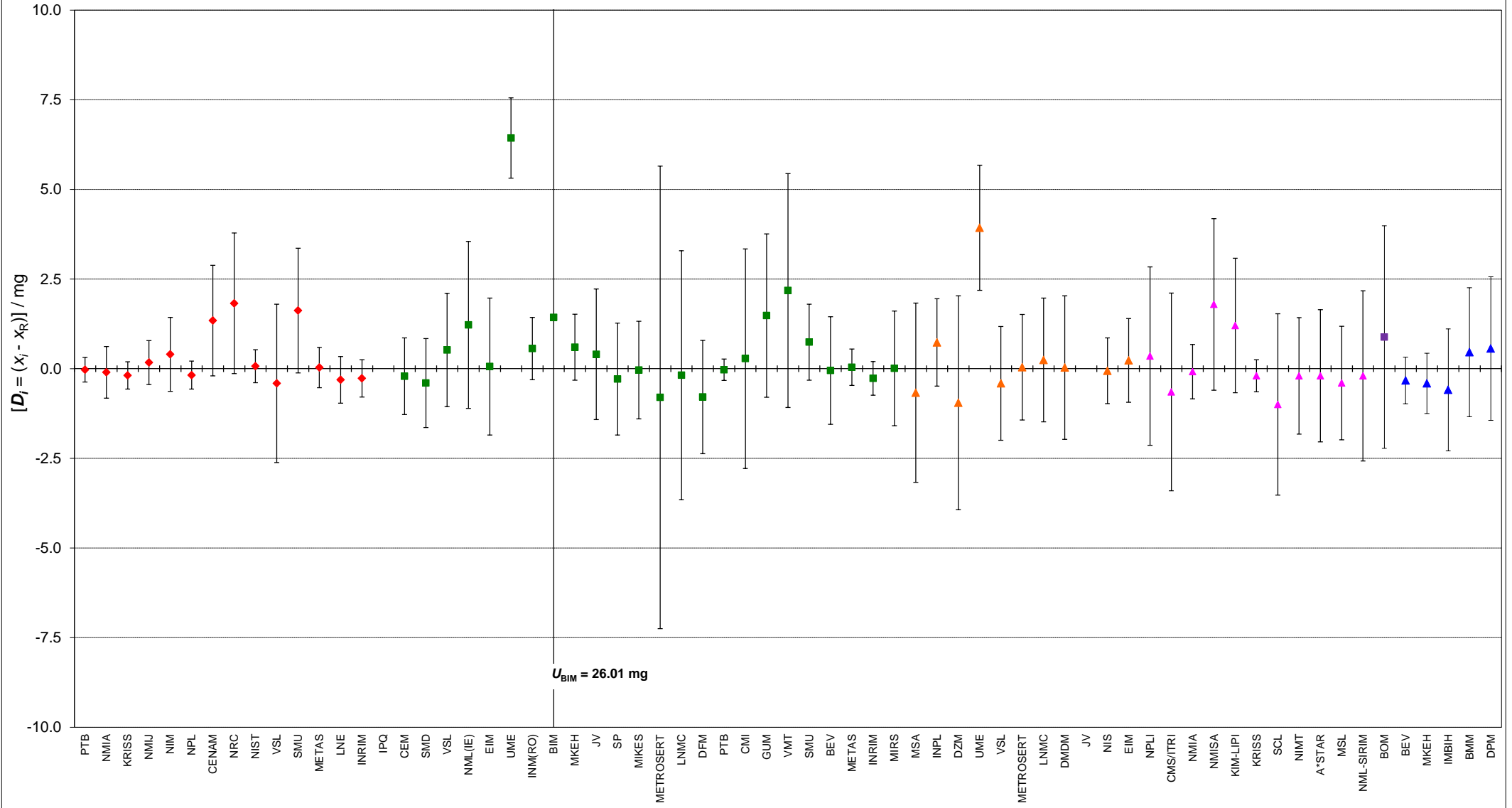
	D_i	U_i
	/ mg	
BOM	0.88	3.1

Lab *i* ↓

	D_i	U_i
	/ mg	
BEV	-0.33	0.65
MKEH	-0.41	0.84
IMBIH	-0.59	1.7
BMM	0.46	1.8
DPM	0.56	2.0

Artefacts of nominal value 10 kg are not measured in the framework of key comparisons APMP.M.M-K6, APMP.M.M-K2.1 and EURAMET.M.M-K2.2

CCM.M-K2 , EUROMET.M.M-K2, EUROMET.M.M-K2.1, APMP.M.M-K2, EURAMET.M.M-K2.3, and EURAMET.M.M-K2.5 10 kg mass standards
Degrees of equivalence: D_i and expanded uncertainty U_i



Red diamonds: CCM.M-K2 participants
Pink triangles: APMP.M.M-K2 participants

Green squares: EUROMET.M.M-K2 participants
Purple square: EURAMET.M.M-K2.3 participant

Orange triangles: EUROMET.M.M-K2.1 participants
Blue triangles : EURAMET.M.M-K2.5 participants

CCM.M-K2 Matrix of equivalence for nominal value 10 kg

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.03	0.34
NMIA	-0.10	0.72
KRISS	-0.19	0.38
NMIJ	0.17	0.61
NIM	0.40	1.03
NPL	-0.18	0.39
CENAM	1.34	1.54
NRC	1.82	1.96
NIST	0.07	0.46
VSL	-0.41	2.21
SMU	1.62	1.74
METAS	0.03	0.56
LNE	-0.31	0.65
INRIM	-0.27	0.52

Lab *j* →

PTB		NMIA		KRISS		NMIJ		NIM		NPL		CENAM	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
		0.07	0.72	0.17	0.38	-0.20	0.61	-0.43	1.03	0.15	0.39	-1.37	1.54
-0.07	0.72			0.10	0.74	-0.27	0.88	-0.50	1.21	0.08	0.75	-1.44	1.67
-0.17	0.38	-0.10	0.74			-0.37	0.64	-0.60	1.04	-0.02	0.43	-1.54	1.55
0.20	0.61	0.27	0.88	0.37	0.64			-0.23	1.15	0.35	0.64	-1.17	1.62
0.43	1.03	0.50	1.21	0.60	1.04	0.23	1.15			0.58	1.05	-0.94	1.82
-0.15	0.39	-0.08	0.75	0.02	0.43	-0.35	0.64	-0.58	1.05			-1.52	1.55
1.37	1.54	1.44	1.67	1.54	1.55	1.17	1.62	0.94	1.82	1.52	1.55		
1.85	1.96	1.92	2.06	2.02	1.96	1.65	2.02	1.42	2.18	2.00	1.96	0.48	2.47
0.10	0.46	0.17	0.79	0.27	0.50	-0.10	0.69	-0.33	1.08	0.25	0.50	-1.27	1.57
-0.38	2.21	-0.31	2.30	-0.21	2.22	-0.58	2.27	-0.81	2.42	-0.23	2.22	-1.75	2.68
1.65	1.74	1.72	1.85	1.82	1.75	1.45	1.81	1.22	1.99	1.80	1.75	0.28	2.30
0.05	0.56	0.13	0.85	0.22	0.59	-0.15	0.76	-0.38	1.12	0.20	0.59	-1.32	1.60
-0.28	0.65	-0.21	0.91	-0.11	0.67	-0.48	0.83	-0.71	1.17	-0.13	0.68	-1.65	1.64
-0.24	0.52	-0.17	0.82	-0.07	0.55	-0.44	0.73	-0.67	1.10	-0.09	0.55	-1.61	1.59

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.03	0.34
NMIA	-0.10	0.72
KRISS	-0.19	0.38
NMIJ	0.17	0.61
NIM	0.40	1.03
NPL	-0.18	0.39
CENAM	1.34	1.54
NRC	1.82	1.96
NIST	0.07	0.46
VSL	-0.41	2.21
SMU	1.62	1.74
METAS	0.03	0.56
LNE	-0.31	0.65
INRIM	-0.27	0.52

Lab *j* →

NRC		NIST		VSL		SMU		METAS		LNE		INRIM	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
-1.85	1.96	-0.10	0.46	0.38	2.21	-1.65	1.74	-0.05	0.56	0.28	0.65	0.24	0.52
-1.92	2.06	-0.17	0.79	0.31	2.30	-1.72	1.85	-0.13	0.85	0.21	0.91	0.17	0.82
-2.02	1.96	-0.27	0.50	0.21	2.22	-1.82	1.75	-0.22	0.59	0.11	0.67	0.07	0.55
-1.65	2.02	0.10	0.69	0.58	2.27	-1.45	1.81	0.15	0.76	0.48	0.83	0.44	0.73
-1.42	2.18	0.33	1.08	0.81	2.42	-1.22	1.99	0.38	1.12	0.71	1.17	0.67	1.10
-2.00	1.96	-0.25	0.50	0.23	2.22	-1.80	1.75	-0.20	0.59	0.13	0.68	0.09	0.55
-0.48	2.47	1.27	1.57	1.75	2.68	-0.28	2.30	1.32	1.60	1.65	1.64	1.61	1.59
		1.75	1.98	2.23	2.93	0.20	2.59	1.80	2.01	2.13	2.03	2.09	2.00
-1.75	1.98			0.48	2.24	-1.55	1.77	0.05	0.65	0.38	0.72	0.34	0.61
-2.23	2.93	-0.48	2.24			-2.03	2.79	-0.44	2.26	-0.10	2.28	-0.14	2.25
-0.20	2.59	1.55	1.77	2.03	2.79			1.60	1.79	1.93	1.82	1.89	1.78
-1.80	2.01	-0.05	0.65	0.44	2.26	-1.60	1.79			0.34	0.78	0.30	0.68
-2.13	2.03	-0.38	0.72	0.10	2.28	-1.93	1.82	-0.34	0.78			-0.04	0.76
-2.09	2.00	-0.34	0.61	0.14	2.25	-1.89	1.78	-0.30	0.68	0.04	0.76		

APMP.M.M-K2 Matrix of equivalence for nominal value 10 kg

Lab <i>i</i> ↓	D_i U_i / mg		Lab <i>j</i> →																					
	D_{ij} / mg	U_{ij} / mg	NPLI		CMS/ITRI		NMIA		NMISA		KIM-LIPI		KRISS		SCL		NIMT		A*STAR		MSL		NML-SIRIM	
NPLI	0.351	2.486			1.000	3.44	0.434	2.56	-1.442	3.16	-0.850	2.79	0.549	2.49	1.350	3.27	0.550	2.63	0.550	2.77	0.750	2.61	0.550	3.15
CMS/ITRI	-0.649	2.754	-1.000	3.44			-0.566	2.82	-2.442	3.38	-1.850	3.03	-0.451	2.76	0.350	3.47	-0.450	2.89	-0.450	3.01	-0.250	2.86	-0.450	3.36
NMIA	-0.083	0.756	-0.434	2.56	0.566	2.82			-1.876	2.46	-1.284	1.97	0.115	0.81	0.916	2.60	0.116	1.73	0.116	1.93	0.316	1.69	0.116	2.45
NMISA	1.793	2.391	1.442	3.16	2.442	3.38	1.876	2.46			0.592	2.71	1.991	2.40	2.792	3.20	1.992	2.54	1.992	2.69	2.192	2.52	1.992	3.07
KIM-LIPI	1.201	1.875	0.850	2.79	1.850	3.03	1.284	1.97	-0.592	2.71			1.399	1.88	2.200	2.83	1.400	2.06	1.400	2.24	1.600	2.03	1.400	2.69
KRISS	-0.198	0.448	-0.549	2.49	0.451	2.76	-0.115	0.81	-1.991	2.40	-1.399	1.88			0.801	2.53	0.001	1.63	0.001	1.85	0.201	1.59	0.001	2.38
SCL	-0.999	2.527	-1.350	3.27	-0.350	3.47	-0.916	2.60	-2.792	3.20	-2.200	2.83	-0.801	2.53			-0.800	2.67	-0.800	2.81	-0.600	2.64	-0.800	3.18
NIMT	-0.199	1.624	-0.550	2.63	0.450	2.89	-0.116	1.73	-1.992	2.54	-1.400	2.06	-0.001	1.63	0.800	2.67			0.000	2.03	0.200	1.80	0.000	2.52
A*STAR	-0.199	1.841	-0.550	2.77	0.450	3.01	-0.116	1.93	-1.992	2.69	-1.400	2.24	-0.001	1.85	0.800	2.81	0.000	2.03			0.200	2.00	0.000	2.67
MSL	-0.399	1.583	-0.750	2.61	0.250	2.86	-0.316	1.69	-2.192	2.52	-1.600	2.03	-0.201	1.59	0.600	2.64	-0.200	1.80	-0.200	2.00			-0.200	2.50
NML-SIRIM	-0.199	2.373	-0.550	3.15	0.450	3.36	-0.116	2.45	-1.992	3.07	-1.400	2.69	-0.001	2.38	0.800	3.18	0.000	2.52	0.000	2.67	0.200	2.50		

Key comparisons CCM.M-K2, APMP.M.M-K6, EUROMET.M.M-K2, EUROMET.M.M-K2.1, APMP.M.M-K2, APMP.M.M-K2.1, EURAMET.M.M-K2.2, and EURAMET.M.M-K2.3

MEASURAND : Mass

NOMINAL VALUE : 500 g

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.005	0.014
NMIA	-0.009	0.041
KRISS	0.001	0.017
NMIJ	0.024	0.018
NIM	0.003	0.025
NPL	-0.001	0.017
CENAM	0.016	0.020
NRC	0.002	0.018
NIST	-0.002	0.018
VSL	-0.053	0.041
SMU	-0.007	0.045
METAS	0.006	0.031
LNE	-0.007	0.031
INRIM	0.008	0.017

VMI-STAMEQ	-0.024	0.053
NMISA	-0.067	0.252
NMIA	-0.009	0.042
ITDI	0.028	0.092
NIMT	0.000	0.083
NIS	-	-
MUSSD	-0.050	0.268
NPLI	0.019	0.089
KIM-LIPI	-	-

Lab *i* ↓

	D_i	U_i
	/ mg	
IPQ	0.004	0.069
CEM	0.006	0.034
SMD	0.019	0.039
VSL	0.028	0.082
NML(IE)	0.014	0.128
EIM	0.017	0.087
UME	0.236	0.030
INM(RO)	0.049	0.047
BIM	0.018	0.086
MKEH	0.064	0.036
JV	-0.088	0.070
SP	0.005	0.036
MIKES	-0.011	0.048
METROSERT	0.002	0.050
LNMC	0.003	0.114
DFM	0.002	0.020
PTB	0.001	0.013
CMI	0.045	0.052
GUM	0.030	0.042
VMT	-0.003	0.161
SMU	0.043	0.025
BEV	0.017	0.043
METAS	0.020	0.028
INRIM	0.013	0.016
MIRS	0.004	0.078

Lab *i* ↓

	D_i	U_i
	/ mg	
MSA	0.044	0.121
INPL	0.063	0.026
DZM	-0.020	0.127
UME	0.049	0.036
VSL	0.018	0.082
METROSERT	0.031	0.043
LNMC	-0.016	0.032
DMDM	0.005	0.093
JV	0.037	0.038
NIS	0.042	0.043
EIM	0.056	0.038

Lab *i* ↓

	D_i	U_i
	/ mg	
NPLI	-0.009	0.048
CMS/ITRI	-0.012	0.039
NMIA	0.001	0.035
NMISA	0.014	0.089
KIM-LIPI	0.006	0.039
KRISS	0.000	0.019
SCL	0.017	0.058
NIMT	-0.031	0.047
A*STAR	-0.003	0.049
MSL	-0.009	0.034
NML-SIRIM	0.004	0.058

NPLI	-0.015	0.018
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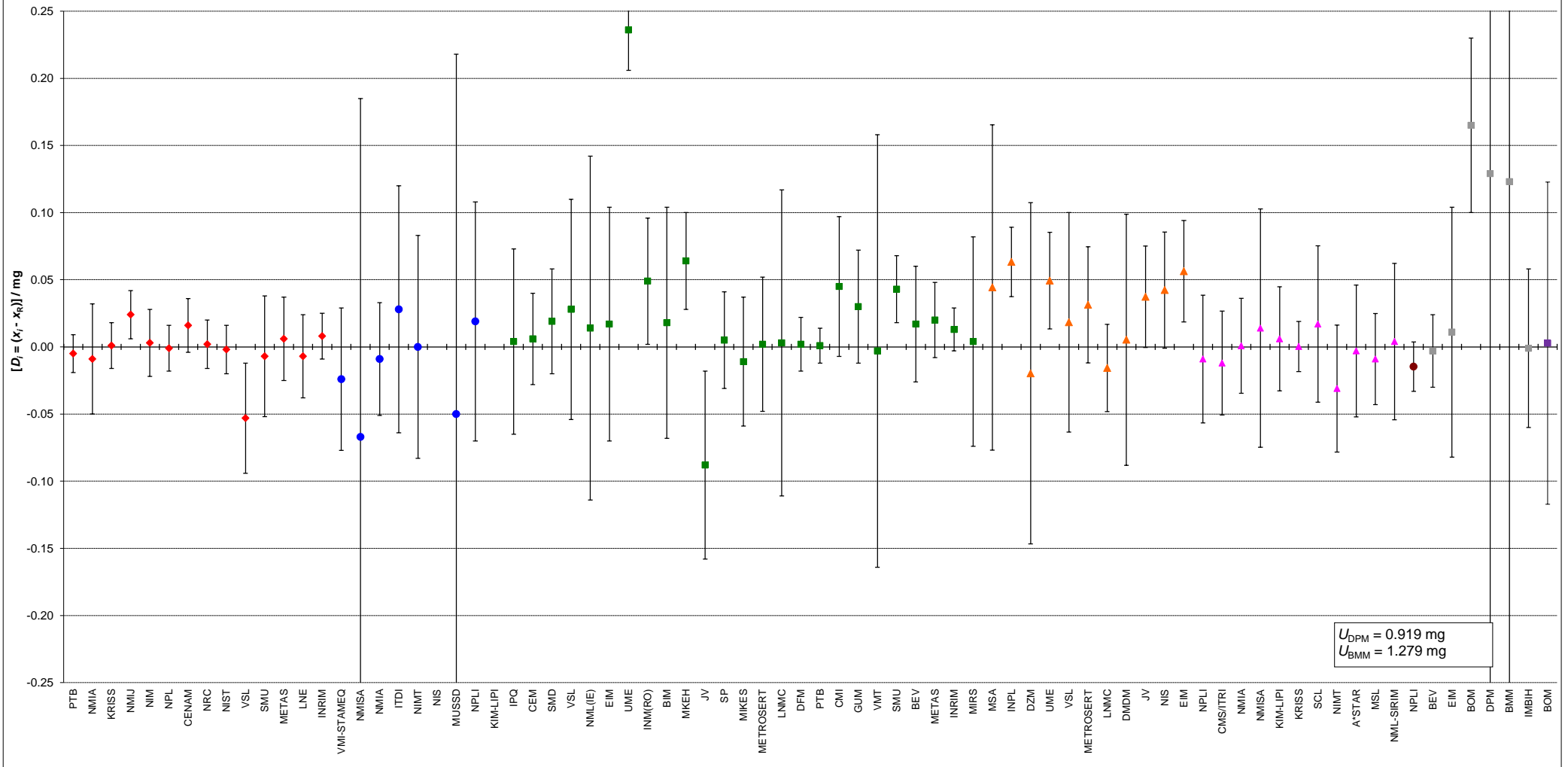
Lab *i* ↓

	D_i	U_i
	/ mg	
BEV	-0.003	0.027
EIM	0.011	0.093
BOM	0.165	0.065
DPM	0.129	0.919
BMM	0.123	1.279
IMBIH	-0.001	0.059

Lab *i* ↓

	D_i	U_i
	/ mg	
BOM	0.0028	0.12

CCM.M-K2 , APMP.M.M-K6, EUROMET.M.M-K2, EUROMET.M.M-K2.1, APMP.M.M-K2&K2.1, EURAMET.M.M-K2.2, and EURAMET.M.M-K2.3 500 g mass standards
 Degrees of equivalence: D_i and expanded uncertainty U_i



Red diamonds: CCM.M-K2 participants
 Blue circles: APMP.M.M-K6 participants
 Pink triangles: APMP.M.M-K2 participants

Green squares: EUROMET.M.M-K2 participants
 Orange triangles: EUROMET.M.M-K2.1 participants
 Braun circle: APMP.M.M-K2.1 participant

Grey squares: EURAMET.M.M-K2.2 participants
 Purple square: EURAMET.M.M-K2.3 participant

CCM.M-K2 Matrix of equivalence for nominal value 500 g

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.005	0.014
NMIA	-0.009	0.041
KRISS	0.001	0.017
NMIJ	0.024	0.018
NIM	0.003	0.025
NPL	-0.001	0.017
CENAM	0.016	0.020
NRC	0.002	0.018
NIST	-0.002	0.018
VSL	-0.053	0.041
SMU	-0.007	0.045
METAS	0.006	0.031
LNE	-0.007	0.031
INRIM	0.008	0.017

Lab *j* →

PTB		NMIA		KRISS		NMIJ		NIM		NPL		CENAM	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
		0.005	0.042	-0.005	0.019	-0.028	0.020	-0.007	0.027	-0.004	0.019	-0.021	0.023
-0.005	0.042			-0.010	0.043	-0.033	0.043	-0.012	0.047	-0.009	0.043	-0.026	0.045
0.005	0.019	0.010	0.043			-0.023	0.022	-0.002	0.028	0.001	0.022	-0.015	0.025
0.028	0.020	0.033	0.043	0.023	0.022			0.021	0.029	0.024	0.023	0.008	0.025
0.007	0.027	0.012	0.047	0.002	0.028	-0.021	0.029			0.003	0.029	-0.014	0.031
0.004	0.019	0.009	0.043	-0.001	0.022	-0.024	0.023	-0.003	0.029			-0.017	0.024
0.021	0.023	0.026	0.045	0.015	0.025	-0.008	0.025	0.014	0.031	0.017	0.024		
0.007	0.020	0.012	0.043	0.001	0.022	-0.022	0.023	0.000	0.029	0.003	0.022	-0.014	0.025
0.002	0.020	0.007	0.044	-0.003	0.023	-0.026	0.024	-0.005	0.030	-0.002	0.022	-0.019	0.025
-0.049	0.042	-0.044	0.057	-0.054	0.043	-0.077	0.044	-0.056	0.047	-0.053	0.043	-0.069	0.045
-0.003	0.046	0.002	0.060	-0.008	0.047	-0.031	0.047	-0.010	0.051	-0.007	0.047	-0.023	0.048
0.010	0.033	0.015	0.051	0.005	0.034	-0.018	0.035	0.003	0.039	0.006	0.034	-0.010	0.036
-0.003	0.033	0.002	0.050	-0.008	0.034	-0.031	0.035	-0.010	0.039	-0.007	0.034	-0.023	0.036
0.012	0.020	0.017	0.043	0.007	0.022	-0.016	0.023	0.005	0.029	0.008	0.022	-0.008	0.025

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.005	0.014
NMIA	-0.009	0.041
KRISS	0.001	0.017
NMIJ	0.024	0.018
NIM	0.003	0.025
NPL	-0.001	0.017
CENAM	0.016	0.020
NRC	0.002	0.018
NIST	-0.002	0.018
VSL	-0.053	0.041
SMU	-0.007	0.045
METAS	0.006	0.031
LNE	-0.007	0.031
INRIM	0.008	0.017

Lab *j* →

NRC		NIST		VSL		SMU		METAS		LNE		INRIM	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
-0.007	0.020	-0.002	0.020	0.049	0.042	0.003	0.046	-0.010	0.033	0.003	0.033	-0.012	0.020
-0.012	0.043	-0.007	0.044	0.044	0.057	-0.002	0.060	-0.015	0.051	-0.002	0.050	-0.017	0.043
-0.001	0.022	0.003	0.023	0.054	0.043	0.008	0.047	-0.005	0.034	0.008	0.034	-0.007	0.022
0.022	0.023	0.026	0.024	0.077	0.044	0.031	0.047	0.018	0.035	0.031	0.035	0.016	0.023
0.000	0.029	0.005	0.030	0.056	0.047	0.010	0.051	-0.003	0.039	0.010	0.039	-0.005	0.029
-0.003	0.022	0.002	0.022	0.053	0.043	0.007	0.047	-0.006	0.034	0.007	0.034	-0.008	0.022
0.014	0.025	0.019	0.025	0.069	0.045	0.023	0.048	0.010	0.036	0.023	0.036	0.008	0.025
		0.005	0.023	0.055	0.043	0.009	0.047	-0.004	0.034	0.009	0.034	-0.006	0.023
-0.005	0.023			0.051	0.044	0.005	0.047	-0.008	0.035	0.005	0.035	-0.010	0.023
-0.055	0.043	-0.051	0.044			-0.046	0.060	-0.059	0.050	-0.046	0.050	-0.061	0.043
-0.009	0.047	-0.005	0.047	0.046	0.060			-0.013	0.054	0.000	0.053	-0.015	0.047
0.004	0.034	0.008	0.035	0.059	0.050	0.013	0.054			0.013	0.043	-0.002	0.034
-0.009	0.034	-0.005	0.035	0.046	0.050	0.000	0.053	-0.013	0.043			-0.015	0.034
0.006	0.023	0.010	0.023	0.061	0.043	0.015	0.047	0.002	0.034	0.015	0.034		

APMP.M.M-K2 Matrix of equivalence for nominal value 500 g

Lab <i>i</i> ↓	D_i U_i / mg		Lab <i>j</i> →																					
	D_{ij} / mg	U_{ij} / mg	NPLI		CMS/ITRI		NMIA		NMISA		KIM-LIPI		KRISS		SCL		NIMT		A*STAR		MSL		NML-SIRIM	
NPLI	-0.009	0.048			0.0030	0.0530	-0.0098	0.0537	-0.0230	0.0958	-0.0150	0.0530	-0.0093	0.0486	-0.0260	0.0685	0.0220	0.0595	-0.0060	0.0610	0.0000	0.0496	-0.0130	0.0685
CMS/ITRI	-0.012	0.039	-0.0030	0.0530			-0.0128	0.0461	-0.0260	0.0918	-0.0180	0.0453	-0.0123	0.0401	-0.0290	0.0628	0.0190	0.0528	-0.0090	0.0544	-0.0030	0.0412	-0.0160	0.0628
NMIA	0.001	0.035	0.0098	0.0537	0.0128	0.0461			-0.0132	0.0922	-0.0052	0.0461	0.0005	0.0375	-0.0162	0.0634	0.0318	0.0535	0.0038	0.0551	0.0098	0.0421	-0.0032	0.0634
NMISA	0.014	0.089	0.0230	0.0958	0.0260	0.0918	0.0132	0.0922			0.0080	0.0918	0.0137	0.0893	-0.0030	0.1015	0.0450	0.0957	0.0170	0.0966	0.0230	0.0898	0.0100	0.1015
KIM-LIPI	0.006	0.039	0.0150	0.0530	0.0180	0.0453	0.0052	0.0461	-0.0080	0.0918			0.0057	0.0401	-0.0110	0.0628	0.0370	0.0528	0.0090	0.0544	0.0150	0.0412	0.0020	0.0628
KRISS	0.000	0.019	0.0093	0.0486	0.0123	0.0401	-0.0005	0.0375	-0.0137	0.0893	-0.0057	0.0401			-0.0167	0.0591	0.0313	0.0484	0.0033	0.0502	0.0093	0.0355	-0.0037	0.0591
SCL	0.017	0.058	0.0260	0.0685	0.0290	0.0628	0.0162	0.0634	0.0030	0.1015	0.0110	0.0628	0.0167	0.0591			0.0480	0.0684			0.0200	0.0697	0.0260	0.0764
NIMT	-0.031	0.047	-0.0220	0.0595	-0.0190	0.0528	-0.0318	0.0535	-0.0450	0.0957	-0.0370	0.0528	-0.0313	0.0484	-0.0480	0.0684					-0.0280	0.0608	-0.0220	0.0684
A*STAR	-0.003	0.049	0.0060	0.0610	0.0090	0.0544	-0.0038	0.0551	-0.0170	0.0966	-0.0090	0.0544	-0.0033	0.0502	-0.0200	0.0697	0.0280	0.0608					0.0060	0.0697
MSL	-0.009	0.034	0.0000	0.0496	0.0030	0.0412	-0.0098	0.0421	-0.0230	0.0898	-0.0150	0.0412	-0.0093	0.0355	-0.0260	0.0599	0.0220	0.0494	-0.0060	0.0511			-0.0130	0.0599
NML-SIRIM	0.004	0.058	0.0130	0.0685	0.0160	0.0628	0.0032	0.0634	-0.0100	0.1015	-0.0020	0.0628	0.0037	0.0591	-0.0130	0.0764	0.0350	0.0684	0.0070	0.0697	0.0130	0.0599		

Key comparisons CCM.M-K2, APMP.M.M-K6, EUROMET.M.M-K2, EUROMET.M.M-K2.1, APMP.M.M-K2, APMP.M.M-K2.1, EURAMET.M.M-K2.2 and EURAMET.M.M-K2.3

MEASURAND : Mass

NOMINAL VALUE : 20 g

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.0026	0.0051
NMIA	-0.0037	0.0079
KRISS	-0.0013	0.0054
NMIJ	-0.0024	0.0065
NIM	0.0001	0.0065
NPL	0.0008	0.0053
CENAM	0.0000	0.0066
NRC	0.0001	0.0090
NIST	0.0005	0.0054
VSL	0.0018	0.0094
SMU	-0.0121	0.0086
METAS	0.0062	0.0072
LNE	0.0035	0.0072
INRIM	-0.0041	0.0091

VMI-STAMEQ	-0.0060	0.0133
NMISA	-0.0003	0.0309
NMIA	-0.0037	0.0082
ITDI	0.0067	0.0267
NIMT	-0.0083	0.0170
NIS	-0.0243	0.0235
MUSSD	0.0075	0.0311
NPLI	-0.0008	0.0185
KIM-LIPI	-0.0017	0.0186

Lab *i* ↓

	D_i	U_i
	/ mg	
IPQ	0.001	0.008
CEM	-0.001	0.007
SMD	0.001	0.007
VSL	0.005	0.009
NML(IE)	-0.002	0.012
EIM	-0.001	0.011
UME	0.001	0.006
INM(RO)	0.007	0.007
BIM	0.007	0.011
MKEH	0.006	0.007
JV	0.002	0.008
SP	0.000	0.008
MIKES	-0.004	0.010
METROSERT	-0.005	0.007
LNMC	-0.002	0.010
DFM	0.001	0.006
PTB	-0.002	0.005
CMi	-0.006	0.013
GUM	0.005	0.009
VMT	0.007	0.011
SMU	0.002	0.008
BEV	0.005	0.007
METAS	0.005	0.007
INRIM	0.000	0.006
MIRS	0.001	0.010

Lab *i* ↓

	D_i	U_i
	/ mg	
MSA	-0.013	0.019
INPL	-0.002	0.010
DZM	-0.005	0.011
UME	0.004	0.009
VSL	0.002	0.009
METROSERT	-0.004	0.009
LNMC	-0.007	0.009
DMDM	-0.008	0.013
JV	-	-
NIS	-0.005	0.041
EIM	0.000	0.008

Lab *i* ↓

	D_i	U_i
	/ mg	
NPLI	-0.0001	0.0076
CMS/ITRI	0.0062	0.0093
NMIA	-0.0031	0.0068
NMISA	0.0032	0.0130
KIM-LIPI	-0.0028	0.0083
KRISS	-0.0016	0.0054
SCL	-0.0028	0.0108
NIMT	-0.0068	0.0076
A*STAR	-0.0038	0.0108
MSL	-0.0068	0.0073
NML-SIRIM	-0.0028	0.0089

NPLI	-0.0030	0.0080
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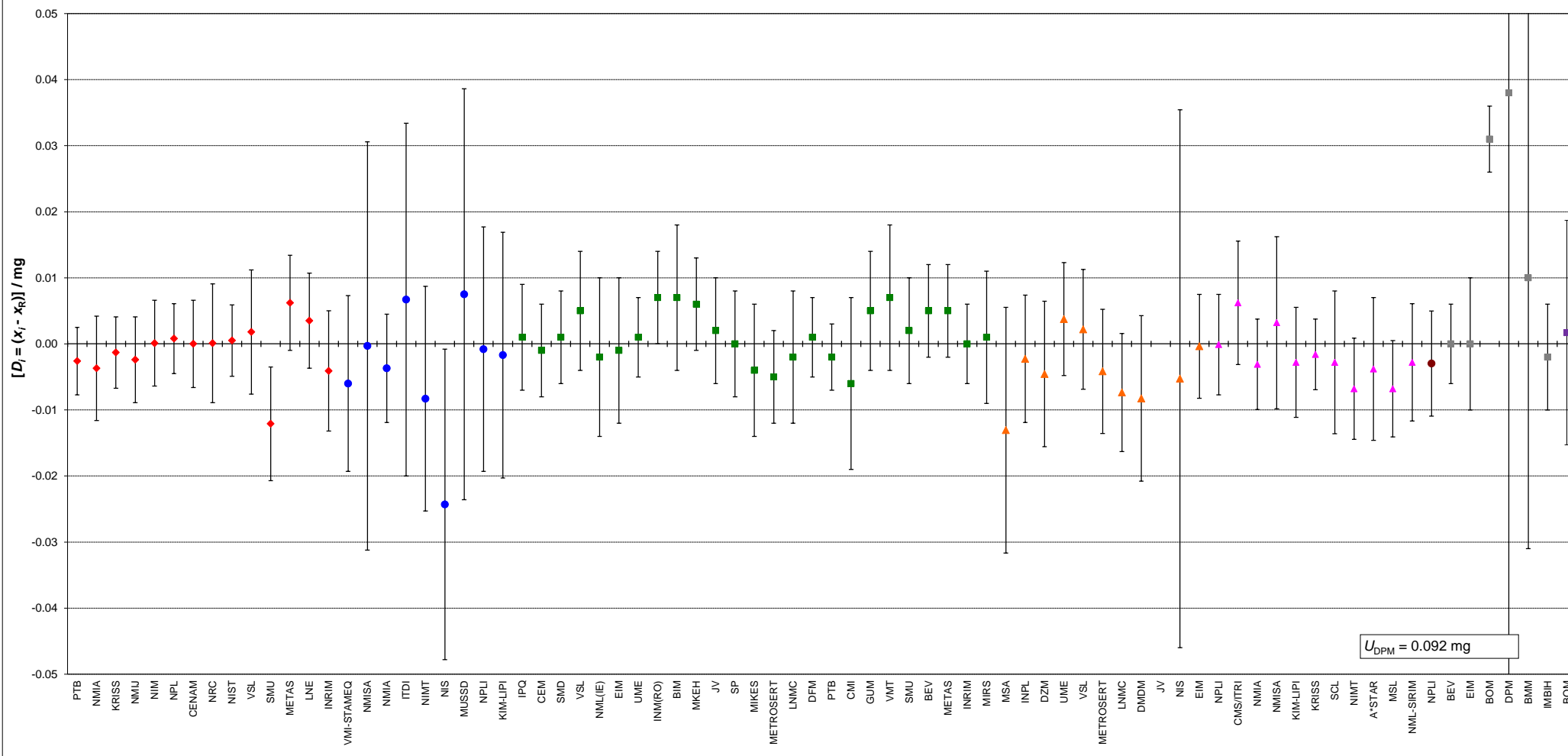
Lab *i* ↓

	D_i	U_i
	/ mg	
BEV	0.000	0.006
EIM	0.000	0.010
BOM	0.031	0.005
DPM	0.038	0.092
BMM	0.010	0.041
IMBIH	-0.002	0.008

Lab *i* ↓

	D_i	U_i
	/ mg	
BOM	0.0017	0.017

CCM.M-K2 , APMP.M.M-K6, EUROMET.M.M-K2, EUROMET.M.M-K2.1, APMP.M.M-K2&K2.1, EURAMET.M.M-K2.2, and EURAMET.M.M-K2.3 20 g mass standards
 Degrees of equivalence: D_i and expanded uncertainty U_i



Red diamonds: CCM.M-K2 participants
 Blue circles: APMP.M.M-K6 participants
 Pink triangles: APMP.M.M-K2 participants

Green squares: EUROMET.M.M-K2 participants
 Orange triangles: EUROMET.M.M-K2.1 participants
 Braun circle: APMP.M.M-K2.1 participant

Grey squares: EURAMET.M.M-K2.2 participants
 Purple square: EURAMET.M.M-K2.3 participant

CCM.M-K2 Matrix of equivalence for nominal value 20 g

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.0026	0.0051
NMIA	-0.0037	0.0079
KRISS	-0.0013	0.0054
NMIJ	-0.0024	0.0065
NIM	0.0001	0.0065
NPL	0.0008	0.0053
CENAM	0.0000	0.0066
NRC	0.0001	0.0090
NIST	0.0005	0.0054
VSL	0.0018	0.0094
SMU	-0.0121	0.0086
METAS	0.0062	0.0072
LNE	0.0035	0.0072
INRIM	-0.0041	0.0091

Lab *j* →

PTB		NMIA		KRISS		NMIJ		NIM		NPL		CENAM	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
		0.0011	0.0076	-0.0014	0.0050	-0.0003	0.0062	-0.0028	0.0062	-0.0034	0.0050	-0.0026	0.0063
-0.0011	0.0076			-0.0024	0.0078	-0.0013	0.0086	-0.0038	0.0086	-0.0045	0.0090	-0.0037	0.0098
0.0014	0.0050	0.0024	0.0078			0.0011	0.0063	-0.0014	0.0063	-0.0021	0.0069	-0.0012	0.0079
0.0003	0.0062	0.0013	0.0086	-0.0011	0.0063			-0.0025	0.0073	-0.0032	0.0078	-0.0024	0.0087
0.0028	0.0062	0.0038	0.0086	0.0014	0.0063	0.0025	0.0073			-0.0007	0.0078	0.0002	0.0087
0.0034	0.0050	0.0045	0.0090	0.0021	0.0069	0.0032	0.0078	0.0007	0.0078			0.0008	0.0065
0.0026	0.0063	0.0037	0.0098	0.0012	0.0079	0.0024	0.0087	-0.0002	0.0087	-0.0008	0.0065		
0.0027	0.0088	0.0038	0.0115	0.0013	0.0100	0.0025	0.0106	-0.0001	0.0106	-0.0007	0.0089	0.0001	0.0097
0.0031	0.0051	0.0042	0.0091	0.0017	0.0070	0.0029	0.0079	0.0004	0.0079	-0.0003	0.0053	0.0005	0.0065
0.0044	0.0092	0.0055	0.0119	0.0030	0.0104	0.0042	0.0110	0.0017	0.0110	0.0010	0.0104	0.0018	0.0111
-0.0095	0.0084	-0.0085	0.0113	-0.0109	0.0097	-0.0098	0.0103	-0.0123	0.0103	-0.0129	0.0097	-0.0121	0.0104
0.0088	0.0070	0.0099	0.0102	0.0074	0.0085	0.0086	0.0092	0.0061	0.0092	0.0054	0.0085	0.0062	0.0093
0.0061	0.0070	0.0072	0.0102	0.0047	0.0085	0.0059	0.0092	0.0034	0.0092	0.0027	0.0085	0.0035	0.0093
-0.0015	0.0089	-0.0005	0.0116	-0.0029	0.0101	-0.0018	0.0107	-0.0043	0.0107	-0.0049	0.0101	-0.0041	0.0108

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.0026	0.0051
NMIA	-0.0037	0.0079
KRISS	-0.0013	0.0054
NMIJ	-0.0024	0.0065
NIM	0.0001	0.0065
NPL	0.0008	0.0053
CENAM	0.0000	0.0066
NRC	0.0001	0.0090
NIST	0.0005	0.0054
VSL	0.0018	0.0094
SMU	-0.0121	0.0086
METAS	0.0062	0.0072
LNE	0.0035	0.0072
INRIM	-0.0041	0.0091

Lab *j* →

NRC		NIST		VSL		SMU		METAS		LNE		INRIM	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
-0.0027	0.0088	-0.0031	0.0051	-0.0044	0.0092	0.0095	0.0084	-0.0088	0.0070	-0.0061	0.0070	0.0015	0.0089
-0.0038	0.0115	-0.0042	0.0091	-0.0055	0.0119	0.0085	0.0113	-0.0099	0.0102	-0.0072	0.0102	0.0005	0.0116
-0.0013	0.0100	-0.0017	0.0070	-0.0030	0.0104	0.0109	0.0097	-0.0074	0.0085	-0.0047	0.0085	0.0029	0.0101
-0.0025	0.0106	-0.0029	0.0079	-0.0042	0.0110	0.0098	0.0103	-0.0086	0.0092	-0.0059	0.0092	0.0018	0.0107
0.0001	0.0106	-0.0004	0.0079	-0.0017	0.0110	0.0123	0.0103	-0.0061	0.0092	-0.0034	0.0092	0.0043	0.0107
0.0007	0.0089	0.0003	0.0053	-0.0010	0.0104	0.0129	0.0097	-0.0054	0.0085	-0.0027	0.0085	0.0049	0.0101
-0.0001	0.0097	-0.0005	0.0065	-0.0018	0.0111	0.0121	0.0104	-0.0062	0.0093	-0.0035	0.0093	0.0041	0.0108
		-0.0004	0.0089	-0.0017	0.0127	0.0122	0.0120	-0.0061	0.0111	-0.0034	0.0111	0.0042	0.0124
0.0004	0.0089			-0.0013	0.0105	0.0126	0.0097	-0.0057	0.0085	-0.0030	0.0085	0.0046	0.0102
0.0017	0.0127	0.0013	0.0105			0.0139	0.0116	-0.0044	0.0106	-0.0017	0.0106	0.0059	0.0119
-0.0122	0.0120	-0.0126	0.0097	-0.0139	0.0116			-0.0183	0.0098	-0.0156	0.0098	-0.0080	0.0113
0.0061	0.0111	0.0057	0.0085	0.0044	0.0106	0.0183	0.0098			0.0027	0.0086	0.0103	0.0103
0.0034	0.0111	0.0030	0.0085	0.0017	0.0106	0.0156	0.0098	-0.0027	0.0086			0.0076	0.0103
-0.0042	0.0124	-0.0046	0.0102	-0.0059	0.0119	0.0080	0.0113	-0.0103	0.0103	-0.0076	0.0103		

APMP.M.M-K2 Matrix of equivalence for nominal value 20 g

Lab *i* ↓

	D_i	U_i
	/ mg	
NPLI	-0.0001	0.0076
CMS/ITRI	0.0062	0.0093
NMIA	-0.0031	0.0068
NMISA	0.0032	0.0130
KIM-LIPI	-0.0028	0.0083
KRISS	-0.0016	0.0054
SCL	-0.0028	0.0108
NIMT	-0.0068	0.0076
A*STAR	-0.0038	0.0108
MSL	-0.0068	0.0073
NML-SIRIM	-0.0028	0.0089

Lab *j* →

NPLI		CMS/ITRI		NMIA		NMISA		KIM-LIPI		KRISS	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
		-0.00631	0.00861	0.00299	0.00739	-0.00331	0.01252	0.00269	0.00748	0.00145	0.00659
0.00631	0.00861			0.00930	0.00918	0.00300	0.01365	0.00900	0.00925	0.00776	0.00854
-0.00299	0.00739	-0.00930	0.00918			-0.00630	0.01292	-0.00030	0.00812	-0.00154	0.00662
0.00331	0.01252	-0.00300	0.01365	0.00630	0.01292			0.00600	0.01297	0.00476	0.01248
-0.00269	0.00748	-0.00900	0.00925	0.00030	0.00812	-0.00600	0.01297			-0.00124	0.00740
-0.00145	0.00659	-0.00776	0.00854	0.00154	0.00662	-0.00476	0.01248	0.00124	0.00740		
-0.00269	0.01016	-0.00900	0.01153	0.00030	0.01065	-0.00600	0.01468	0.00000	0.01071	-0.00124	0.01011
-0.00669	0.00673	-0.01300	0.00865	-0.00370	0.00744	-0.01000	0.01255	-0.00400	0.00753	-0.00524	0.00665
-0.00369	0.01016	-0.01000	0.01153	-0.00070	0.01065	-0.00700	0.01468	-0.00100	0.01071	-0.00224	0.01011
-0.00669	0.00632	-0.01300	0.00834	-0.00370	0.00707	-0.01000	0.01234	-0.00400	0.00716	-0.00524	0.00623
-0.00269	0.00811	-0.00900	0.00977	0.00030	0.00871	-0.00600	0.01335	0.00000	0.00879	-0.00124	0.00804

Lab *i* ↓

	D_i	U_i
	/ mg	
NPLI	-0.0001	0.0076
CMS/ITRI	0.0062	0.0093
NMIA	-0.0031	0.0068
NMISA	0.0032	0.0130
KIM-LIPI	-0.0028	0.0083
KRISS	-0.0016	0.0054
SCL	-0.0028	0.0108
NIMT	-0.0068	0.0076
A*STAR	-0.0038	0.0108
MSL	-0.0068	0.0073
NML-SIRIM	-0.0028	0.0089

Lab *j* →

SCL		NIMT		A*STAR		MSL		NML-SIRIM			
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}		
/ mg		/ mg		/ mg		/ mg		/ mg			
		0.00269	0.01016	0.00669	0.00673	0.00369	0.01016	0.00669	0.00632	0.00269	0.00811
0.00900	0.01153	0.01300	0.00865	0.01000	0.01153	0.01300	0.00834	0.00900	0.00977		
-0.00030	0.01065	0.00370	0.00744	0.00070	0.01065	0.00370	0.00707	-0.00030	0.00871		
0.00600	0.01468	0.01000	0.01255	0.00700	0.01468	0.01000	0.01234	0.00600	0.01335		
0.00000	0.01071	0.00400	0.00753	0.00100	0.01071	0.00400	0.00716	0.00000	0.00879		
0.00124	0.01011	0.00524	0.00665	0.00224	0.01011	0.00524	0.00623	0.00124	0.00804		
		0.00400	0.01020	0.00100	0.01273	0.00400	0.00993	0.00000	0.01116		
-0.00400	0.01020			-0.00300	0.01020	0.00000	0.00638	-0.00400	0.00816		
-0.00100	0.01273	0.00300	0.01020			0.00300	0.00993	-0.00100	0.01116		
-0.00400	0.00993	0.00000	0.00638	-0.00300	0.00993			-0.00400	0.00782		
0.00000	0.01116	0.00400	0.00816	0.00100	0.01116	0.00400	0.00782				

Key comparisons CCM.M-K2, APMP.M.M-K6, EUROMET.M.M-K2, EUROMET.M.M-K2.1, APMP.M.M-K2, APMP.M.M-K2.1, and EURAMET.M.M-K2.2

MEASURAND : Mass

NOMINAL VALUE : 2 g

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.0007	0.0016
NMIA	-0.0011	0.0020
KRISS	0.0007	0.0018
NMIJ	0.0007	0.0019
NIM	-0.0005	0.0020
NPL	0.0001	0.0015
CENAM	0.0000	0.0019
NRC	0.0028	0.0033
NIST	0.0007	0.0016
VSL	-0.0025	0.0062
SMU	0.0000	0.0043
METAS	0.0011	0.0024
LNE	0.0009	0.0025
INRIM	-0.0022	0.0039

VMI-STAMEQ	-0.0027	0.0036
NMISA	0.0001	0.0135
NMIA	-0.0011	0.0022
ITDI	-0.0079	0.0203
NIMT	-0.0027	0.0055
NIS	-0.0219	0.0145
MUSSD	-0.0031	0.0144
NPLI	0.0001	0.0035
KIM-LIPI	-0.0005	0.0045

Lab *i* ↓

	D_i	U_i
	/ mg	
IPQ	-0.0023	0.0042
CEM	-0.0021	0.0021
SMD	-0.0024	0.0023
VSL	-0.0019	0.0043
NML(IE)	-0.0008	0.0063
EIM	-0.0010	0.0072
UME	-0.0004	0.0020
INM(RO)	0.0014	0.0035
BIM	-0.0001	0.0065
MKEH	0.0002	0.0020
JV	-0.0013	0.0037
SP	0.0014	0.0030
MIKES	-0.0001	0.0033
METROSERT	-0.0010	0.0027
LNMC	-0.0039	0.0055
DFM	0.0002	0.0024
PTB	-0.0003	0.0015
CMI	-0.0005	0.0062
GUM	0.0025	0.0024
VMT	0.0095	0.0181
SMU	0.0005	0.0034
BEV	0.0010	0.0026
METAS	0.0006	0.0021
INRIM	0.0004	0.0022
MIRS	0.0001	0.0043

Lab *i* ↓

	D_i	U_i
	/ mg	
MSA	-0.0029	0.0069
INPL	-0.0006	0.0039
DZM	-0.0003	0.0045
UME	0.0001	0.0036
VSL	-0.0016	0.0051
METROSERT	-0.0023	0.0042
LNMC	-0.0017	0.0040
DMDM	-0.0037	0.0059
JV	-	-
NIS	-0.0013	0.0041
EIM	-0.0027	0.0038

Lab *i* ↓

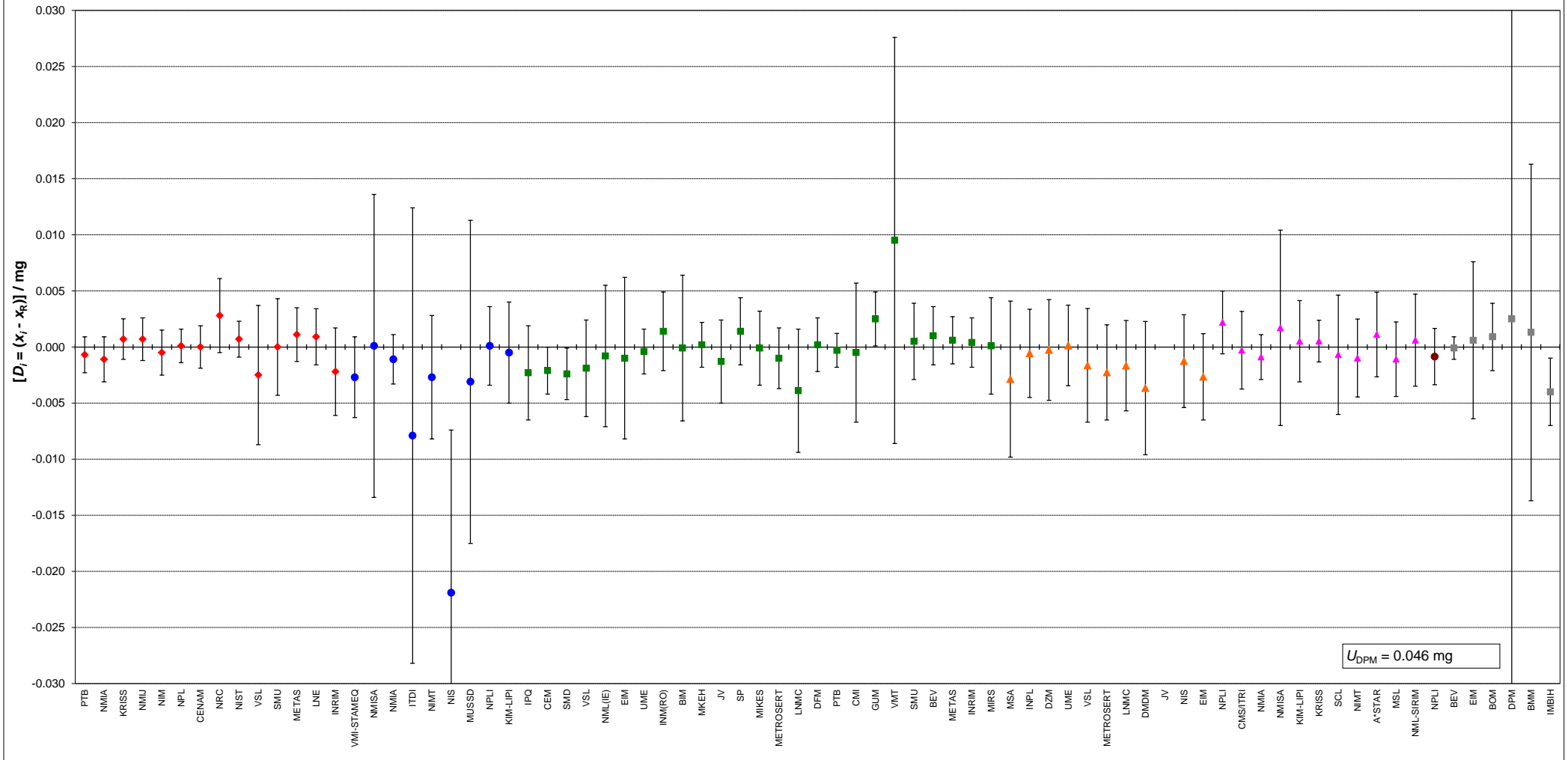
	D_i	U_i
	/ mg	
NPLI	0.0022	0.0028
CMS/ITRI	-0.0003	0.0035
NMIA	-0.0009	0.0020
NMISA	0.0017	0.0087
KIM-LIPI	0.0005	0.0036
KRISS	0.0005	0.0019
SCL	-0.0007	0.0053
NIMT	-0.0010	0.0035
A*STAR	0.0011	0.0038
MSL	-0.0011	0.0033
NML-SIRIM	0.0006	0.0041

NPLI	-0.0009	0.0025
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Lab *i* ↓

	D_i	U_i
	/ mg	
BEV	-0.0001	0.001
EIM	0.0006	0.007
BOM	0.0009	0.003
DPM	0.0025	0.046
BMM	0.0013	0.015
IMBIH	-0.0040	0.003

CCM.M-K2 , APMP.M.M-K6, EUROMET.M.M-K2, EUROMET.M.M-K2.1, APMP.M.M-K2&K2.1, and EURAMET.M.M-K2.2 2 g mass standards
 Degrees of equivalence: D_i and expanded uncertainty U_i



Red diamonds: CCM.M-K2 participants
 Blue circles: APMP.M.M-K6 participants
 Pink triangles: APMP.M.M-K2 participants

Green squares: EUROMET.M.M-K2 participants
 Orange triangles: EUROMET.M.M-K2.1 participants
 Braun circle: APMP.M.M-K2.1 participant

Grey squares: EURAMET.M.M-K2.2 participants

CCM.M-K2 Matrix of equivalence for nominal value 2 g

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.0007	0.0016
NMIA	-0.0011	0.0020
KRISS	0.0007	0.0018
NMIJ	0.0007	0.0019
NIM	-0.0005	0.0020
NPL	0.0001	0.0015
CENAM	0.0000	0.0019
NRC	0.0028	0.0033
NIST	0.0007	0.0016
VSL	-0.0025	0.0062
SMU	0.0000	0.0043
METAS	0.0011	0.0024
LNE	0.0009	0.0025
INRIM	-0.0022	0.0039

Lab *j* →

PTB		NMIA		KRISS		NMIJ		NIM		NPL		CENAM	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
		0.0004	0.0020	-0.0014	0.0018	-0.0014	0.0019	-0.0002	0.0020	-0.0008	0.0015	-0.0007	0.0019
-0.0004	0.0020			-0.0018	0.0020	-0.0018	0.0021	-0.0006	0.0022	-0.0012	0.0023	-0.0011	0.0026
0.0014	0.0018	0.0018	0.0020			0.0000	0.0019	0.0012	0.0020	0.0006	0.0021	0.0007	0.0024
0.0014	0.0019	0.0018	0.0021	0.0000	0.0019			0.0012	0.0021	0.0007	0.0022	0.0008	0.0025
0.0002	0.0020	0.0006	0.0022	-0.0012	0.0020	-0.0012	0.0021			-0.0006	0.0023	-0.0005	0.0025
0.0008	0.0015	0.0012	0.0023	-0.0006	0.0021	-0.0007	0.0022	0.0006	0.0023			0.0001	0.0018
0.0007	0.0019	0.0011	0.0026	-0.0007	0.0024	-0.0008	0.0025	0.0005	0.0025	-0.0001	0.0018		
0.0035	0.0033	0.0039	0.0038	0.0021	0.0036	0.0021	0.0037	0.0033	0.0037	0.0027	0.0033	0.0028	0.0035
0.0013	0.0016	0.0017	0.0024	0.0000	0.0022	-0.0001	0.0023	0.0011	0.0024	0.0006	0.0015	0.0007	0.0019
-0.0018	0.0062	-0.0014	0.0064	-0.0031	0.0063	-0.0032	0.0064	-0.0020	0.0064	-0.0025	0.0063	-0.0024	0.0064
0.0007	0.0043	0.0011	0.0046	-0.0007	0.0045	-0.0008	0.0046	0.0005	0.0046	-0.0001	0.0044	0.0000	0.0045
0.0018	0.0024	0.0022	0.0030	0.0004	0.0028	0.0004	0.0029	0.0016	0.0030	0.0010	0.0027	0.0011	0.0029
0.0016	0.0025	0.0020	0.0030	0.0002	0.0029	0.0002	0.0030	0.0014	0.0030	0.0008	0.0027	0.0009	0.0029
-0.0016	0.0039	-0.0012	0.0043	-0.0029	0.0041	-0.0030	0.0042	-0.0018	0.0043	-0.0023	0.0041	-0.0022	0.0042

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	-0.0007	0.0016
NMIA	-0.0011	0.0020
KRISS	0.0007	0.0018
NMIJ	0.0007	0.0019
NIM	-0.0005	0.0020
NPL	0.0001	0.0015
CENAM	0.0000	0.0019
NRC	0.0028	0.0033
NIST	0.0007	0.0016
VSL	-0.0025	0.0062
SMU	0.0000	0.0043
METAS	0.0011	0.0024
LNE	0.0009	0.0025
INRIM	-0.0022	0.0039

Lab *j* →

NRC		NIST		VSL		SMU		METAS		LNE		INRIM	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
-0.0035	0.0033	-0.0013	0.0016	0.0018	0.0062	-0.0007	0.0043	-0.0018	0.0024	-0.0016	0.0025	0.0016	0.0039
-0.0039	0.0038	-0.0017	0.0024	0.0014	0.0064	-0.0011	0.0046	-0.0022	0.0030	-0.0020	0.0030	0.0012	0.0043
-0.0021	0.0036	0.0000	0.0022	0.0031	0.0063	0.0007	0.0045	-0.0004	0.0028	-0.0002	0.0029	0.0029	0.0041
-0.0021	0.0037	0.0001	0.0023	0.0032	0.0064	0.0008	0.0046	-0.0004	0.0029	-0.0002	0.0030	0.0030	0.0042
-0.0033	0.0037	-0.0011	0.0024	0.0020	0.0064	-0.0005	0.0046	-0.0016	0.0030	-0.0014	0.0030	0.0018	0.0043
-0.0027	0.0033	-0.0006	0.0015	0.0025	0.0063	0.0001	0.0044	-0.0010	0.0027	-0.0008	0.0027	0.0023	0.0041
-0.0028	0.0035	-0.0007	0.0019	0.0024	0.0064	0.0000	0.0045	-0.0011	0.0029	-0.0009	0.0029	0.0022	0.0042
		0.0021	0.0033	0.0052	0.0069	0.0028	0.0053	0.0017	0.0040	0.0019	0.0040	0.0050	0.0050
-0.0021	0.0033			0.0031	0.0063	0.0007	0.0044	-0.0004	0.0027	-0.0002	0.0028	0.0029	0.0041
-0.0052	0.0069	-0.0031	0.0063			-0.0024	0.0073	-0.0035	0.0064	-0.0033	0.0065	-0.0002	0.0071
-0.0028	0.0053	-0.0007	0.0044	0.0024	0.0073			-0.0011	0.0046	-0.0009	0.0047	0.0022	0.0055
-0.0017	0.0040	0.0004	0.0027	0.0035	0.0064	0.0011	0.0046			0.0002	0.0031	0.0033	0.0043
-0.0019	0.0040	0.0002	0.0028	0.0033	0.0065	0.0009	0.0047	-0.0002	0.0031			0.0031	0.0043
-0.0050	0.0050	-0.0029	0.0041	0.0002	0.0071	-0.0022	0.0055	-0.0033	0.0043	-0.0031	0.0043		

APMP.M.M-K2 Matrix of equivalence for nominal value 2 g

Lab <i>i</i> ↓	D_i U_i / mg		Lab <i>j</i> →											
	D_{ij} / mg	U_{ij} / mg	NPLI		CMS/ITRI		NMIA		NMISA		KIM-LIPI		KRISS	
NPLI	0.0022	0.0028			0.00247	0.00305	0.00311	0.00282	0.00047	0.00855	0.00167	0.00322	0.00167	0.00267
CMS/ITRI	-0.0003	0.0035	-0.00247	0.00305			0.00063	0.00349	-0.00200	0.00879	-0.00080	0.00382	-0.00081	0.00337
NMIA	-0.0009	0.0020	-0.00311	0.00282	-0.00063	0.00349			-0.00263	0.00872	-0.00143	0.00364	-0.00144	0.00235
NMISA	0.0017	0.0087	-0.00047	0.00855	0.00200	0.00879	0.00263	0.00872			0.00120	0.00885	0.00119	0.00867
KIM-LIPI	0.0005	0.0036	-0.00167	0.00322	0.00080	0.00382	0.00143	0.00364	-0.00120	0.00885			-0.00001	0.00353
KRISS	0.0005	0.0019	-0.00167	0.00267	0.00081	0.00337	0.00144	0.00235	-0.00119	0.00867	0.00001	0.00353		
SCL	-0.0007	0.0053	-0.00287	0.00505	-0.00040	0.00546	0.00023	0.00534	-0.00240	0.00967	-0.00120	0.00556	-0.00121	0.00526
NIMT	-0.0010	0.0035	-0.00317	0.00305	-0.00070	0.00368	-0.00007	0.00349	-0.00270	0.00879	-0.00150	0.00382	-0.00151	0.00337
A*STAR	0.0011	0.0038	-0.00107	0.00339	0.00140	0.00397	0.00203	0.00380	-0.00060	0.00892	0.00060	0.00410	0.00059	0.00369
MSL	-0.0011	0.0033	-0.00327	0.00288	-0.00080	0.00354	-0.00017	0.00335	-0.00280	0.00874	-0.00160	0.00369	-0.00161	0.00322
NML-SIRIM	0.0006	0.0041	-0.00157	0.00375	0.00090	0.00428	0.00153	0.00412	-0.00110	0.00906	0.00010	0.00440	0.00009	0.00402

Lab <i>i</i> ↓	D_i U_i / mg		Lab <i>j</i> →									
	D_{ij} / mg	U_{ij} / mg	SCL		NIMT		A*STAR		MSL		NML-SIRIM	
NPLI	0.0022	0.0028	0.00287	0.00505	0.00317	0.00305	0.00107	0.00339	0.00327	0.00288	0.00157	0.00375
CMS/ITRI	-0.0003	0.0035	0.00040	0.00546	0.00070	0.00368	-0.00140	0.00397	0.00080	0.00354	-0.00090	0.00428
NMIA	-0.0009	0.0020	-0.00023	0.00534	0.00007	0.00349	-0.00203	0.00380	0.00017	0.00335	-0.00153	0.00412
NMISA	0.0017	0.0087	0.00240	0.00967	0.00270	0.00879	0.00060	0.00892	0.00280	0.00874	0.00110	0.00906
KIM-LIPI	0.0005	0.0036	0.00120	0.00556	0.00150	0.00382	-0.00060	0.00410	0.00160	0.00369	-0.00010	0.00440
KRISS	0.0005	0.0019	0.00121	0.00526	0.00151	0.00337	-0.00059	0.00369	0.00161	0.00322	-0.00009	0.00402
SCL	-0.0007	0.0053			0.00030	0.00546	-0.00180	0.00566	0.00040	0.00537	-0.00130	0.00588
NIMT	-0.0010	0.0035	-0.00030	0.00546			-0.00210	0.00397	0.00010	0.00354	-0.00160	0.00428
A*STAR	0.0011	0.0038	0.00180	0.00566	0.00210	0.00397			0.00220	0.00384	0.00050	0.00453
MSL	-0.0011	0.0033	-0.00040	0.00537	-0.00010	0.00354	-0.00220	0.00384			-0.00170	0.00416
NML-SIRIM	0.0006	0.0041	0.00130	0.00588	0.00160	0.00428	-0.00050	0.00453	0.00170	0.00416		

Key comparisons CCM.M-K2, APMP.M.M-K6, EUROMET.M.M-K2, EUROMET.M.M-K2.1, APMP.M.M-K2, APMP.M.M-K2.1, and EURAMET.M.M-K2.2

MEASURAND : Mass

NOMINAL VALUE : 100 mg

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	0.0004	0.0007
NMIA	0.0001	0.0010
KRISS	-0.0005	0.0008
NMIJ	-0.0003	0.0008
NIM	-0.0001	0.0009
NPL	0.0001	0.0010
CENAM	-0.0006	0.0011
NRC	0.0003	0.0009
NIST	-0.0002	0.0007
VSL	0.0011	0.0018
SMU	0.0013	0.0021
METAS	0.0001	0.0009
LNE	-0.0004	0.0012
INRIM	-0.0004	0.0017

VMI-STAMEQ	-0.0014	0.0035
NMISA	-0.0003	0.0062
NMIA	0.0001	0.0011
ITDI	0.0047	0.0184
NIMT	0.0068	0.0040
NIS	-0.0007	0.0067
MUSSD	-0.0058	0.0063
NPLI	0.0002	0.0033
KIM-LIPI	0.0017	0.0034

Lab *i* ↓

	D_i	U_i
	/ mg	
IPQ	0.0002	0.0017
CEM	0.0001	0.0011
SMD	0.0003	0.0012
VSL	0.0010	0.0016
NML(IE)	0.0002	0.0022
EIM	-0.0005	0.0021
UME	-0.0001	0.0012
INM(RO)	0.0004	0.0021
BIM	0.0013	0.0036
MKEH	0.0018	0.0012
JV	0.0009	0.0017
SP	0.0013	0.0014
MIKES	0.0001	0.0014
METROSERT	0.0001	0.0016
LNMC	-0.0004	0.0017
DFM	0.0007	0.0013
PTB	0.0010	0.0011
CMI	0.0015	0.0026
GUM	0.0000	0.0013
VMT	-0.0019	0.0032
SMU	-0.0022	0.0016
BEV	-0.0001	0.0010
METAS	0.0001	0.0009
INRIM	0.0003	0.0010
MIRS	0.0002	0.0018

Lab *i* ↓

	D_i	U_i
	/ mg	
MSA	-0.0007	0.0033
INPL	-0.0001	0.0015
DZM	-0.0004	0.0021
UME	0.0013	0.0015
VSL	0.0008	0.0017
METROSERT	-0.0006	0.0019
LNMC	0.0010	0.0017
DMDM	0.0011	0.0023
JV	-	-
NIS	0.0002	0.0024
EIM	-0.0001	0.0017

Lab *i* ↓

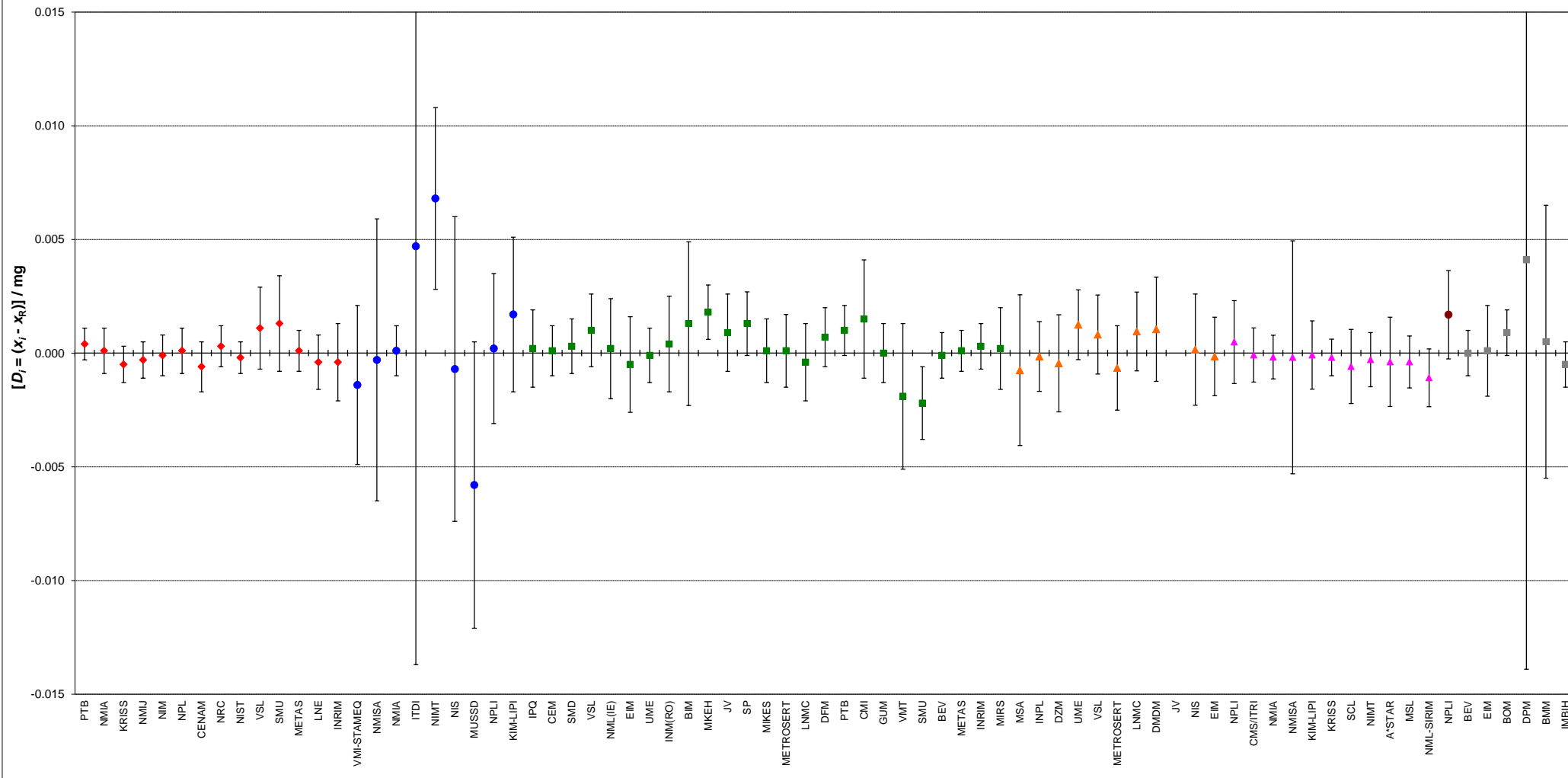
	D_i	U_i
	/ mg	
NPLI	0.0005	0.0018
CMS/ITRI	-0.0001	0.0012
NMIA	-0.0002	0.0010
NMISA	-0.0002	0.0051
KIM-LIPI	-0.0001	0.0015
KRISS	-0.0002	0.0008
SCL	-0.0006	0.0016
NIMT	-0.0003	0.0012
A*STAR	-0.0004	0.0020
MSL	-0.0004	0.0011
NML-SIRIM	-0.0011	0.0013

NPLI	0.0017	0.0019
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Lab *i* ↓

	D_i	U_i
	/ mg	
BEV	0.0000	0.001
EIM	0.0001	0.002
BOM	0.0009	0.001
DPM	0.0041	0.018
BMM	0.0005	0.006
IMBIH	-0.0005	0.001

CCM.M-K2 , APMP.M-M-K6, EUROMET.M-M-K2, EUROMET.M-M-K2.1, APMP.M-M-K2&K2.1, and EURAMET.M-M-K2.2 100 mg mass standards
 Degrees of equivalence: D_i and expanded uncertainty U_i



Red diamonds: CCM.M-K2 participants
 Blue circles: APMP.M-M-K6 participants
 Pink triangles: APMP.M-M-K2 participants

Green squares: EUROMET.M-M-K2 participants
 Orange triangles: EUROMET.M-M-K2.1 participants
 Braun circle: APMP.M-M-K2.1 participant

Grey squares: EURAMET.M-M-K2.2 participants

CCM.M-K2 Matrix of equivalence for nominal value 100 mg

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	0.0004	0.0007
NMIA	0.0001	0.0010
KRISS	-0.0005	0.0008
NMIJ	-0.0003	0.0008
NIM	-0.0001	0.0009
NPL	0.0001	0.0010
CENAM	-0.0006	0.0011
NRC	0.0003	0.0009
NIST	-0.0002	0.0007
VSL	0.0011	0.0018
SMU	0.0013	0.0021
METAS	0.0001	0.0009
LNE	-0.0004	0.0012
INRIM	-0.0004	0.0017

Lab *j* →

PTB		NMIA		KRISS		NMIJ		NIM		NPL		CENAM	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
		0.0003	0.0009	0.0009	0.0007	0.0007	0.0008	0.0005	0.0009	0.0004	0.0010	0.0011	0.0010
-0.0003	0.0009			0.0006	0.0009	0.0004	0.0010	0.0002	0.0011	0.0001	0.0013	0.0008	0.0013
-0.0009	0.0007	-0.0006	0.0009			-0.0002	0.0008	-0.0004	0.0009	-0.0005	0.0012	0.0002	0.0012
-0.0007	0.0008	-0.0004	0.0010	0.0002	0.0008			-0.0002	0.0010	-0.0004	0.0012	0.0004	0.0012
-0.0005	0.0009	-0.0002	0.0011	0.0004	0.0009	0.0002	0.0010			-0.0002	0.0013	0.0006	0.0013
-0.0004	0.0010	-0.0001	0.0013	0.0005	0.0012	0.0004	0.0012	0.0002	0.0013			0.0007	0.0013
-0.0011	0.0010	-0.0008	0.0013	-0.0002	0.0012	-0.0004	0.0012	-0.0006	0.0013	-0.0007	0.0013		
-0.0002	0.0009	0.0002	0.0012	0.0007	0.0011	0.0006	0.0011	0.0004	0.0012	0.0002	0.0012	0.0009	0.0012
-0.0006	0.0007	-0.0003	0.0011	0.0002	0.0009	0.0001	0.0010	-0.0001	0.0011	-0.0003	0.0010	0.0004	0.0010
0.0007	0.0018	0.0010	0.0020	0.0015	0.0019	0.0014	0.0019	0.0012	0.0019	0.0010	0.0020	0.0017	0.0020
0.0009	0.0021	0.0012	0.0023	0.0017	0.0022	0.0016	0.0022	0.0014	0.0023	0.0012	0.0023	0.0019	0.0023
-0.0004	0.0009	-0.0001	0.0013	0.0005	0.0011	0.0004	0.0011	0.0002	0.0012	0.0000	0.0013	0.0007	0.0013
-0.0008	0.0011	-0.0005	0.0014	0.0000	0.0013	-0.0001	0.0013	-0.0003	0.0014	-0.0005	0.0015	0.0002	0.0015
-0.0009	0.0017	-0.0006	0.0019	0.0000	0.0018	-0.0002	0.0018	-0.0004	0.0019	-0.0005	0.0019	0.0002	0.0019

Lab *i* ↓

	D_i	U_i
	/ mg	
PTB	0.0004	0.0007
NMIA	0.0001	0.0010
KRISS	-0.0005	0.0008
NMIJ	-0.0003	0.0008
NIM	-0.0001	0.0009
NPL	0.0001	0.0010
CENAM	-0.0006	0.0011
NRC	0.0003	0.0009
NIST	-0.0002	0.0007
VSL	0.0011	0.0018
SMU	0.0013	0.0021
METAS	0.0001	0.0009
LNE	-0.0004	0.0012
INRIM	-0.0004	0.0017

Lab *j* →

NRC		NIST		VSL		SMU		METAS		LNE		INRIM	
D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
/ mg		/ mg		/ mg		/ mg		/ mg		/ mg		/ mg	
0.0002	0.0009	0.0006	0.0007	-0.0007	0.0018	-0.0009	0.0021	0.0004	0.0009	0.0008	0.0011	0.0009	0.0017
-0.0002	0.0012	0.0003	0.0011	-0.0010	0.0020	-0.0012	0.0023	0.0001	0.0013	0.0005	0.0014	0.0006	0.0019
-0.0007	0.0011	-0.0002	0.0009	-0.0015	0.0019	-0.0017	0.0022	-0.0005	0.0011	0.0000	0.0013	0.0000	0.0018
-0.0006	0.0011	-0.0001	0.0010	-0.0014	0.0019	-0.0016	0.0022	-0.0004	0.0011	0.0001	0.0013	0.0002	0.0018
-0.0004	0.0012	0.0001	0.0011	-0.0012	0.0019	-0.0014	0.0023	-0.0002	0.0012	0.0003	0.0014	0.0004	0.0019
-0.0002	0.0012	0.0003	0.0010	-0.0010	0.0020	-0.0012	0.0023	0.0000	0.0013	0.0005	0.0015	0.0005	0.0019
-0.0009	0.0012	-0.0004	0.0010	-0.0017	0.0020	-0.0019	0.0023	-0.0007	0.0013	-0.0002	0.0015	-0.0002	0.0019
		0.0005	0.0009	-0.0008	0.0019	-0.0010	0.0023	0.0002	0.0012	0.0007	0.0014	0.0007	0.0019
-0.0005	0.0009			-0.0013	0.0018	-0.0015	0.0022	-0.0003	0.0011	0.0002	0.0013	0.0002	0.0018
0.0008	0.0019	0.0013	0.0018			-0.0002	0.0027	0.0010	0.0018	0.0015	0.0020	0.0015	0.0023
0.0010	0.0023	0.0015	0.0022	0.0002	0.0027			0.0012	0.0022	0.0017	0.0023	0.0017	0.0026
-0.0002	0.0012	0.0003	0.0011	-0.0010	0.0018	-0.0012	0.0022			0.0005	0.0012	0.0005	0.0018
-0.0007	0.0014	-0.0002	0.0013	-0.0015	0.0020	-0.0017	0.0023	-0.0005	0.0012			0.0000	0.0019
-0.0007	0.0019	-0.0002	0.0018	-0.0015	0.0023	-0.0017	0.0026	-0.0005	0.0018	0.0000	0.0019		

APMP.M.M-K2 Matrix of equivalence for nominal value 100 mg

Lab <i>i</i> ↓	D_i U_i / mg		Lab <i>j</i> →											
	D_{ij} / mg	U_{ij} / mg	NPLI		CMS/ITRI		NMIA		NMISA		KIM-LIPI		KRISS	
NPLI	0.0005	0.0018			0.00057	0.00177	0.00067	0.00178	0.00067	0.00528	0.00057	0.00199	0.00078	0.00173
CMS/ITRI	-0.0001	0.0012	-0.00057	0.00177			0.00009	0.00113	0.00010	0.00510	0.00000	0.00143	0.00020	0.00104
NMIA	-0.0002	0.0010	-0.00067	0.00178	-0.00009	0.00113			0.00001	0.00511	-0.00009	0.00145	0.00011	0.00093
NMISA	-0.0002	0.0051	-0.00067	0.00528	-0.00010	0.00510	-0.00001	0.00511			-0.00010	0.00518	0.00010	0.00509
KIM-LIPI	-0.0001	0.0015	-0.00057	0.00199	0.00000	0.00143	0.00009	0.00145	0.00010	0.00518			0.00020	0.00138
KRISS	-0.0002	0.0008	-0.00078	0.00173	-0.00020	0.00104	-0.00011	0.00093	-0.00010	0.00509	-0.00020	0.00138		
SCL	-0.0006	0.0016	-0.00107	0.00209	-0.00050	0.00157	-0.00041	0.00159	-0.00040	0.00522	-0.00050	0.00181	-0.00030	0.00152
NIMT	-0.0003	0.0012	-0.00077	0.00177	-0.00020	0.00110	-0.00011	0.00113	-0.00010	0.00510	-0.00020	0.00143	0.00000	0.00104
A*STAR	-0.0004	0.0020	-0.00087	0.00235	-0.00030	0.00191	-0.00021	0.00192	-0.00020	0.00533	-0.00030	0.00211	-0.00010	0.00187
MSL	-0.0004	0.0011	-0.00087	0.00173	-0.00030	0.00105	-0.00021	0.00108	-0.00020	0.00509	-0.00030	0.00139	-0.00010	0.00098
NML-SIRIM	-0.0011	0.0013	-0.00157	0.00182	-0.00100	0.00119	-0.00091	0.00121	-0.00090	0.00512	-0.00100	0.00150	-0.00080	0.00113

Lab <i>i</i> ↓	D_i U_i / mg		Lab <i>j</i> →									
	D_{ij} / mg	U_{ij} / mg	SCL		NIMT		A*STAR		MSL		NML-SIRIM	
NPLI	0.0005	0.0018	0.00107	0.00209	0.00077	0.00177	0.00087	0.00235	0.00087	0.00173	0.00157	0.00182
CMS/ITRI	-0.0001	0.0012	0.00050	0.00157	0.00020	0.00110	0.00030	0.00191	0.00030	0.00105	0.00100	0.00119
NMIA	-0.0002	0.0010	0.00041	0.00159	0.00011	0.00113	0.00021	0.00192	0.00021	0.00108	0.00091	0.00121
NMISA	-0.0002	0.0051	0.00040	0.00522	0.00010	0.00510	0.00020	0.00533	0.00020	0.00509	0.00090	0.00512
KIM-LIPI	-0.0001	0.0015	0.00050	0.00181	0.00020	0.00143	0.00030	0.00211	0.00030	0.00139	0.00100	0.00150
KRISS	-0.0002	0.0008	0.00030	0.00152	0.00000	0.00104	0.00010	0.00187	0.00010	0.00098	0.00080	0.00113
SCL	-0.0006	0.0016			-0.00030	0.00157	-0.00020	0.00221	-0.00020	0.00153	0.00050	0.00163
NIMT	-0.0003	0.0012	0.00030	0.00157			0.00010	0.00191	0.00010	0.00105	0.00080	0.00119
A*STAR	-0.0004	0.0020	0.00020	0.00221	-0.00010	0.00191			0.00000	0.00188	0.00070	0.00196
MSL	-0.0004	0.0011	0.00020	0.00153	-0.00010	0.00105	0.00000	0.00188			0.00070	0.00114
NML-SIRIM	-0.0011	0.0013	-0.00050	0.00163	-0.00080	0.00119	-0.00070	0.00196	-0.00070	0.00114		