Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 1 kHz

x_i adjusted value of the measurement reported by laboratory i (see on page 13 of the CCEM-K9 Final Report and on page 11 of the EUROMET.EM-K9 Final Report)

U_i expanded uncertainty of x_i at a 95 % level of confidence

Lab i	x_i / (µV/V)	U_i / (µV/V)	Date of measurement	Participant in	
				CCEM-K9	EUROMET.EM-K9
LNE	3.4	13.2	Feb 2000	Yes	Yes
BEV	1.6	13.2	Apr 2000	No	Yes
MIKES	0.9	8.3	May 2000	No	Yes
INETI	5.6	26.1	Jun 2000	No	Yes
AREPA	4.6	21.1	Jul 2000	Yes	Yes
NPL	0.6	13.2	Aug 2000	Yes	Yes
SP	3.6	8.3	Sep 2000	Yes	Yes
IEN	1.0	9.7	Oct 2000	Yes	Yes
CEM	-0.4	30.1	Nov 2000	Yes	Yes
PTB	-0.5	8.0	Jan 2001	Yes	Yes
NMi-VSL	2.6	15.0	May 2001	Yes	Yes
OMH	-0.4	31.0	Oct 2001	No	Yes
JV	1.3	20.1	Mar 2002	No	Yes
UME	0.3	22.1	Apr 2002	No	Yes
INTI	-1.4	12.2	Jul 2000	Yes	No
NMIA	4.2	9.2	Nov 2000	Yes	No
NRC	2.6	9.0	Mar 2001	Yes	No
VNIIM	2.3	16.7	May 2001	Yes	No
METAS	0.4	6.3	Aug 2001	Yes	Yes
NIST	5.9	11.2	Jan 2002	Yes	No
NIM	0.1	19.7	May 2002	Yes	No
CMI	3.6	38.1	Dec 2002	No	Yes

Key comparison APMP.EM-K9

Measurement results of the participants in key comparison APMP.EM-K9 are given in Table 2 of the Final Report. They were taken between 2000 and 2004.

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 1 kHz

The key comparison reference value, x_R, is computed as the weighted average of the adjusted values obtained by the CCEM-K9 participants. Its expanded uncertainty is $U_R = 2u_R$, where u_R is the standard uncertainty of the weighted average. All adjusted values from CCEM-K9 participants have been taken into account in the calculation, except the value of AREPA, which is traceable to PTB.

$x_R = 1.8$ µV/V, $U_R = 2.8$ µV/V

The degree of equivalence of laboratory i relative to the key comparison reference value is given by two terms:
$D_i = (x_i - x_R)$ and its expanded uncertainty U_i at a 95 % level of confidence computed as explained on page 15 of the CCEM-K9 Final Report and on page 12 of the EUROMET.EM-K9 Final Report, both expressed in µV/V.

The degree of equivalence between two laboratories i and j is given by two terms:
$D_{ij} = (D_i - D_j)$ and its expanded uncertainty U_{ij} at a 95 % level of confidence computed as explained in the Appendices 1 of the CCEM-K9 Final Report and EUROMET.EM-K9 Final Report, both expressed in µV/V.
The CCEM-K9 Matrix of equivalence is extended with degrees of equivalence between participants in EUROMET.EM-K9.

Linking APMP.EM-K9 to CCEM-K9

The linkage process is based on the results of the common participants, NMIA and PTB, and is detailed in Sections 8 and 9 of the APMP.EM-K9 Final Report. This makes in possible to extend the graph of equivalence to participants in APMP.EM-K9 only.

Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 12 of the Final Report. They are not reported here.

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
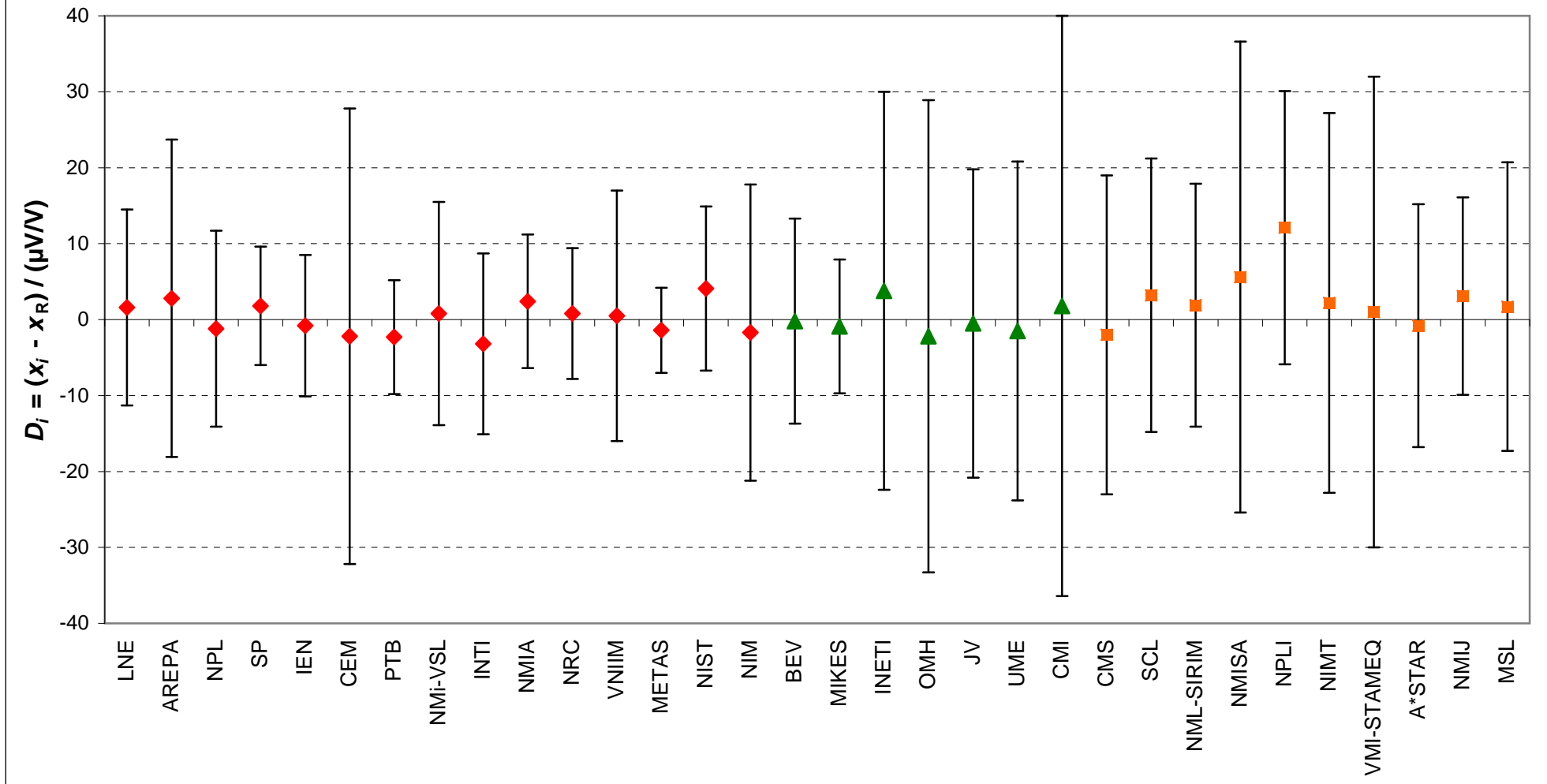**VOLTAGE : 500 V**
FREQUENCY : 1 kHz

Lab i

	D_i / (µV/V)	U_i / (µV/V)
LNE	1.6	12.9
AREPA	2.8	20.9
NPL	-1.2	12.9
SP	1.8	7.8
IEN	-0.8	9.3
CEM	-2.2	30.0
PTB	-2.3	7.5
NMi-VSL	0.8	14.7
INTI	-3.2	11.9
NMIA	2.4	8.8
NRC	0.8	8.6
VNIIM	0.5	16.5
METAS	-1.4	5.6
NIST	4.1	10.8
NIM	-1.7	19.5

	D_i / (µV/V)	U_i / (µV/V)
BEV	-0.2	13.5
MIKES	-0.9	8.8
INETI	3.8	26.2
OMH	-2.2	31.1
JV	-0.5	20.3
UME	-1.5	22.3
CMI	1.8	38.2

	D_i / (µV/V)	U_i / (µV/V)
CMS	-2.0	21
SCL	3.2	18
NML-SIRIM	1.9	16
NMISA	5.6	31
NPLI	12.1	18
NIMT	2.2	25
VMI-STAMEQ	1.0	31
A*STAR	-0.8	16
NMIJ	3.1	13
MSL	1.7	19

Red: participants in CCEM-K9, Green: participants in EUROMET.EM-K9 only, Orange: participants in APMP.EM-K9 only

CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9   AC-DC transfer difference: 500 V, 1 kHz
Degrees of equivalence, D_i and expanded uncertainty U_i (95 % level of confidence)

Red diamonds: participants in CCEM-K9, Green triangles: participants in EUROMET.EM-K9 only, Orange squares: participants in APMP.EM-K9 only

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 1 kHz

Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 12
of the Final Report. They are not reported here.

Lab j ⟹

Lab i	D_i / (µV/V)	U_i / (µV/V)	LNE D_{ij} / (µV/V)	LNE U_{ij} / (µV/V)	AREPA D_{ij} / (µV/V)	AREPA U_{ij} / (µV/V)	NPL D_{ij} / (µV/V)	NPL U_{ij} / (µV/V)	SP D_{ij} / (µV/V)	SP U_{ij} / (µV/V)	IEN D_{ij} / (µV/V)	IEN U_{ij} / (µV/V)	CEM D_{ij} / (µV/V)	CEM U_{ij} / (µV/V)
LNE	1.6	12.9			-1.2	24.9	2.8	18.7	-0.2	15.6	2.4	16.4	3.8	32.9
AREPA	2.8	20.9	1.2	24.9			4.0	24.9	1.0	22.7	3.6	23.3	5.0	36.8
NPL	-1.2	12.9	-2.8	18.7	-4.0	24.9			-3.0	15.6	-0.4	16.4	1.0	32.9
SP	1.8	7.8	0.2	15.6	-1.0	22.7	3.0	15.6			2.6	12.8	4.0	31.3
IEN	-0.8	9.3	-2.4	16.4	-3.6	23.3	0.4	16.4	-2.6	12.8			1.4	31.7
CEM	-2.2	30.0	-3.8	32.9	-5.0	36.8	-1.0	32.9	-4.0	31.3	-1.4	31.7		
PTB	-2.3	7.5	-3.9	15.5	-5.1	19.6	-1.1	15.5	-4.1	11.6	-1.5	12.6	-0.1	31.2
NMi-VSL	0.8	14.7	-0.8	20.0	-2.0	25.9	2.0	20.0	-1.0	17.2	1.6	17.9	3.0	33.7
INTI	-3.2	11.9	-4.8	18.0	-6.0	24.4	-2.0	18.0	-5.0	14.8	-2.4	15.6	-1.0	32.5
NMIA	2.4	8.8	0.8	16.1	-0.4	23.1	3.6	16.1	0.6	12.4	3.2	13.4	4.6	31.5
NRC	0.8	8.6	-0.8	16.0	-2.0	23.0	2.0	16.0	-1.0	12.3	1.6	13.3	3.0	31.5
VNIIM	0.5	16.5	-1.1	21.3	-2.3	27.0	1.7	21.3	-1.3	18.7	1.3	19.4	2.7	34.5
METAS	-1.4	5.6	-3.0	14.7	-4.2	22.1	-0.2	14.7	-3.2	10.5	-0.6	11.6	0.8	30.8
NIST	4.1	10.8	2.5	17.4	1.3	23.9	5.3	17.4	2.3	14.0	4.9	14.9	6.3	32.2
NIM	-1.7	19.5	-3.3	23.8	-4.5	28.9	-0.5	23.8	-3.5	21.4	-0.9	22.0	0.5	36.0
BEV	-0.2	13.5	-1.8	18.7	-3.0	24.9	1.0	18.7	-2.0	15.6	0.6	16.4	2.0	32.9
MIKES	-0.9	8.8	-2.5	15.6	-3.7	22.7	0.3	15.6	-2.7	11.8	-0.1	12.8	1.3	31.3
INETI	3.8	26.2	2.2	29.3	1.0	33.6	5.0	29.3	2.0	27.4	4.6	27.9	6.0	39.9
OMH	-2.2	31.1	-3.8	33.7	-5.0	37.5	-1.0	33.7	-4.0	32.1	-1.4	32.5	0.0	43.3
JV	-0.5	20.3	-2.1	24.1	-3.3	29.2	0.7	24.1	-2.3	21.8	0.3	22.4	1.7	36.2
UME	-1.5	22.3	-3.1	25.8	-4.3	30.6	-0.3	25.8	-3.3	23.7	-0.7	24.2	0.7	37.4
CMI	1.8	38.2	0.2	40.4	-1.0	43.6	3.0	40.4	0.0	39.0	2.6	39.4	4.0	48.6

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 1 kHz

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	PTB D_{ij} / (µV/V)	U_{ij} / (µV/V)	NMi-VSL D_{ij} / (µV/V)	U_{ij} / (µV/V)	INTI D_{ij} / (µV/V)	U_{ij} / (µV/V)	NMIA D_{ij} / (µV/V)	U_{ij} / (µV/V)	NRC D_{ij} / (µV/V)	U_{ij} / (µV/V)	VNIIM D_{ij} / (µV/V)	U_{ij} / (µV/V)
LNE	1.6	12.9	3.9	15.5	0.8	20.0	4.8	18.0	-0.8	16.1	0.8	16.0	1.1	21.3
AREPA	2.8	20.9	5.1	19.6	2.0	25.9	6.0	24.4	0.4	23.1	2.0	23.0	2.3	27.0
NPL	-1.2	12.9	1.1	15.5	-2.0	20.0	2.0	18.0	-3.6	16.1	-2.0	16.0	-1.7	21.3
SP	1.8	7.8	4.1	11.6	1.0	17.2	5.0	14.8	-0.6	12.4	1.0	12.3	1.3	18.7
IEN	-0.8	9.3	1.5	12.6	-1.6	17.9	2.4	15.6	-3.2	13.4	-1.6	13.3	-1.3	19.4
CEM	-2.2	30.0	0.1	31.2	-3.0	33.7	1.0	32.5	-4.6	31.5	-3.0	31.5	-2.7	34.5
PTB	-2.3	7.5			-3.1	17.0	0.9	14.6	-4.7	12.2	-3.1	12.1	-2.8	18.6
NMi-VSL	0.8	14.7	3.1	17.0			4.0	19.4	-1.6	17.6	0.0	17.5	0.3	22.5
INTI	-3.2	11.9	-0.9	14.6	-4.0	19.4			-5.6	15.3	-4.0	15.2	-3.7	20.7
NMIA	2.4	8.8	4.7	12.2	1.6	17.6	5.6	15.3			1.6	12.9	1.9	19.1
NRC	0.8	8.6	3.1	12.1	0.0	17.5	4.0	15.2	-1.6	12.9			0.3	19.0
VNIIM	0.5	16.5	2.8	18.6	-0.3	22.5	3.7	20.7	-1.9	19.1	-0.3	19.0		
METAS	-1.4	5.6	0.9	10.2	-2.2	16.3	1.8	13.8	-3.8	11.2	-2.2	11.0	-1.9	17.9
NIST	4.1	10.8	6.4	13.8	3.3	18.8	7.3	16.6	1.7	14.5	3.3	14.4	3.6	20.2
NIM	-1.7	19.5	0.6	21.3	-2.5	24.8	1.5	23.2	-4.1	21.8	-2.5	21.7	-2.2	25.9
BEV	-0.2	13.5	2.1	15.5	-1.0	20.0	-	-	-	-	-	-	-	-
MIKES	-0.9	8.8	1.4	11.6	-1.7	17.2	-	-	-	-	-	-	-	-
INETI	3.8	26.2	6.1	27.3	3.0	30.2	-	-	-	-	-	-	-	-
OMH	-2.2	31.1	0.1	32.1	-3.0	34.5	-	-	-	-	-	-	-	-
JV	-0.5	20.3	1.8	21.7	-1.3	25.1	-	-	-	-	-	-	-	-
UME	-1.5	22.3	0.8	23.6	-2.3	26.8	-	-	-	-	-	-	-	-
CMI	1.8	38.2	4.1	39.0	1.0	41.0	-	-	-	-	-	-	-	-

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 1 kHz

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	METAS D_{ij} / (µV/V)	METAS U_{ij} / (µV/V)	NIST D_{ij} / (µV/V)	NIST U_{ij} / (µV/V)	NIM D_{ij} / (µV/V)	NIM U_{ij} / (µV/V)	BEV D_{ij} / (µV/V)	BEV U_{ij} / (µV/V)	MIKES D_{ij} / (µV/V)	MIKES U_{ij} / (µV/V)	INETI D_{ij} / (µV/V)	INETI U_{ij} / (µV/V)
LNE	1.6	12.9	3.0	14.7	-2.5	17.4	3.3	23.8	1.8	18.7	2.5	15.6	-2.2	29.3
AREPA	2.8	20.9	4.2	22.1	-1.3	23.9	4.5	28.9	3.0	24.9	3.7	22.7	-1.0	33.6
NPL	-1.2	12.9	0.2	14.7	-5.3	17.4	0.5	23.8	-1.0	18.7	-0.3	15.6	-5.0	29.3
SP	1.8	7.8	3.2	10.5	-2.3	14.0	3.5	21.4	2.0	15.6	2.7	11.8	-2.0	27.4
IEN	-0.8	9.3	0.6	11.6	-4.9	14.9	0.9	22.0	-0.6	16.4	0.1	12.8	-4.6	27.9
CEM	-2.2	30.0	-0.8	30.8	-6.3	32.2	-0.5	36.0	-2.0	32.9	-1.3	31.3	-6.0	39.9
PTB	-2.3	7.5	-0.9	10.2	-6.4	13.8	-0.6	21.3	-2.1	15.5	-1.4	11.6	-6.1	27.3
NMi-VSL	0.8	14.7	2.2	16.3	-3.3	18.8	2.5	24.8	1.0	20.0	1.7	17.2	-3.0	30.2
INTI	-3.2	11.9	-1.8	13.8	-7.3	16.6	-1.5	23.2	-	-	-	-	-	-
NMIA	2.4	8.8	3.8	11.2	-1.7	14.5	4.1	21.8	-	-	-	-	-	-
NRC	0.8	8.6	2.2	11.0	-3.3	14.4	2.5	21.7	-	-	-	-	-	-
VNIIM	0.5	16.5	1.9	17.9	-3.6	20.2	2.2	25.9	-	-	-	-	-	-
METAS	-1.4	5.6			-5.5	12.9	0.3	20.7	-1.2	14.7	-0.5	10.5	-5.2	26.9
NIST	4.1	10.8	5.5	12.9			5.8	22.7	-	-	-	-	-	-
NIM	-1.7	19.5	-0.3	20.7	-5.8	22.7			-	-	-	-	-	-

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	METAS D_{ij} / (µV/V)	METAS U_{ij} / (µV/V)	NIST D_{ij} / (µV/V)	NIST U_{ij} / (µV/V)	NIM D_{ij} / (µV/V)	NIM U_{ij} / (µV/V)	BEV D_{ij} / (µV/V)	BEV U_{ij} / (µV/V)	MIKES D_{ij} / (µV/V)	MIKES U_{ij} / (µV/V)	INETI D_{ij} / (µV/V)	INETI U_{ij} / (µV/V)
BEV	-0.2	13.5	1.2	14.7	-	-	-	-			0.7	15.6	-4.0	29.3
MIKES	-0.9	8.8	0.5	10.5	-	-	-	-	-0.7	15.6			-4.7	27.4
INETI	3.8	26.2	5.2	26.9	-	-	-	-	4.0	29.3	4.7	27.4		
OMH	-2.2	31.1	-0.8	31.7	-	-	-	-	-2.0	33.7	-1.3	32.1	-6.0	40.6
JV	-0.5	20.3	0.9	21.1	-	-	-	-	-0.3	24.1	0.4	21.8	-4.3	33.0
UME	-1.5	22.3	-0.1	23.0	-	-	-	-	-1.3	25.8	-0.6	23.7	-5.3	34.2
CMI	1.8	38.2	3.2	38.7	-	-	-	-	2.0	40.4	2.7	39.0	-2.0	46.2

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 1 kHz

Lab *j* ⟹

Lab *i* ⟹

	D_i / (µV/V)	U_i / (µV/V)	OMH D_{ij} / (µV/V)	OMH U_{ij} / (µV/V)	JV D_{ij} / (µV/V)	JV U_{ij} / (µV/V)	UME D_{ij} / (µV/V)	UME U_{ij} / (µV/V)	CMI D_{ij} / (µV/V)	CMI U_{ij} / (µV/V)
LNE	1.6	12.9	3.8	33.7	2.1	24.1	3.1	25.8	-0.2	40.4
AREPA	2.8	20.9	5.0	37.5	3.3	29.2	4.3	30.6	1.0	43.6
NPL	-1.2	12.9	1.0	33.7	-0.7	24.1	0.3	25.8	-3.0	40.4
SP	1.8	7.8	4.0	32.1	2.3	21.8	3.3	23.7	0.0	39.0
IEN	-0.8	9.3	1.4	32.5	-0.3	22.4	0.7	24.2	-2.6	39.4
CEM	-2.2	30.0	0.0	43.3	-1.7	36.2	-0.7	37.4	-4.0	48.6
PTB	-2.3	7.5	-0.1	32.1	-1.8	21.7	-0.8	23.6	-4.1	39.0
NMi-VSL	0.8	14.7	3.0	34.5	1.3	25.1	2.3	26.8	-1.0	41.0
INTI	-3.2	11.9	-	-	-	-	-	-	-	-
NMIA	2.4	8.8	-	-	-	-	-	-	-	-
NRC	0.8	8.6	-	-	-	-	-	-	-	-
VNIIM	0.5	16.5	-	-	-	-	-	-	-	-
METAS	-1.4	5.6	0.8	31.7	-0.9	21.1	0.1	23.0	-3.2	38.7
NIST	4.1	10.8	-	-	-	-	-	-	-	-
NIM	-1.7	19.5	-	-	-	-	-	-	-	-
BEV	-0.2	13.5	2.0	33.7	0.3	24.1	1.3	25.8	-2.0	40.4
MIKES	-0.9	8.8	1.3	32.1	-0.4	21.8	0.6	23.7	-2.7	39.0
INETI	3.8	26.2	6.0	40.6	4.3	33.0	5.3	34.2	2.0	46.2
OMH	-2.2	31.1			-1.7	37.0	-0.7	38.1	-4.0	49.2
JV	-0.5	20.3	1.7	37.0			1.0	29.9	-2.3	43.1
UME	-1.5	22.3	0.7	38.1	-1.0	29.9			-3.3	44.1
CMI	1.8	38.2	4.0	49.2	2.3	43.1	3.3	44.1		

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 10 kHz

x_i adjusted value of the measurement reported by laboratory i (see on page 13 of the CCEM-K9 Final Report and on page 11 of the EUROMET.EM-K9 Final Report)

U_i expanded uncertainty of x_i at a 95 % level of confidence

Lab i	x_i / (µV/V)	U_i / (µV/V)	Date of measurement	Participant in	
				CCEM-K9	EUROMET.EM-K9
LNE	-2.5	21.1	Feb 2000	Yes	Yes
BEV	-0.3	15.1	Apr 2000	No	Yes
MIKES	-8.7	7.5	May 2000	No	Yes
INETI	-11.3	30.0	Jun 2000	No	Yes
AREPA	0.7	21.1	Jul 2000	Yes	Yes
NPL	-7.3	13.1	Aug 2000	Yes	Yes
SP	0.7	9.1	Sep 2000	Yes	Yes
IEN	-5.0	9.5	Oct 2000	Yes	Yes
CEM	-3.3	30.0	Nov 2000	Yes	Yes
PTB	-2.8	8.0	Jan 2001	Yes	Yes
NMi-VSL	-4.3	15.0	May 2001	Yes	Yes
OMH	-5.3	36.0	Oct 2001	No	Yes
JV	-1.8	22.1	Mar 2002	No	Yes
UME	0.2	22.1	Apr 2002	No	Yes
INTI	-6.1	14.1	Jul 2000	Yes	No
NMIA	0.9	9.1	Nov 2000	Yes	No
NRC	0.9	8.7	Mar 2001	Yes	No
VNIIM	-2.2	17.1	May 2001	Yes	No
METAS	-3.5	6.2	Aug 2001	Yes	Yes
NIST	1.1	10.7	Jan 2002	Yes	No
NIM	-3.6	19.6	May 2002	Yes	No
CMI	-5.1	38.0	Dec 2002	No	Yes

Key comparison APMP.EM-K9

Measurement results of the participants in key comparison APMP.EM-K9 are given in Table 2 of the Final Report. They were taken between 2000 and 2004.

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 10 kHz

The key comparison reference value, x_R, is computed as the weighted average of the adjusted values obtained by the CCEM-K9 participants. Its expanded uncertainty is $U_R = 2u_R$, where u_R is the standard uncertainty of the weighted average. All adjusted values from CCEM-K9 participants have been taken into account in the calculation, except the value of AREPA, which is traceable to PTB.

x_R = -2.2 µV/V, U_R = 2.8 µV/V

The degree of equivalence of laboratory *i* relative to the key comparison reference value is given by two terms:
$D_i = (x_i - x_R)$ and its expanded uncertainty U_i at a 95 % level of confidence computed as explained on page 15 of the CCEM-K9 Final Report and on page 12 of the EUROMET.EM-K9 Final Report, both expressed in µV/V.

The degree of equivalence between two laboratories *i* and *j* is given by two terms:
$D_{ij} = (D_i - D_j)$ and its expanded uncertainty U_{ij} at a 95 % level of confidence computed as explained in the Appendices 1 of the
CCEM-K9 Final Report and EUROMET.EM-K9 Final Report, both expressed in µV/V.
The CCEM-K9 Matrix of equivalence is extended with degrees of equivalence between participants in EUROMET.EM-K9.

Linking APMP.EM-K9 to CCEM-K9

The linkage process is based on the results of the common participants, NMIA and PTB, and is detailed in Sections 8 and 9 of the APMP.EM-K9 Final Report. This makes in possible to extend the graph of equivalence to participants in APMP.EM-K9 only.

Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 13 of the Final Report. They are not reported here.

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
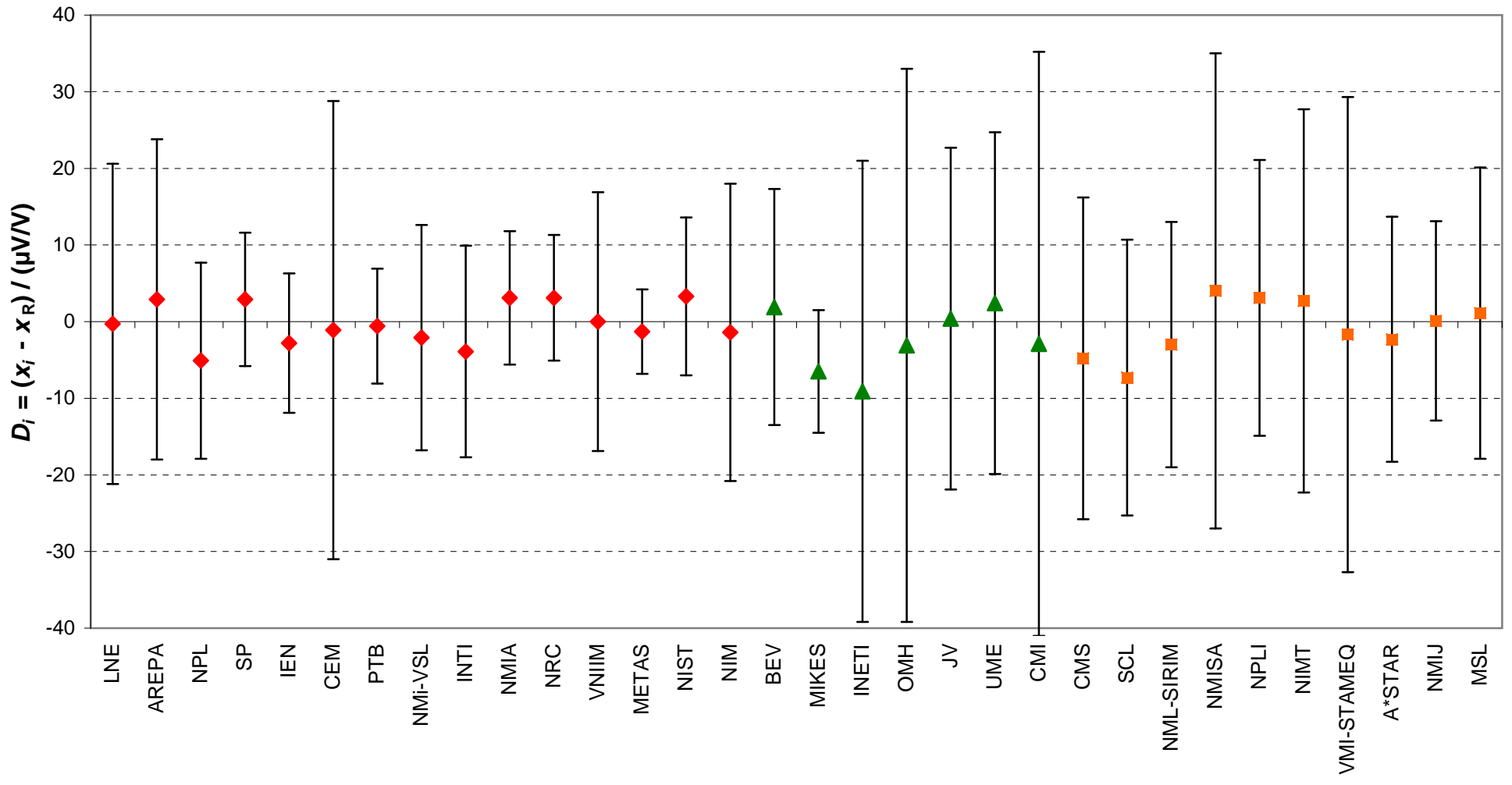**VOLTAGE : 500 V**
FREQUENCY : 10 kHz

Lab i

	D_i / (µV/V)	U_i / (µV/V)
LNE	-0.3	20.9
AREPA	2.9	20.9
NPL	-5.1	12.8
SP	2.9	8.7
IEN	-2.8	9.1
CEM	-1.1	29.9
PTB	-0.6	7.5
NMi-VSL	-2.1	14.7
INTI	-3.9	13.8
NMIA	3.1	8.7
NRC	3.1	8.2
VNIIM	0.0	16.9
METAS	-1.3	5.5
NIST	3.3	10.3
NIM	-1.4	19.4

	D_i / (µV/V)	U_i / (µV/V)
BEV	1.9	15.4
MIKES	-6.5	8.0
INETI	-9.1	30.1
OMH	-3.1	36.1
JV	0.4	22.3
UME	2.4	22.3
CMI	-2.9	38.1

	D_i / (µV/V)	U_i / (µV/V)
CMS	-4.8	21
SCL	-7.3	19
NML-SIRIM	-3.0	17
NMISA	4.0	31
NPLI	3.1	18
NIMT	2.7	25
VMI-STAMEQ	-1.7	31
A*STAR	-2.3	14
NMIJ	0.1	13
MSL	1.1	19

Red: participants in CCEM-K9, Green: participants in EUROMET.EM-K9 only, Orange: participants in APMP.EM-K9 only

CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9   AC-DC transfer difference: 500 V, 10 kHz
Degrees of equivalence, D_i and expanded uncertainty U_i (95 % level of confidence)

Red diamonds: participants in CCEM-K9, Green triangles: participants in EUROMET.EM-K9 only, Orange squares: participants in APMP.EM-K9 only

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 10 kHz

Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 13
of the Final Report. They are not reported here.

Lab j ⟹

Lab i	D_i / (µV/V)	U_i / (µV/V)	LNE D_{ij} / (µV/V)	U_{ij} / (µV/V)	AREPA D_{ij} / (µV/V)	U_{ij} / (µV/V)	NPL D_{ij} / (µV/V)	U_{ij} / (µV/V)	SP D_{ij} / (µV/V)	U_{ij} / (µV/V)	IEN D_{ij} / (µV/V)	U_{ij} / (µV/V)	CEM D_{ij} / (µV/V)	U_{ij} / (µV/V)
LNE	-0.3	20.9			-3.2	29.9	4.8	24.9	-3.2	23.0	2.5	23.2	0.8	36.7
AREPA	2.9	20.9	3.2	29.9			8.0	24.9	0.0	23.0	5.7	23.2	4.0	36.7
NPL	-5.1	12.8	-4.8	24.9	-8.0	24.9			-8.0	16.0	-2.3	16.2	-4.0	32.8
SP	2.9	8.7	3.2	23.0	0.0	23.0	8.0	16.0			5.7	13.2	4.0	31.4
IEN	-2.8	9.1	-2.5	23.2	-5.7	23.2	2.3	16.2	-5.7	13.2			-1.7	31.5
CEM	-1.1	29.9	-0.8	36.7	-4.0	36.7	4.0	32.8	-4.0	31.4	1.7	31.5		
PTB	-0.6	7.5	-0.3	22.6	-3.5	19.6	4.5	15.4	-3.5	12.2	2.2	12.5	0.5	31.1
NMi-VSL	-2.1	14.7	-1.8	25.9	-5.0	25.9	3.0	20.0	-5.0	17.6	0.7	17.8	-1.0	33.6
INTI	-3.9	13.8	-3.6	25.4	-6.8	25.4	1.2	19.3	-6.8	16.8	-1.1	17.1	-2.8	33.2
NMIA	3.1	8.7	3.4	23.0	0.2	23.0	8.2	16.0	0.2	12.9	5.9	13.2	4.2	31.4
NRC	3.1	8.2	3.4	22.9	0.2	22.9	8.2	15.8	0.2	12.6	5.9	12.9	4.2	31.3
VNIIM	0.0	16.9	0.3	27.2	-2.9	27.2	5.1	21.6	-2.9	19.4	2.8	19.6	1.1	34.6
METAS	-1.3	5.5	-1.0	22.0	-4.2	22.0	3.8	14.5	-4.2	11.1	1.5	11.4	-0.2	30.7
NIST	3.3	10.3	3.6	23.7	0.4	23.7	8.4	17.0	0.4	14.1	6.1	14.4	4.4	31.9
NIM	-1.4	19.4	-1.1	28.8	-4.3	28.8	3.7	23.6	-4.3	21.7	1.4	21.8	-0.3	35.9
BEV	1.9	15.4	2.2	26.0	-1.0	26.0	7.0	20.0	-1.0	17.7	4.7	17.9	3.0	33.6
MIKES	-6.5	8.0	-6.2	22.4	-9.4	22.4	-1.4	15.1	-9.4	11.8	-3.7	12.2	-5.4	31.0
INETI	-9.1	30.1	-8.8	36.7	-12.0	36.7	-4.0	32.8	-12.0	31.4	-6.3	31.5	-8.0	42.5
OMH	-3.1	36.1	-2.8	41.8	-6.0	41.8	2.0	38.4	-6.0	37.2	-0.3	37.3	-2.0	46.9
JV	0.4	22.3	0.7	30.6	-2.5	30.6	5.5	25.7	-2.5	24.0	3.2	24.1	1.5	37.3
UME	2.4	22.3	2.7	30.6	-0.5	30.6	7.5	25.7	-0.5	24.0	5.2	24.1	3.5	37.3
CMI	-2.9	38.1	-2.6	43.5	-5.8	43.5	2.2	40.2	-5.8	39.1	-0.1	39.2	-1.8	48.5

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 10 kHz

Lab j ⟹

Lab i ⟱

	D_i / (µV/V)	U_i / (µV/V)	PTB D_{ij} / (µV/V)	U_{ij} / (µV/V)	NMi-VSL D_{ij} / (µV/V)	U_{ij} / (µV/V)	INTI D_{ij} / (µV/V)	U_{ij} / (µV/V)	NMIA D_{ij} / (µV/V)	U_{ij} / (µV/V)	NRC D_{ij} / (µV/V)	U_{ij} / (µV/V)	VNIIM D_{ij} / (µV/V)	U_{ij} / (µV/V)
LNE	-0.3	20.9	0.3	22.6	1.8	25.9	3.6	25.4	-3.4	23.0	-3.4	22.9	-0.3	27.2
AREPA	2.9	20.9	3.5	19.6	5.0	25.9	6.8	25.4	-0.2	23.0	-0.2	22.9	2.9	27.2
NPL	-5.1	12.8	-4.5	15.4	-3.0	20.0	-1.2	19.3	-8.2	16.0	-8.2	15.8	-5.1	21.6
SP	2.9	8.7	3.5	12.2	5.0	17.6	6.8	16.8	-0.2	12.9	-0.2	12.6	2.9	19.4
IEN	-2.8	9.1	-2.2	12.5	-0.7	17.8	1.1	17.1	-5.9	13.2	-5.9	12.9	-2.8	19.6
CEM	-1.1	29.9	-0.5	31.1	1.0	33.6	2.8	33.2	-4.2	31.4	-4.2	31.3	-1.1	34.6
PTB	-0.6	7.5			1.5	17.0	3.3	16.3	-3.7	12.2	-3.7	11.9	-0.6	18.9
NMi-VSL	-2.1	14.7	-1.5	17.0			1.8	20.6	-5.2	17.6	-5.2	17.4	-2.1	22.8
INTI	-3.9	13.8	-3.3	16.3	-1.8	20.6			-7.0	16.8	-7.0	16.6	-3.9	22.2
NMIA	3.1	8.7	3.7	12.2	5.2	17.6	7.0	16.8			0.0	12.6	3.1	19.4
NRC	3.1	8.2	3.7	11.9	5.2	17.4	7.0	16.6	0.0	12.6			3.1	19.2
VNIIM	0.0	16.9	0.6	18.9	2.1	22.8	3.9	22.2	-3.1	19.4	-3.1	19.2		
METAS	-1.3	5.5	-0.7	10.2	0.8	16.3	2.6	15.5	-4.4	11.1	-4.4	10.7	-1.3	18.2
NIST	3.3	10.3	3.9	13.4	5.4	18.5	7.2	17.8	0.2	14.1	0.2	13.8	3.3	20.2
NIM	-1.4	19.4	-0.8	21.2	0.7	24.7	2.5	24.2	-4.5	21.7	-4.5	21.5	-1.4	26.1
BEV	1.9	15.4	2.5	17.1	4.0	21.3	-	-	-	-	-	-	-	-
MIKES	-6.5	8.0	-5.9	11.0	-4.4	16.8	-	-	-	-	-	-	-	-
INETI	-9.1	30.1	-8.5	31.1	-7.0	33.6	-	-	-	-	-	-	-	-
OMH	-3.1	36.1	-2.5	36.9	-1.0	39.0	-	-	-	-	-	-	-	-
JV	0.4	22.3	1.0	23.6	2.5	26.8	-	-	-	-	-	-	-	-
UME	2.4	22.3	3.0	23.6	4.5	26.8	-	-	-	-	-	-	-	-
CMI	-2.9	38.1	-2.3	38.9	-0.8	40.9	-	-	-	-	-	-	-	-

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 10 kHz

Lab *j* ⟹

Lab *i*	D_i /(µV/V)	U_i /(µV/V)	METAS D_{ij} /(µV/V)	U_{ij} /(µV/V)	NIST D_{ij} /(µV/V)	U_{ij} /(µV/V)	NIM D_{ij} /(µV/V)	U_{ij} /(µV/V)	BEV D_{ij} /(µV/V)	U_{ij} /(µV/V)	MIKES D_{ij} /(µV/V)	U_{ij} /(µV/V)	INETI D_{ij} /(µV/V)	U_{ij} /(µV/V)
LNE	-0.3	20.9	1.0	22.0	-3.6	23.7	1.1	28.8	-2.2	26.0	6.2	22.4	8.8	36.7
AREPA	2.9	20.9	4.2	22.0	-0.4	23.7	4.3	28.8	1.0	26.0	9.4	22.4	12.0	36.7
NPL	-5.1	12.8	-3.8	14.5	-8.4	17.0	-3.7	23.6	-7.0	20.0	1.4	15.1	4.0	32.8
SP	2.9	8.7	4.2	11.1	-0.4	14.1	4.3	21.7	1.0	17.7	9.4	11.8	12.0	31.4
IEN	-2.8	9.1	-1.5	11.4	-6.1	14.4	-1.4	21.8	-4.7	17.9	3.7	12.2	6.3	31.5
CEM	-1.1	29.9	0.2	30.7	-4.4	31.9	0.3	35.9	-3.0	33.6	5.4	31.0	8.0	42.5
PTB	-0.6	7.5	0.7	10.2	-3.9	13.4	0.8	21.2	-2.5	17.1	5.9	11.0	8.5	31.1
NMi-VSL	-2.1	14.7	-0.8	16.3	-5.4	18.5	-0.7	24.7	-4.0	21.3	4.4	16.8	7.0	33.6
INTI	-3.9	13.8	-2.6	15.5	-7.2	17.8	-2.5	24.2	-	-	-	-	-	-
NMIA	3.1	8.7	4.4	11.1	-0.2	14.1	4.5	21.7	-	-	-	-	-	-
NRC	3.1	8.2	4.4	10.7	-0.2	13.8	4.5	21.5	-	-	-	-	-	-
VNIIM	0.0	16.9	1.3	18.2	-3.3	20.2	1.4	26.1	-	-	-	-	-	-
METAS	-1.3	5.5			-4.6	12.4	0.1	20.6	-3.2	16.4	5.2	9.8	7.8	30.7
NIST	3.3	10.3	4.6	12.4			4.7	22.4	-	-	-	-	-	-
NIM	-1.4	19.4	-0.1	20.6	-4.7	22.4			-	-	-	-	-	-
BEV	1.9	15.4	3.2	16.4	-	-	-	-			8.4	16.9	11.0	33.6
MIKES	-6.5	8.0	-5.2	9.8	-	-	-	-	-8.4	16.9			2.6	31.0
INETI	-9.1	30.1	-7.8	30.7	-	-	-	-	-11.0	33.6	-2.6	31.0		
OMH	-3.1	36.1	-1.8	36.6	-	-	-	-	-5.0	39.1	3.4	36.8	6.0	46.9
JV	0.4	22.3	1.7	23.0	-	-	-	-	-1.5	26.8	6.9	23.4	9.5	37.3
UME	2.4	22.3	3.7	23.0	-	-	-	-	0.5	26.8	8.9	23.4	11.5	37.3
CMI	-2.9	38.1	-1.6	38.6	-	-	-	-	-4.8	40.9	3.6	38.8	6.2	48.5

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 10 kHz

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	OMH D_{ij} / (µV/V)	OMH U_{ij} / (µV/V)	JV D_{ij} / (µV/V)	JV U_{ij} / (µV/V)	UME D_{ij} / (µV/V)	UME U_{ij} / (µV/V)	CMI D_{ij} / (µV/V)	CMI U_{ij} / (µV/V)
LNE	-0.3	20.9	2.8	41.8	-0.7	30.6	-2.7	30.6	2.6	43.5
AREPA	2.9	20.9	6.0	41.8	2.5	30.6	0.5	30.6	5.8	43.5
NPL	-5.1	12.8	-2.0	38.4	-5.5	25.7	-7.5	25.7	-2.2	40.2
SP	2.9	8.7	6.0	37.2	2.5	24.0	0.5	24.0	5.8	39.1
IEN	-2.8	9.1	0.3	37.3	-3.2	24.1	-5.2	24.1	0.1	39.2
CEM	-1.1	29.9	2.0	46.9	-1.5	37.3	-3.5	37.3	1.8	48.5
PTB	-0.6	7.5	2.5	36.9	-1.0	23.6	-3.0	23.6	2.3	38.9
NMi-VSL	-2.1	14.7	1.0	39.0	-2.5	26.8	-4.5	26.8	0.8	40.9
INTI	-3.9	13.8	-	-	-	-	-	-	-	-
NMIA	3.1	8.7	-	-	-	-	-	-	-	-
NRC	3.1	8.2	-	-	-	-	-	-	-	-
VNIIM	0.0	16.9	-	-	-	-	-	-	-	-
METAS	-1.3	5.5	1.8	36.6	-1.7	23.0	-3.7	23.0	1.6	38.6
NIST	3.3	10.3	-	-	-	-	-	-	-	-
NIM	-1.4	19.4	-	-	-	-	-	-	-	-
BEV	1.9	15.4	5.0	39.1	1.5	26.8	-0.5	26.8	4.8	40.9
MIKES	-6.5	8.0	-3.4	36.8	-6.9	23.4	-8.9	23.4	-3.6	38.8
INETI	-9.1	30.1	-6.0	46.9	-9.5	37.3	-11.5	37.3	-6.2	48.5
OMH	-3.1	36.1			-3.5	42.3	-5.5	42.3	-0.2	52.4
JV	0.4	22.3	3.5	42.3			-2.0	31.3	3.3	44.0
UME	2.4	22.3	5.5	42.3	2.0	31.3			5.3	44.0
CMI	-2.9	38.1	0.2	52.4	-3.3	44.0	-5.3	44.0		

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 20 kHz

x_i adjusted value of the measurement reported by laboratory i (see on page 13 of the CCEM-K9 Final Report and on page 11 of the EUROMET.EM-K9 Final Report)

U_i expanded uncertainty of x_i at a 95 % level of confidence

Lab i	x_i / (µV/V)	U_i / (µV/V)	Date of measurement	Participant in CCEM-K9	Participant in EUROMET.EM-K9
LNE	-6.0	21.1	Feb 2000	Yes	Yes
BEV	-2.2	19.1	Apr 2000	No	Yes
MIKES	-14.0	8.2	May 2000	No	Yes
INETI	-18.2	36.0	Jun 2000	No	Yes
AREPA	-3.2	21.1	Jul 2000	Yes	Yes
NPL	-12.2	17.1	Aug 2000	Yes	Yes
SP	-4.2	10.2	Sep 2000	Yes	Yes
IEN	-12.3	14.1	Oct 2000	Yes	Yes
CEM	-4.2	30.1	Nov 2000	Yes	Yes
PTB	-7.0	8.0	Jan 2001	Yes	Yes
NMi-VSL	-9.2	20.0	May 2001	Yes	Yes
OMH	-7.1	40.0	Oct 2001	No	Yes
JV	-5.7	24.1	Mar 2002	No	Yes
UME	-3.7	26.1	Apr 2002	No	Yes
INTI	-9.1	16.1	Jul 2000	Yes	No
NMIA	-2.1	10.1	Nov 2000	Yes	No
NRC	-0.1	10.1	Mar 2001	Yes	No
VNIIM	-11.6	24.7	May 2001	Yes	No
METAS	-6.9	6.2	Aug 2001	Yes	Yes
NIST	-2.0	11.3	Jan 2002	Yes	No
NIM	-6.3	21.3	May 2002	Yes	No
CMI	-8.1	46.0	Dec 2002	No	Yes

Key comparison APMP.EM-K9

Measurement results of the participants in key comparison APMP.EM-K9 are given in Table 2 of the Final Report. They were taken between 2000 and 2004.

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 20 kHz

The key comparison reference value, x_R, is computed as the weighted average of the adjusted values obtained by the CCEM-K9 participants. Its expanded uncertainty is $U_R = 2u_R$, where u_R is the standard uncertainty of the weighted average. All adjusted values from CCEM-K9 participants have been taken into account in the calculation, except the value of AREPA, which is traceable to PTB.

x_R = -5.8 µV/V, U_R = 3.2 µV/V

The degree of equivalence of laboratory *i* relative to the key comparison reference value is given by two terms:
$D_i = (x_i - x_R)$ and its expanded uncertainty U_i at a 95 % level of confidence computed as explained on page 15 of the CCEM-K9 Final Report and on page 12 of the EUROMET.EM-K9 Final Report, both expressed in µV/V.

The degree of equivalence between two laboratories *i* and *j* is given by two terms:
$D_{ij} = (D_i - D_j)$ and its expanded uncertainty U_{ij} at a 95 % level of confidence computed as explained in the Appendices 1 of the
CCEM-K9 Final Report and EUROMET.EM-K9 Final Report, both expressed in µV/V.
The CCEM-K9 Matrix of equivalence is extended with degrees of equivalence between participants in EUROMET.EM-K9.

Linking APMP.EM-K9 to CCEM-K9

The linkage process is based on the results of the common participants, NMIA and PTB, and is detailed in Sections 8 and 9 of the APMP.EM-K9 Final Report. This makes in possible to extend the graph of equivalence to participants in APMP.EM-K9 only.

Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 14 of the Final Report. They are not reported here.

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 20 kHz

Lab *i*

	D_i / (μV/V)	U_i / (μV/V)
LNE	-0.2	20.9
AREPA	2.6	20.9
NPL	-6.4	16.8
SP	1.6	9.7
IEN	-6.5	13.7
CEM	1.6	29.9
PTB	-1.2	7.3
NMi-VSL	-3.4	19.7
INTI	-3.3	15.8
NMIA	3.7	9.6
NRC	5.7	9.6
VNIIM	-5.8	24.5
METAS	-1.1	5.3
NIST	3.8	10.8
NIM	-0.5	21.1

	D_i / (μV/V)	U_i / (μV/V)
BEV	3.6	19.4
MIKES	-8.2	8.8
INETI	-12.4	36.1
OMH	-1.3	40.1
JV	0.1	24.3
UME	2.1	26.3
CMI	-2.3	46.1

	D_i / (μV/V)	U_i / (μV/V)
CMS	-6.5	22
SCL	-5.1	25
NML-SIRIM	-3.2	19
NMISA	5.2	31
NPLI	6.8	23
NIMT	4.9	26
VMI-STAMEQ	-4.1	32
A*STAR	-5.1	18
NMIJ	0.9	16
MSL	-0.4	20

Red: participants in CCEM-K9, Green: participants in EUROMET.EM-K9 only, Orange: participants in APMP.EM-K9 only

CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9   AC-DC transfer difference: 500 V, 20 kHz
Degrees of equivalence, D_i and expanded uncertainty U_i (95 % level of confidence)
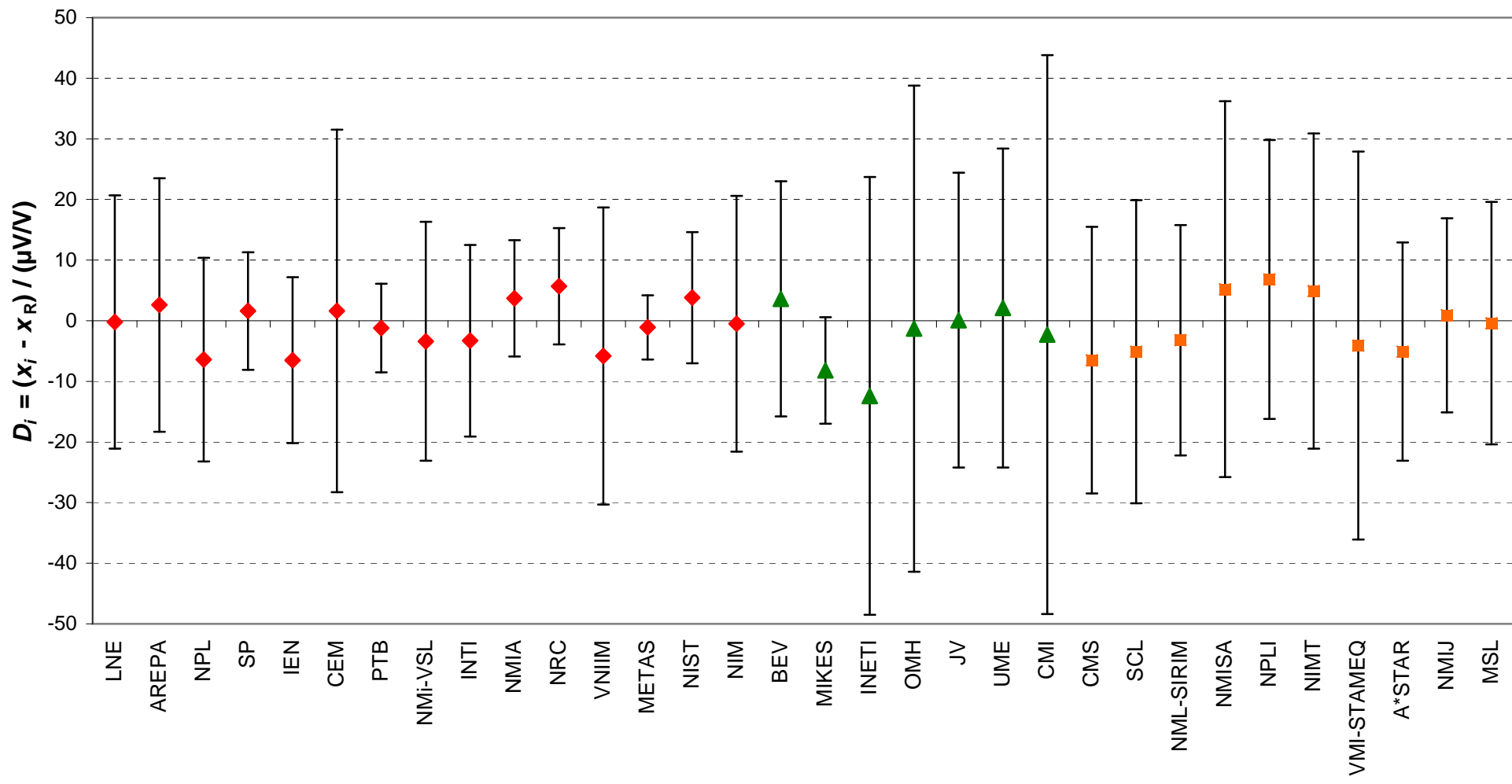
y-axis: $D_i = (x_i - x_R) / (\mu V/V)$

x-axis labels: LNE, AREPA, NPL, SP, IEN, CEM, PTB, NMi-VSL, INTI, NMIA, NRC, VNIIM, METAS, NIST, NIM, BEV, MIKES, INETI, OMH, JV, UME, CMI, CMS, SCL, NML-SIRIM, NMISA, NPLI, NIMT, VMI-STAMEQ, A*STAR, NMIJ, MSL

Red diamonds: participants in CCEM-K9, **Green triangles**: participants in EUROMET.EM-K9 only, **Orange squares**: participants in APMP.EM-K9 only

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 20 kHz

Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 14
of the Final Report. They are not reported here.

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	LNE D_{ij} / (µV/V)	U_{ij} / (µV/V)	AREPA D_{ij} / (µV/V)	U_{ij} / (µV/V)	NPL D_{ij} / (µV/V)	U_{ij} / (µV/V)	SP D_{ij} / (µV/V)	U_{ij} / (µV/V)	IEN D_{ij} / (µV/V)	U_{ij} / (µV/V)	CEM D_{ij} / (µV/V)	U_{ij} / (µV/V)
LNE	-0.2	20.9			-2.8	29.9	6.2	27.2	-1.8	23.5	6.3	25.4	-1.8	36.8
AREPA	2.6	20.9	2.8	29.9			9.0	27.2	1.0	23.5	9.1	25.4	1.0	36.8
NPL	-6.4	16.8	-6.2	27.2	-9.0	27.2			-8.0	20.0	0.1	22.2	-8.0	34.7
SP	1.6	9.7	1.8	23.5	-1.0	23.5	8.0	20.0			8.1	17.5	0.0	31.8
IEN	-6.5	13.7	-6.3	25.4	-9.1	25.4	-0.1	22.2	-8.1	17.5			-8.1	33.3
CEM	1.6	29.9	1.8	36.8	-1.0	36.8	8.0	34.7	0.0	31.8	8.1	33.3		
PTB	-1.2	7.3	-1.0	22.6	-3.8	19.6	5.2	18.9	-2.8	13.0	5.3	16.3	-2.8	31.2
NMi-VSL	-3.4	19.7	-3.2	29.1	-6.0	29.1	3.0	26.4	-5.0	22.5	3.1	24.5	-5.0	36.2
INTI	-3.3	15.8	-3.1	26.6	-5.9	26.6	3.1	23.5	-4.9	19.1	3.2	21.5	-4.9	34.2
NMIA	3.7	9.6	3.9	23.4	1.1	23.4	10.1	19.9	2.1	14.4	10.2	17.4	2.1	31.8
NRC	5.7	9.6	5.9	23.4	3.1	23.4	12.1	19.9	4.1	14.4	12.2	17.4	4.1	31.8
VNIIM	-5.8	24.5	-5.6	32.5	-8.4	32.5	0.6	30.1	-7.4	26.8	0.7	28.5	-7.4	39.0
METAS	-1.1	5.3	-0.9	22.0	-3.7	22.0	5.3	18.2	-2.7	12.0	5.4	15.5	-2.7	30.8
NIST	3.8	10.8	4.0	24.0	1.2	24.0	10.2	20.5	2.2	15.3	10.3	18.1	2.2	32.2
NIM	-0.5	21.1	-0.3	30.0	-3.1	30.0	5.9	27.4	-2.1	23.7	6.0	25.6	-2.1	36.9
BEV	3.6	19.4	3.8	28.5	1.0	28.5	10.0	25.7	2.0	21.7	10.1	23.8	2.0	35.7
MIKES	-8.2	8.8	-8.0	22.7	-10.8	22.7	-1.8	19.0	-9.8	13.1	-1.7	16.4	-9.8	31.2
INETI	-12.4	36.1	-12.2	41.8	-15.0	41.8	-6.0	39.9	-14.0	37.5	-5.9	38.7	-14.0	47.0
OMH	-1.3	40.1	-1.1	45.3	-3.9	45.3	5.1	43.6	-2.9	41.3	5.2	42.5	-2.9	50.1
JV	0.1	24.3	0.3	32.1	-2.5	32.1	6.5	29.6	-1.5	26.2	6.6	28.0	-1.5	38.6
UME	2.1	26.3	2.3	33.6	-0.5	33.6	8.5	31.3	0.5	28.1	8.6	29.7	0.5	39.9
CMI	-2.3	46.1	-2.1	50.7	-4.9	50.7	4.1	49.1	-3.9	47.2	4.2	48.2	-3.9	55.0

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 20 kHz

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	PTB D_{ij} / (µV/V)	PTB U_{ij} / (µV/V)	NMi-VSL D_{ij} / (µV/V)	NMi-VSL U_{ij} / (µV/V)	INTI D_{ij} / (µV/V)	INTI U_{ij} / (µV/V)	NMIA D_{ij} / (µV/V)	NMIA U_{ij} / (µV/V)	NRC D_{ij} / (µV/V)	NRC U_{ij} / (µV/V)	VNIIM D_{ij} / (µV/V)	VNIIM U_{ij} / (µV/V)
LNE	-0.2	20.9	1.0	22.6	3.2	29.1	3.1	26.6	-3.9	23.4	-5.9	23.4	5.6	32.5
AREPA	2.6	20.9	3.8	19.6	6.0	29.1	5.9	26.6	-1.1	23.4	-3.1	23.4	8.4	32.5
NPL	-6.4	16.8	-5.2	18.9	-3.0	26.4	-3.1	23.5	-10.1	19.9	-12.1	19.9	-0.6	30.1
SP	1.6	9.7	2.8	13.0	5.0	22.5	4.9	19.1	-2.1	14.4	-4.1	14.4	7.4	26.8
IEN	-6.5	13.7	-5.3	16.3	-3.1	24.5	-3.2	21.5	-10.2	17.4	-12.2	17.4	-0.7	28.5
CEM	1.6	29.9	2.8	31.2	5.0	36.2	4.9	34.2	-2.1	31.8	-4.1	31.8	7.4	39.0
PTB	-1.2	7.3			2.2	21.6	2.1	18.0	-4.9	12.9	-6.9	12.9	4.6	26.0
NMi-VSL	-3.4	19.7	-2.2	21.6			-0.1	25.7	-7.1	22.5	-9.1	22.5	2.4	31.8
INTI	-3.3	15.8	-2.1	18.0	0.1	25.7			-7.0	19.1	-9.0	19.1	2.5	29.5
NMIA	3.7	9.6	4.9	12.9	7.1	22.5	7.0	19.1			-2.0	14.3	9.5	26.7
NRC	5.7	9.6	6.9	12.9	9.1	22.5	9.0	19.1	2.0	14.3			11.5	26.7
VNIIM	-5.8	24.5	-4.6	26.0	-2.4	31.8	-2.5	29.5	-9.5	26.7	-11.5	26.7		
METAS	-1.1	5.3	0.1	10.2	2.3	21.0	2.2	17.3	-4.8	11.9	-6.8	11.9	4.7	25.5
NIST	3.8	10.8	5.0	13.9	7.2	23.0	7.1	19.7	0.1	15.2	-1.9	15.2	9.6	27.2
NIM	-0.5	21.1	0.7	22.8	2.9	29.3	2.8	26.8	-4.2	23.6	-6.2	23.6	5.3	32.7
BEV	3.6	19.4	4.8	20.8	7.0	27.7	-	-	-	-	-	-	-	-
MIKES	-8.2	8.8	-7.0	11.5	-4.8	21.7	-	-	-	-	-	-	-	-
INETI	-12.4	36.1	-11.2	36.9	-9.0	41.2	-	-	-	-	-	-	-	-
OMH	-1.3	40.1	-0.1	40.8	2.1	44.8	-	-	-	-	-	-	-	-
JV	0.1	24.3	1.3	25.4	3.5	31.4	-	-	-	-	-	-	-	-
UME	2.1	26.3	3.3	27.3	5.5	32.9	-	-	-	-	-	-	-	-
CMI	-2.3	46.1	-1.1	46.7	1.1	50.2	-	-	-	-	-	-	-	-

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 20 kHz

Lab *j* ⟹

Lab *i*	D_i /(µV/V)	U_i /(µV/V)	METAS D_{ij} /(µV/V)	U_{ij} /(µV/V)	NIST D_{ij} /(µV/V)	U_{ij} /(µV/V)	NIM D_{ij} /(µV/V)	U_{ij} /(µV/V)	BEV D_{ij} /(µV/V)	U_{ij} /(µV/V)	MIKES D_{ij} /(µV/V)	U_{ij} /(µV/V)	INETI D_{ij} /(µV/V)	U_{ij} /(µV/V)
LNE	-0.2	20.9	0.9	22.0	-4.0	24.0	0.3	30.0	-3.8	28.5	8.0	22.7	12.2	41.8
AREPA	2.6	20.9	3.7	22.0	-1.2	24.0	3.1	30.0	-1.0	28.5	10.8	22.7	15.0	41.8
NPL	-6.4	16.8	-5.3	18.2	-10.2	20.5	-5.9	27.4	-10.0	25.7	1.8	19.0	6.0	39.9
SP	1.6	9.7	2.7	12.0	-2.2	15.3	2.1	23.7	-2.0	21.7	9.8	13.1	14.0	37.5
IEN	-6.5	13.7	-5.4	15.5	-10.3	18.1	-6.0	25.6	-10.1	23.8	1.7	16.4	5.9	38.7
CEM	1.6	29.9	2.7	30.8	-2.2	32.2	2.1	36.9	-2.0	35.7	9.8	31.2	14.0	47.0
PTB	-1.2	7.3	-0.1	10.2	-5.0	13.9	-0.7	22.8	-4.8	20.8	7.0	11.5	11.2	36.9
NMi-VSL	-3.4	19.7	-2.3	21.0	-7.2	23.0	-2.9	29.3	-7.0	27.7	4.8	21.7	9.0	41.2
INTI	-3.3	15.8	-2.2	17.3	-7.1	19.7	-2.8	26.8	-	-	-	-	-	-
NMIA	3.7	9.6	4.8	11.9	-0.1	15.2	4.2	23.6	-	-	-	-	-	-
NRC	5.7	9.6	6.8	11.9	1.9	15.2	6.2	23.6	-	-	-	-	-	-
VNIIM	-5.8	24.5	-4.7	25.5	-9.6	27.2	-5.3	32.7	-	-	-	-	-	-
METAS	-1.1	5.3			-4.9	12.9	-0.6	22.2	-4.7	20.1	7.1	10.3	11.3	36.6
NIST	3.8	10.8	4.9	12.9			4.3	24.2	-	-	-	-	-	-
NIM	-0.5	21.1	0.6	22.2	-4.3	24.2			-	-	-	-	-	-
BEV	3.6	19.4	4.7	20.1	-	-	-	-			11.8	20.8	16.0	40.8
MIKES	-8.2	8.8	-7.1	10.3	-	-	-	-	-11.8	20.8			4.2	37.0
INETI	-12.4	36.1	-11.3	36.6	-	-	-	-	-16.0	40.8	-4.2	37.0		
OMH	-1.3	40.1	-0.2	40.5	-	-	-	-	-4.9	44.4	6.9	40.9	11.1	53.9
JV	0.1	24.3	1.2	24.9	-	-	-	-	-3.5	30.8	8.3	25.5	12.5	43.4
UME	2.1	26.3	3.2	26.9	-	-	-	-	-1.5	32.4	10.3	27.4	14.5	44.5
CMI	-2.3	46.1	-1.2	46.5	-	-	-	-	-5.9	49.9	5.9	46.8	10.1	58.5

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 20 kHz

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	OMH D_{ij} / (µV/V)	OMH U_{ij} / (µV/V)	JV D_{ij} / (µV/V)	JV U_{ij} / (µV/V)	UME D_{ij} / (µV/V)	UME U_{ij} / (µV/V)	CMI D_{ij} / (µV/V)	CMI U_{ij} / (µV/V)
LNE	-0.2	20.9	1.1	45.3	-0.3	32.1	-2.3	33.6	2.1	50.7
AREPA	2.6	20.9	3.9	45.3	2.5	32.1	0.5	33.6	4.9	50.7
NPL	-6.4	16.8	-5.1	43.6	-6.5	29.6	-8.5	31.3	-4.1	49.1
SP	1.6	9.7	2.9	41.3	1.5	26.2	-0.5	28.1	3.9	47.2
IEN	-6.5	13.7	-5.2	42.5	-6.6	28.0	-8.6	29.7	-4.2	48.2
CEM	1.6	29.9	2.9	50.1	1.5	38.6	-0.5	39.9	3.9	55.0
PTB	-1.2	7.3	0.1	40.8	-1.3	25.4	-3.3	27.3	1.1	46.7
NMi-VSL	-3.4	19.7	-2.1	44.8	-3.5	31.4	-5.5	32.9	-1.1	50.2
INTI	-3.3	15.8	-	-	-	-	-	-	-	-
NMIA	3.7	9.6	-	-	-	-	-	-	-	-
NRC	5.7	9.6	-	-	-	-	-	-	-	-
VNIIM	-5.8	24.5	-	-	-	-	-	-	-	-
METAS	-1.1	5.3	0.2	40.5	-1.2	24.9	-3.2	26.9	1.2	46.5
NIST	3.8	10.8	-	-	-	-	-	-	-	-
NIM	-0.5	21.1	-	-	-	-	-	-	-	-

	D_i	U_i	OMH D_{ij}	OMH U_{ij}	JV D_{ij}	JV U_{ij}	UME D_{ij}	UME U_{ij}	CMI D_{ij}	CMI U_{ij}
BEV	3.6	19.4	4.9	44.4	3.5	30.8	1.5	32.4	5.9	49.9
MIKES	-8.2	8.8	-6.9	40.9	-8.3	25.5	-10.3	27.4	-5.9	46.8
INETI	-12.4	36.1	-11.1	53.9	-12.5	43.4	-14.5	44.5	-10.1	58.5
OMH	-1.3	40.1			-1.4	46.7	-3.4	47.8	1.0	61.0
JV	0.1	24.3	1.4	46.7			-2.0	35.6	2.4	52.0
UME	2.1	26.3	3.4	47.8	2.0	35.6			4.4	52.9
CMI	-2.3	46.1	-1.0	61.0	-2.4	52.0	-4.4	52.9		

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 50 kHz

x_i adjusted value of the measurement reported by laboratory i (see on page 13 of the CCEM-K9 Final Report and on page 11 of the EUROMET.EM-K9 Final Report)

U_i expanded uncertainty of x_i at a 95 % level of confidence

Lab i	x_i / (µV/V)	U_i / (µV/V)	Date of measurement	Participant in	
				CCEM-K9	EUROMET.EM-K9
LNE	-23.6	36.0	Feb 2000	Yes	Yes
BEV	-13.9	21.1	Apr 2000	No	Yes
MIKES	-43.0	13.1	May 2000	No	Yes
INETI	-37.9	46.0	Jun 2000	No	Yes
AREPA	-19.9	21.1	Jul 2000	Yes	Yes
NPL	-28.9	24.1	Aug 2000	Yes	Yes
SP	-15.9	14.1	Sep 2000	Yes	Yes
IEN	-33.1	20.3	Oct 2000	Yes	Yes
CEM	-26.9	38.0	Nov 2000	Yes	Yes
PTB	-22.5	10.0	Jan 2001	Yes	Yes
NMi-VSL	-25.7	25.0	May 2001	Yes	Yes
OMH	-19.0	63.0	Oct 2001	No	Yes
JV	-19.1	34.0	Mar 2002	No	Yes
UME	-18.1	36.0	Apr 2002	No	Yes
INTI	-24.9	18.1	Jul 2000	Yes	No
NMIA	-13.9	15.1	Nov 2000	Yes	No
NRC	-12.9	10.7	Mar 2001	Yes	No
VNIIM	-41.0	40.6	May 2001	Yes	No
METAS	-21.3	9.1	Aug 2001	Yes	Yes
NIST	-25.0	14.1	Jan 2002	Yes	No
NIM	-24.9	29.2	May 2002	Yes	No
CMI	-38.9	56.0	Dec 2002	No	Yes

Key comparison APMP.EM-K9

Measurement results of the participants in key comparison APMP.EM-K9 are given in Table 2 of the Final Report. They were taken between 2000 and 2004.

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 50 kHz

The key comparison reference value, x_R, is computed as the weighted average of the adjusted values obtained by the CCEM-K9 participants. Its expanded uncertainty is $U_R = 2u_R$, where u_R is the standard uncertainty of the weighted average. All adjusted values from CCEM-K9 participants have been taken into account in the calculation, except the value of AREPA, which is traceable to PTB.

x_R = -20.9 μV/V, U_R = 4.2 μV/V

The degree of equivalence of laboratory *i* relative to the key comparison reference value is given by two terms:
$D_i = (x_i - x_R)$ and its expanded uncertainty U_i at a 95 % level of confidence computed as explained on page 15 of the CCEM-K9 Final Report and on page 12 of the EUROMET.EM-K9 Final Report, both expressed in μV/V.

The degree of equivalence between two laboratories *i* and *j* is given by two terms:
$D_{ij} = (D_i - D_j)$ and its expanded uncertainty U_{ij} at a 95 % level of confidence computed as explained in the Appendices 1 of the CCEM-K9 Final Report and EUROMET.EM-K9 Final Report, both expressed in μV/V.
The CCEM-K9 Matrix of equivalence is extended with degrees of equivalence between participants in EUROMET.EM-K9.

Linking APMP.EM-K9 to CCEM-K9

The linkage process is based on the results of the common participants, NMIA and PTB, and is detailed in Sections 8 and 9 of the APMP.EM-K9 Final Report. This makes in possible to extend the graph of equivalence to participants in APMP.EM-K9 only.

Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 15 of the Final Report. They are not reported here.

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
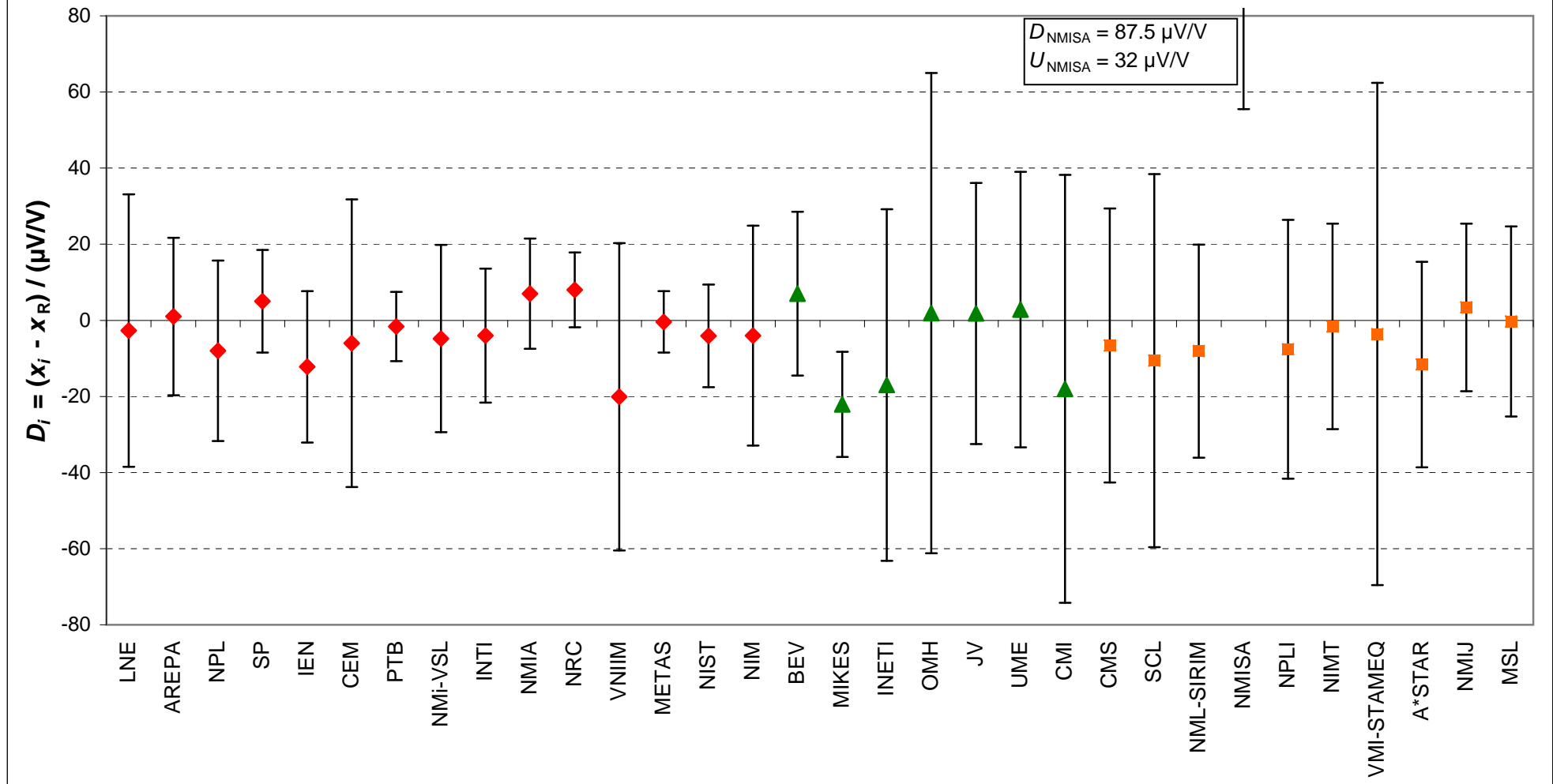**VOLTAGE : 500 V**
FREQUENCY : 50 kHz

Lab i

	D_i / (µV/V)	U_i / (µV/V)
LNE	-2.7	35.8
AREPA	1.0	20.7
NPL	-8.0	23.7
SP	5.0	13.5
IEN	-12.2	19.9
CEM	-6.0	37.8
PTB	-1.6	9.1
NMi-VSL	-4.8	24.6
INTI	-4.0	17.6
NMIA	7.0	14.5
NRC	8.0	9.8
VNIIM	-20.1	40.4
METAS	-0.4	8.1
NIST	-4.1	13.5
NIM	-4.0	28.9

	D_i / (µV/V)	U_i / (µV/V)
BEV	7.0	21.5
MIKES	-22.1	13.8
INETI	-17.0	46.2
OMH	1.9	63.1
JV	1.8	34.3
UME	2.8	36.2
CMI	-18.0	56.2

	D_i / (µV/V)	U_i / (µV/V)
CMS	-6.6	36
SCL	-10.6	49
NML-SIRIM	-8.1	28
NMISA	87.5	32
NPLI	-7.6	34
NIMT	-1.6	27
VMI-STAMEQ	-3.6	66
A*STAR	-11.6	27
NMIJ	3.4	22
MSL	-0.3	25

Red: participants in CCEM-K9, Green: participants in EUROMET.EM-K9 only, Orange: participants in APMP.EM-K9 only

CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9   AC-DC transfer difference: 500 V, 50 kHz
Degrees of equivalence, D_i and expanded uncertainty U_i (95 % level of confidence)

$D_{NMISA} = 87.5$ µV/V
$U_{NMISA} = 32$ µV/V

Red diamonds: participants in CCEM-K9, **Green triangles**: participants in EUROMET.EM-K9 only, **Orange squares**: participants in APMP.EM-K9 only

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 50 kHz

Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 15 of the Final Report. They are not reported here.

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	LNE D_{ij} / (µV/V)	LNE U_{ij} / (µV/V)	AREPA D_{ij} / (µV/V)	AREPA U_{ij} / (µV/V)	NPL D_{ij} / (µV/V)	NPL U_{ij} / (µV/V)	SP D_{ij} / (µV/V)	SP U_{ij} / (µV/V)	IEN D_{ij} / (µV/V)	IEN U_{ij} / (µV/V)	CEM D_{ij} / (µV/V)	CEM U_{ij} / (µV/V)
LNE	-2.7	35.8			-3.7	41.8	5.3	43.4	-7.7	38.7	9.5	41.4	3.3	52.4
AREPA	1.0	20.7	3.7	41.8			9.0	32.1	-4.0	25.4	13.2	29.3	7.0	43.5
NPL	-8.0	23.7	-5.3	43.4	-9.0	32.1			-13.0	28.0	4.2	31.6	-2.0	45.0
SP	5.0	13.5	7.7	38.7	4.0	25.4	13.0	28.0			17.2	24.8	11.0	40.6
IEN	-12.2	19.9	-9.5	41.4	-13.2	29.3	-4.2	31.6	-17.2	24.8			-6.2	43.1
CEM	-6.0	37.8	-3.3	52.4	-7.0	43.5	2.0	45.0	-11.0	40.6	6.2	43.1		
PTB	-1.6	9.1	1.1	37.4	-2.6	18.6	6.4	26.1	-6.6	17.3	10.6	22.7	4.4	39.3
NMi-VSL	-4.8	24.6	-2.1	43.9	-5.8	32.8	3.2	34.8	-9.8	28.8	7.4	32.3	1.2	45.5
INTI	-4.0	17.6	-1.3	40.3	-5.0	27.8	4.0	30.2	-9.0	23.0	8.2	27.2	2.0	42.1
NMIA	7.0	14.5	9.7	39.1	6.0	26.0	15.0	28.5	2.0	20.7	19.2	25.4	13.0	40.9
NRC	8.0	9.8	10.7	37.6	7.0	23.7	16.0	26.4	3.0	17.8	20.2	23.0	14.0	39.5
VNIIM	-20.1	40.4	-17.4	54.3	-21.1	45.8	-12.1	47.3	-25.1	43.0	-7.9	45.4	-14.1	55.7
METAS	-0.4	8.1	2.3	37.2	-1.4	23.0	7.6	25.8	-5.4	16.8	11.8	22.3	5.6	39.1
NIST	-4.1	13.5	-1.4	38.7	-5.1	25.4	3.9	28.0	-9.1	20.0	8.1	24.8	1.9	40.6
NIM	-4.0	28.9	-1.3	46.4	-5.0	36.1	4.0	37.9	-9.0	32.5	8.2	35.6	2.0	48.0
BEV	7.0	21.5	9.7	41.8	6.0	29.9	15.0	32.1	2.0	25.4	19.2	29.3	13.0	43.5
MIKES	-22.1	13.8	-19.4	38.4	-23.1	24.9	-14.1	27.5	-27.1	19.3	-9.9	24.2	-16.1	40.2
INETI	-17.0	46.2	-14.3	58.5	-18.0	50.7	-9.0	52.0	-22.0	48.2	-4.8	50.3	-11.0	59.7
OMH	1.9	63.1	4.6	72.6	0.9	66.5	9.9	67.5	-3.1	64.6	14.1	66.2	7.9	73.6
JV	1.8	34.3	4.5	49.6	0.8	40.1	9.8	41.7	-3.2	36.9	14.0	39.6	7.8	51.0
UME	2.8	36.2	5.5	51.0	1.8	41.8	10.8	43.4	-2.2	38.7	15.0	41.4	8.8	52.4
CMI	-18.0	56.2	-15.3	66.6	-19.0	59.9	-10.0	61.0	-23.0	57.8	-5.8	59.6	-12.0	67.7

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 50 kHz

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	PTB D_{ij} / (µV/V)	PTB U_{ij} / (µV/V)	NMi-VSL D_{ij} / (µV/V)	NMi-VSL U_{ij} / (µV/V)	INTI D_{ij} / (µV/V)	INTI U_{ij} / (µV/V)	NMIA D_{ij} / (µV/V)	NMIA U_{ij} / (µV/V)	NRC D_{ij} / (µV/V)	NRC U_{ij} / (µV/V)	VNIIM D_{ij} / (µV/V)	VNIIM U_{ij} / (µV/V)
LNE	-2.7	35.8	-1.1	37.4	2.1	43.9	1.3	40.3	-9.7	39.1	-10.7	37.6	17.4	54.3
AREPA	1.0	20.7	2.6	18.6	5.8	32.8	5.0	27.8	-6.0	26.0	-7.0	23.7	21.1	45.8
NPL	-8.0	23.7	-6.4	26.1	-3.2	34.8	-4.0	30.2	-15.0	28.5	-16.0	26.4	12.1	47.3
SP	5.0	13.5	6.6	17.3	9.8	28.8	9.0	23.0	-2.0	20.7	-3.0	17.8	25.1	43.0
IEN	-12.2	19.9	-10.6	22.7	-7.4	32.3	-8.2	27.2	-19.2	25.4	-20.2	23.0	7.9	45.4
CEM	-6.0	37.8	-4.4	39.3	-1.2	45.5	-2.0	42.1	-13.0	40.9	-14.0	39.5	14.1	55.7
PTB	-1.6	9.1			3.2	27.0	2.4	20.7	-8.6	18.2	-9.6	14.7	18.5	41.9
NMi-VSL	-4.8	24.6	-3.2	27.0			-0.8	30.9	-11.8	29.3	-12.8	27.2	15.3	47.7
INTI	-4.0	17.6	-2.4	20.7	0.8	30.9			-11.0	23.6	-12.0	21.1	16.1	44.5
NMIA	7.0	14.5	8.6	18.2	11.8	29.3	11.0	23.6			-1.0	18.6	27.1	43.4
NRC	8.0	9.8	9.6	14.7	12.8	27.2	12.0	21.1	1.0	18.6			28.1	42.0
VNIIM	-20.1	40.4	-18.5	41.9	-15.3	47.7	-16.1	44.5	-27.1	43.4	-28.1	42.0		
METAS	-0.4	8.1	1.2	13.6	4.4	26.7	3.6	20.3	-7.4	17.7	-8.4	14.1	19.7	41.7
NIST	-4.1	13.5	-2.5	17.3	0.7	28.8	-0.1	23.0	-11.1	20.7	-12.1	17.8	16.0	43.0
NIM	-4.0	28.9	-2.4	30.9	0.8	38.5	0.0	34.4	-11.0	32.9	-12.0	31.1	16.1	50.1
BEV	7.0	21.5	8.6	23.4	11.8	32.8	-	-	-	-	-	-	-	-
MIKES	-22.1	13.8	-20.5	16.5	-17.3	28.3	-	-	-	-	-	-	-	-
INETI	-17.0	46.2	-15.4	47.1	-12.2	52.4	-	-	-	-	-	-	-	-
OMH	1.9	63.1	3.5	63.8	6.7	67.8	-	-	-	-	-	-	-	-
JV	1.8	34.3	3.4	35.5	6.6	42.3	-	-	-	-	-	-	-	-
UME	2.8	36.2	4.4	37.4	7.6	43.9	-	-	-	-	-	-	-	-
CMI	-18.0	56.2	-16.4	56.9	-13.2	61.4	-	-	-	-	-	-	-	-

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 50 kHz

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	METAS D_{ij} / (µV/V)	U_{ij} / (µV/V)	NIST D_{ij} / (µV/V)	U_{ij} / (µV/V)	NIM D_{ij} / (µV/V)	U_{ij} / (µV/V)	BEV D_{ij} / (µV/V)	U_{ij} / (µV/V)	MIKES D_{ij} / (µV/V)	U_{ij} / (µV/V)	INETI D_{ij} / (µV/V)	U_{ij} / (µV/V)
LNE	-2.7	35.8	-2.3	37.2	1.4	38.7	1.3	46.4	-9.7	41.8	19.4	38.4	14.3	58.5
AREPA	1.0	20.7	1.4	23.0	5.1	25.4	5.0	36.1	-6.0	29.9	23.1	24.9	18.0	50.7
NPL	-8.0	23.7	-7.6	25.8	-3.9	28.0	-4.0	37.9	-15.0	32.1	14.1	27.5	9.0	52.0
SP	5.0	13.5	5.4	16.8	9.1	20.0	9.0	32.5	-2.0	25.4	27.1	19.3	22.0	48.2
IEN	-12.2	19.9	-11.8	22.3	-8.1	24.8	-8.2	35.6	-19.2	29.3	9.9	24.2	4.8	50.3
CEM	-6.0	37.8	-5.6	39.1	-1.9	40.6	-2.0	48.0	-13.0	43.5	16.1	40.2	11.0	59.7
PTB	-1.6	9.1	-1.2	13.6	2.5	17.3	2.4	30.9	-8.6	23.4	20.5	16.5	15.4	47.1
NMi-VSL	-4.8	24.6	-4.4	26.7	-0.7	28.8	-0.8	38.5	-11.8	32.8	17.3	28.3	12.2	52.4
INTI	-4.0	17.6	-3.6	20.3	0.1	23.0	0.0	34.4	-	-	-	-	-	-
NMIA	7.0	14.5	7.4	17.7	11.1	20.7	11.0	32.9	-	-	-	-	-	-
NRC	8.0	9.8	8.4	14.1	12.1	17.8	12.0	31.1	-	-	-	-	-	-
VNIIM	-20.1	40.4	-19.7	41.7	-16.0	43.0	-16.1	50.1	-	-	-	-	-	-
METAS	-0.4	8.1			3.7	16.8	3.6	30.6	-7.4	23.0	21.7	16.0	16.6	46.9
NIST	-4.1	13.5	-3.7	16.8			-0.1	32.5	-	-	-	-	-	-
NIM	-4.0	28.9	-3.6	30.6	0.1	32.5			-	-	-	-	-	-
BEV	7.0	21.5	7.4	23.0	-	-	-	-			29.1	24.9	24.0	50.7
MIKES	-22.1	13.8	-21.7	16.0	-	-	-	-	-29.1	24.9			-5.1	47.9
INETI	-17.0	46.2	-16.6	46.9	-	-	-	-	-24.0	50.7	5.1	47.9		
OMH	1.9	63.1	2.3	63.7	-	-	-	-	-5.1	66.5	24.0	64.4	18.9	78.1
JV	1.8	34.3	2.2	35.2	-	-	-	-	-5.2	40.1	23.9	36.5	18.8	57.3
UME	2.8	36.2	3.2	37.2	-	-	-	-	-4.2	41.8	24.9	38.4	19.8	58.5
CMI	-18.0	56.2	-17.6	56.8	-	-	-	-	-25.0	59.9	4.1	57.6	-1.0	72.5

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 50 kHz

Lab *j* ⟹

Lab *i* ⟱

	D_i / (µV/V)	U_i / (µV/V)	OMH D_{ij} / (µV/V)	OMH U_{ij} / (µV/V)	JV D_{ij} / (µV/V)	JV U_{ij} / (µV/V)	UME D_{ij} / (µV/V)	UME U_{ij} / (µV/V)	CMI D_{ij} / (µV/V)	CMI U_{ij} / (µV/V)
LNE	-2.7	35.8	-4.6	72.6	-4.5	49.6	-5.5	51.0	15.3	66.6
AREPA	1.0	20.7	-0.9	66.5	-0.8	40.1	-1.8	41.8	19.0	59.9
NPL	-8.0	23.7	-9.9	67.5	-9.8	41.7	-10.8	43.4	10.0	61.0
SP	5.0	13.5	3.1	64.6	3.2	36.9	2.2	38.7	23.0	57.8
IEN	-12.2	19.9	-14.1	66.2	-14.0	39.6	-15.0	41.4	5.8	59.6
CEM	-6.0	37.8	-7.9	73.6	-7.8	51.0	-8.8	52.4	12.0	67.7
PTB	-1.6	9.1	-3.5	63.8	-3.4	35.5	-4.4	37.4	16.4	56.9
NMi-VSL	-4.8	24.6	-6.7	67.8	-6.6	42.3	-7.6	43.9	13.2	61.4
INTI	-4.0	17.6	-	-	-	-	-	-	-	-
NMIA	7.0	14.5	-	-	-	-	-	-	-	-
NRC	8.0	9.8	-	-	-	-	-	-	-	-
VNIIM	-20.1	40.4	-	-	-	-	-	-	-	-
METAS	-0.4	8.1	-2.3	63.7	-2.2	35.2	-3.2	37.2	17.6	56.8
NIST	-4.1	13.5	-	-	-	-	-	-	-	-
NIM	-4.0	28.9	-	-	-	-	-	-	-	-
BEV	7.0	21.5	5.1	66.5	5.2	40.1	4.2	41.8	25.0	59.9
MIKES	-22.1	13.8	-24.0	64.4	-23.9	36.5	-24.9	38.4	-4.1	57.6
INETI	-17.0	46.2	-18.9	78.1	-18.8	57.3	-19.8	58.5	1.0	72.5
OMH	1.9	63.1			0.1	71.6	-0.9	72.6	19.9	84.3
JV	1.8	34.3	-0.1	71.6			-1.0	49.6	19.8	65.6
UME	2.8	36.2	0.9	72.6	1.0	49.6			20.8	66.6
CMI	-18.0	56.2	-19.9	84.3	-19.8	65.6	-20.8	66.6		

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 100 kHz

x_i adjusted value of the measurement reported by laboratory i (see on page 13 of the CCEM-K9 Final Report and on page 11 of the EUROMET.EM-K9 Final Report)

U_i expanded uncertainty of x_i at a 95 % level of confidence

Lab i	x_i / (µV/V)	U_i / (µV/V)	Date of measurement	Participant in	
				CCEM-K9	EUROMET.EM-K9
LNE	-61.6	36.1	Feb 2000	Yes	Yes
BEV	-40.9	31.1	Apr 2000	No	Yes
MIKES	-91.1	36.0	May 2000	No	Yes
INETI	-71.9	72.0	Jun 2000	No	Yes
AREPA	-53.9	41.1	Jul 2000	Yes	Yes
NPL	-68.9	46.1	Aug 2000	Yes	Yes
SP	-48.9	21.1	Sep 2000	Yes	Yes
IEN	-74.3	47.7	Oct 2000	Yes	Yes
CEM	-55.9	50.0	Nov 2000	Yes	Yes
PTB	-60.5	22.0	Jan 2001	Yes	Yes
NMi-VSL	-63.8	40.0	May 2001	Yes	Yes
OMH	-61.1	100.0	Oct 2001	No	Yes
JV	-45.5	48.1	Mar 2002	No	Yes
UME	-49.9	56.1	Apr 2002	No	Yes
INTI	-63.0	30.1	Jul 2000	Yes	No
NMIA	-46.0	23.1	Nov 2000	Yes	No
NRC	-59.0	24.1	Mar 2001	Yes	No
VNIIM	-80.2	60.4	May 2001	Yes	No
METAS	-56.0	26.1	Aug 2001	Yes	Yes
NIST	-67.0	17.9	Jan 2002	Yes	No
NIM	-81.5	39.7	May 2002	Yes	No
CMI	-73.0	80.0	Dec 2002	No	Yes

Key comparison APMP.EM-K9

Measurement results of the participants in key comparison APMP.EM-K9 are given in Table 2 of the Final Report. They were taken between 2000 and 2004.

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 100 kHz

The key comparison reference value, x_R, is computed as the weighted average of the adjusted values obtained by the CCEM-K9 participants. Its expanded uncertainty is $U_R = 2u_R$, where u_R is the standard uncertainty of the weighted average. All adjusted values from CCEM-K9 participants have been taken into account in the calculation, except the value of AREPA, which is traceable to PTB.

x_R = -59.9 µV/V, U_R = 7.6 µV/V

The degree of equivalence of laboratory i relative to the key comparison reference value is given by two terms:
$D_i = (x_i - x_R)$ and its expanded uncertainty U_i at a 95 % level of confidence computed as explained on page 15 of the CCEM-K9 Final Report and on page 12 of the EUROMET.EM-K9 Final Report, both expressed in µV/V.

The degree of equivalence between two laboratories i and j is given by two terms:
$D_{ij} = (D_i - D_j)$ and its expanded uncertainty U_{ij} at a 95 % level of confidence computed as explained in the Appendices 1 of the
CCEM-K9 Final Report and EUROMET.EM-K9 Final Report, both expressed in µV/V.
The CCEM-K9 Matrix of equivalence is extended with degrees of equivalence between participants in EUROMET.EM-K9.

Linking APMP.EM-K9 to CCEM-K9

The linkage process is based on the results of the common participants, NMIA and PTB, and is detailed in Sections 8 and 9 of the APMP.EM-K9 Final Report. This makes in possible to extend the graph of equivalence to participants in APMP.EM-K9 only.

Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 16 of the Final Report. They are not reported here.

Key comparisons CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
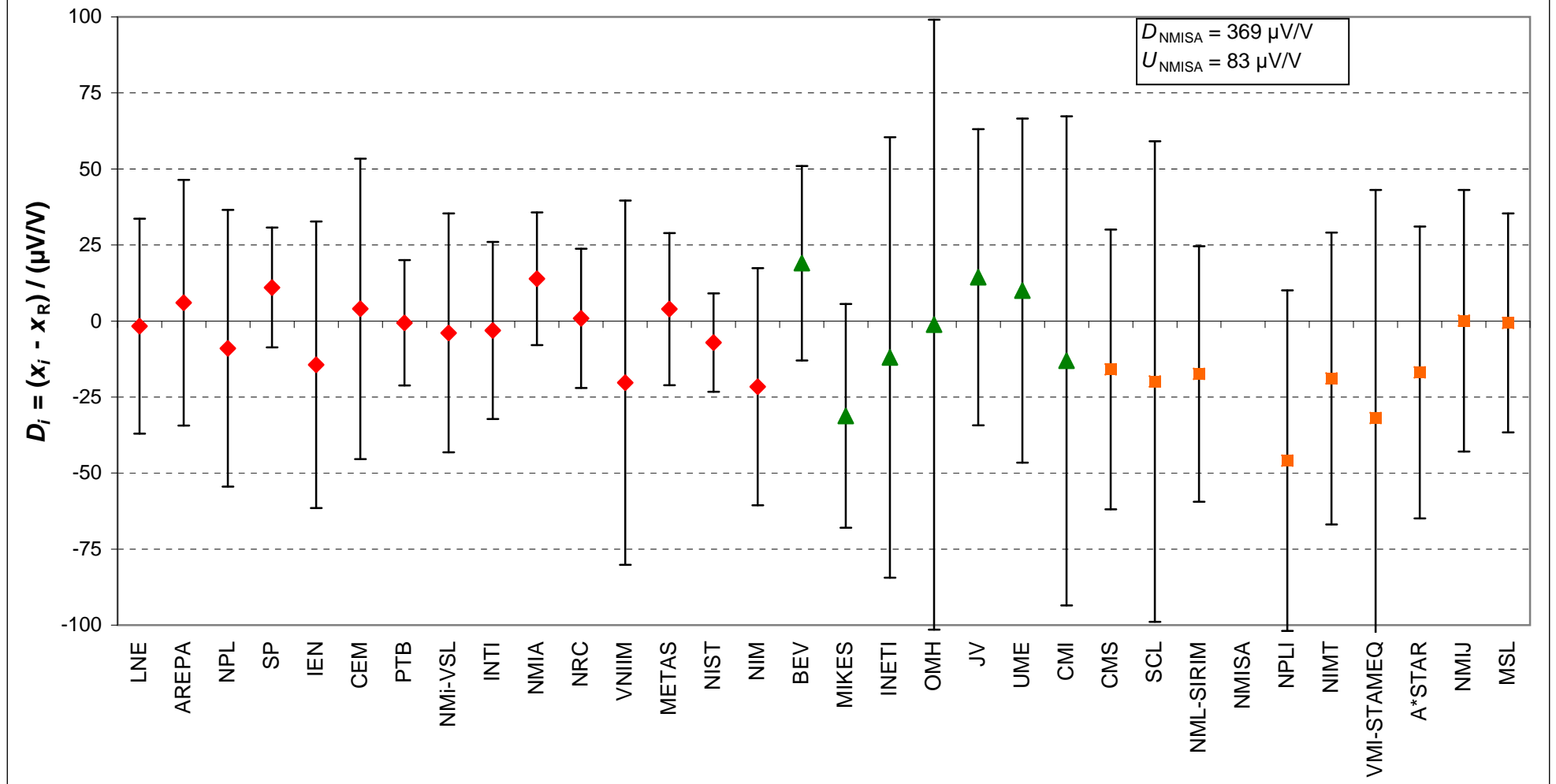**VOLTAGE : 500 V**
FREQUENCY : 100 kHz

Lab *i*

	D_i / (µV/V)	U_i / (µV/V)
LNE	-1.7	35.3
AREPA	6.0	40.4
NPL	-9.0	45.5
SP	11.0	19.7
IEN	-14.4	47.1
CEM	4.0	49.4
PTB	-0.6	20.6
NMi-VSL	-3.9	39.3
INTI	-3.1	29.1
NMIA	13.9	21.8
NRC	0.9	22.9
VNIIM	-20.3	59.9
METAS	3.9	25.0
NIST	-7.1	16.2
NIM	-21.6	39.0

	D_i / (µV/V)	U_i / (µV/V)
BEV	19.0	32.0
MIKES	-31.2	36.8
INETI	-12.0	72.4
OMH	-1.2	100.3
JV	14.4	48.7
UME	10.0	56.6
CMI	-13.1	80.4

	D_i / (µV/V)	U_i / (µV/V)
CMS	-15.9	46
SCL	-19.9	79
NML-SIRIM	-17.4	42
NMISA	369	83
NPLI	-45.9	56
NIMT	-18.9	48
VMI-STAMEQ	-31.9	75
A*STAR	-16.9	48
NMIJ	0.1	43
MSL	-0.6	36

Red: participants in CCEM-K9, Green: participants in EUROMET.EM-K9 only, Orange: participants in APMP.EM-K9 only

CCEM-K9, EUROMET.EM-K9 and APMP.EM-K9   AC-DC transfer difference: 500 V, 100 kHz
Degrees of equivalence, D_i and expanded uncertainty U_i (95 % level of confidence)

D_{NMISA} = 369 µV/V
U_{NMISA} = 83 µV/V

$D_i = (x_i - x_R) / (\mu V/V)$

Red diamonds: participants in CCEM-K9, **Green triangles**: participants in EUROMET.EM-K9 only, **Orange squares**: participants in APMP.EM-K9 only

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 100 kHz

Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 16
of the Final Report. They are not reported here.

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	LNE D_{ij} / (µV/V)	LNE U_{ij} / (µV/V)	AREPA D_{ij} / (µV/V)	AREPA U_{ij} / (µV/V)	NPL D_{ij} / (µV/V)	NPL U_{ij} / (µV/V)	SP D_{ij} / (µV/V)	SP U_{ij} / (µV/V)	IEN D_{ij} / (µV/V)	IEN U_{ij} / (µV/V)	CEM D_{ij} / (µV/V)	CEM U_{ij} / (µV/V)
LNE	-1.7	35.3			-7.7	54.8	7.3	58.6	-12.7	41.9	12.7	59.9	-5.7	61.7
AREPA	6.0	40.4	7.7	54.8			15.0	61.8	-5.0	46.2	20.4	63.0	2.0	64.8
NPL	-9.0	45.5	-7.3	58.6	-15.0	61.8			-20.0	50.7	5.4	66.4	-13.0	68.1
SP	11.0	19.7	12.7	41.9	5.0	46.2	20.0	50.7			25.4	52.2	7.0	54.3
IEN	-14.4	47.1	-12.7	59.9	-20.4	63.0	-5.4	66.4	-25.4	52.2			-18.4	69.2
CEM	4.0	49.4	5.7	61.7	-2.0	64.8	13.0	68.1	-7.0	54.3	18.4	69.2		
PTB	-0.6	20.6	1.1	42.3	-6.6	34.8	8.4	51.1	-11.6	30.5	13.8	52.6	-4.6	54.7
NMi-VSL	-3.9	39.3	-2.2	53.9	-9.9	57.4	5.1	61.1	-14.9	45.3	10.5	62.3	-7.9	64.1
INTI	-3.1	29.1	-1.4	47.1	-9.1	51.0	5.9	55.1	-14.1	36.8	11.3	56.5	-7.1	58.4
NMIA	13.9	21.8	15.6	42.9	7.9	47.2	22.9	51.6	2.9	31.3	28.3	53.0	9.9	55.1
NRC	0.9	22.9	2.6	43.5	-5.1	47.7	9.9	52.1	-10.1	32.1	15.3	53.5	-3.1	55.6
VNIIM	-20.3	59.9	-18.6	70.4	-26.3	73.1	-11.3	76.0	-31.3	64.0	-5.9	77.0	-24.3	78.5
METAS	3.9	25.0	5.6	44.6	-2.1	48.7	12.9	53.0	-7.1	33.6	18.3	54.4	-0.1	56.5
NIST	-7.1	16.2	-5.4	40.3	-13.1	44.9	1.9	49.5	-18.1	27.7	7.3	51.0	-11.1	53.2
NIM	-21.6	39.0	-19.9	53.7	-27.6	57.2	-12.6	60.9	-32.6	45.0	-7.2	62.1	-25.6	63.9
BEV	19.0	32.0	20.7	47.7	13.0	51.6	28.0	55.7	8.0	37.6	33.4	57.0	15.0	58.9
MIKES	-31.2	36.8	-29.5	51.0	-37.2	54.7	-22.2	58.5	-42.2	41.8	-16.8	59.8	-35.2	61.7
INETI	-12.0	72.4	-10.3	80.6	-18.0	83.0	-3.0	85.5	-23.0	75.1	2.4	86.4	-16.0	87.7
OMH	-1.2	100.3	0.5	106.4	-7.2	108.2	7.8	110.2	-12.2	102.3	13.2	110.8	-5.2	111.9
JV	14.4	48.7	16.1	60.2	8.4	63.3	23.4	66.7	3.4	52.6	28.8	67.8	10.4	69.4
UME	10.0	56.6	11.7	66.8	4.0	69.6	19.0	72.7	-1.0	60.0	24.4	73.7	6.0	75.2
CMI	-13.1	80.4	-11.4	87.8	-19.1	90.0	-4.1	92.4	-24.1	82.8	1.3	93.2	-17.1	94.4

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 100 kHz

Lab *j* ⟹

Lab *i*	D_i / (µV/V)	U_i / (µV/V)	PTB D_{ij} / (µV/V)	PTB U_{ij} / (µV/V)	NMi-VSL D_{ij} / (µV/V)	NMi-VSL U_{ij} / (µV/V)	INTI D_{ij} / (µV/V)	INTI U_{ij} / (µV/V)	NMIA D_{ij} / (µV/V)	NMIA U_{ij} / (µV/V)	NRC D_{ij} / (µV/V)	NRC U_{ij} / (µV/V)	VNIIM D_{ij} / (µV/V)	VNIIM U_{ij} / (µV/V)
LNE	-1.7	35.3	-1.1	42.3	2.2	53.9	1.4	47.1	-15.6	42.9	-2.6	43.5	18.6	70.4
AREPA	6.0	40.4	6.6	34.8	9.9	57.4	9.1	51.0	-7.9	47.2	5.1	47.7	26.3	73.1
NPL	-9.0	45.5	-8.4	51.1	-5.1	61.1	-5.9	55.1	-22.9	51.6	-9.9	52.1	11.3	76.0
SP	11.0	19.7	11.6	30.5	14.9	45.3	14.1	36.8	-2.9	31.3	10.1	32.1	31.3	64.0
IEN	-14.4	47.1	-13.8	52.6	-10.5	62.3	-11.3	56.5	-28.3	53.0	-15.3	53.5	5.9	77.0
CEM	4.0	49.4	4.6	54.7	7.9	64.1	7.1	58.4	-9.9	55.1	3.1	55.6	24.3	78.5
PTB	-0.6	20.6			3.3	45.7	2.5	37.3	-14.5	31.9	-1.5	32.7	19.7	64.3
NMi-VSL	-3.9	39.3	-3.3	45.7			-0.8	50.1	-17.8	46.2	-4.8	46.7	16.4	72.5
INTI	-3.1	29.1	-2.5	37.3	0.8	50.1			-17.0	38.0	-4.0	38.6	17.2	67.5
NMIA	13.9	21.8	14.5	31.9	17.8	46.2	17.0	38.0			13.0	33.4	34.2	64.7
NRC	0.9	22.9	1.5	32.7	4.8	46.7	4.0	38.6	-13.0	33.4			21.2	65.1
VNIIM	-20.3	59.9	-19.7	64.3	-16.4	72.5	-17.2	67.5	-34.2	64.7	-21.2	65.1		
METAS	3.9	25.0	4.5	34.2	7.8	47.8	7.0	39.9	-10.0	34.9	3.0	35.6	24.2	65.8
NIST	-7.1	16.2	-6.5	28.4	-3.2	43.9	-4.0	35.1	-21.0	29.3	-8.0	30.1	13.2	63.0
NIM	-21.6	39.0	-21.0	45.4	-17.7	56.4	-18.5	49.9	-35.5	46.0	-22.5	46.5	-1.3	72.3
BEV	19.0	32.0	19.6	38.1	22.9	50.7	-	-	-	-	-	-	-	-
MIKES	-31.2	36.8	-30.6	42.2	-27.3	53.9	-	-	-	-	-	-	-	-
INETI	-12.0	72.4	-11.4	75.3	-8.1	82.4	-	-	-	-	-	-	-	-
OMH	-1.2	100.3	-0.6	102.4	2.7	107.8	-	-	-	-	-	-	-	-
JV	14.4	48.7	15.0	52.9	18.3	62.6	-	-	-	-	-	-	-	-
UME	10.0	56.6	10.6	60.3	13.9	68.9	-	-	-	-	-	-	-	-
CMI	-13.1	80.4	-12.5	83.0	-9.2	89.5	-	-	-	-	-	-	-	-

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 100 kHz

Lab j ⟹

Lab i ⟱

Lab i	D_i / (µV/V)	U_i / (µV/V)	METAS D_{ij} / (µV/V)	U_{ij} / (µV/V)	NIST D_{ij} / (µV/V)	U_{ij} / (µV/V)	NIM D_{ij} / (µV/V)	U_{ij} / (µV/V)	BEV D_{ij} / (µV/V)	U_{ij} / (µV/V)	MIKES D_{ij} / (µV/V)	U_{ij} / (µV/V)	INETI D_{ij} / (µV/V)	U_{ij} / (µV/V)
LNE	-1.7	35.3	-5.6	44.6	5.4	40.3	19.9	53.7	-20.7	47.7	29.5	51.0	10.3	80.6
AREPA	6.0	40.4	2.1	48.7	13.1	44.9	27.6	57.2	-13.0	51.6	37.2	54.7	18.0	83.0
NPL	-9.0	45.5	-12.9	53.0	-1.9	49.5	12.6	60.9	-28.0	55.7	22.2	58.5	3.0	85.5
SP	11.0	19.7	7.1	33.6	18.1	27.7	32.6	45.0	-8.0	37.6	42.2	41.8	23.0	75.1
IEN	-14.4	47.1	-18.3	54.4	-7.3	51.0	7.2	62.1	-33.4	57.0	16.8	59.8	-2.4	86.4
CEM	4.0	49.4	0.1	56.5	11.1	53.2	25.6	63.9	-15.0	58.9	35.2	61.7	16.0	87.7
PTB	-0.6	20.6	-4.5	34.2	6.5	28.4	21.0	45.4	-19.6	38.1	30.6	42.2	11.4	75.3
NMi-VSL	-3.9	39.3	-7.8	47.8	3.2	43.9	17.7	56.4	-22.9	50.7	27.3	53.9	8.1	82.4
INTI	-3.1	29.1	-7.0	39.9	4.0	35.1	18.5	49.9	-	-	-	-	-	-
NMIA	13.9	21.8	10.0	34.9	21.0	29.3	35.5	46.0	-	-	-	-	-	-
NRC	0.9	22.9	-3.0	35.6	8.0	30.1	22.5	46.5	-	-	-	-	-	-
VNIIM	-20.3	59.9	-24.2	65.8	-13.2	63.0	1.3	72.3	-	-	-	-	-	-
METAS	3.9	25.0			11.0	31.7	25.5	47.6	-15.1	40.7	35.1	44.5	15.9	76.6
NIST	-7.1	16.2	-11.0	31.7			14.5	43.6	-	-	-	-	-	-
NIM	-21.6	39.0	-25.5	47.6	-14.5	43.6			-	-	-	-	-	-
BEV	19.0	32.0	15.1	40.7	-	-	-	-			50.2	47.6	31.0	78.5
MIKES	-31.2	36.8	-35.1	44.5	-	-	-	-	-50.2	47.6			-19.2	80.5
INETI	-12.0	72.4	-15.9	76.6	-	-	-	-	-31.0	78.5	19.2	80.5		
OMH	-1.2	100.3	-5.1	103.4	-	-	-	-	-20.2	104.8	30.0	106.3	10.8	123.3
JV	14.4	48.7	10.5	54.8	-	-	-	-	-4.6	57.3	45.6	60.1	26.4	86.6
UME	10.0	56.6	6.1	61.9	-	-	-	-	-9.0	64.2	41.2	66.7	22.0	91.3
CMI	-13.1	80.4	-17.0	84.2	-	-	-	-	-32.1	85.9	18.1	87.8	-1.1	107.7

Matrix of equivalence for CCEM-K9 and EUROMET.EM-K9 (Continued)

MEASURAND : AC-DC transfer difference
VOLTAGE : 500 V
FREQUENCY : 100 kHz

Lab *j* ⟹

Lab *i* ⟱

	D_i / (µV/V)	U_i / (µV/V)	OMH D_{ij} / (µV/V)	OMH U_{ij} / (µV/V)	JV D_{ij} / (µV/V)	JV U_{ij} / (µV/V)	UME D_{ij} / (µV/V)	UME U_{ij} / (µV/V)	CMI D_{ij} / (µV/V)	CMI U_{ij} / (µV/V)
LNE	-1.7	35.3	-0.5	106.4	-16.1	60.2	-11.7	66.8	11.4	87.8
AREPA	6.0	40.4	7.2	108.2	-8.4	63.3	-4.0	69.6	19.1	90.0
NPL	-9.0	45.5	-7.8	110.2	-23.4	66.7	-19.0	72.7	4.1	92.4
SP	11.0	19.7	12.2	102.3	-3.4	52.6	1.0	60.0	24.1	82.8
IEN	-14.4	47.1	-13.2	110.8	-28.8	67.8	-24.4	73.7	-1.3	93.2
CEM	4.0	49.4	5.2	111.9	-10.4	69.4	-6.0	75.2	17.1	94.4
PTB	-0.6	20.6	0.6	102.4	-15.0	52.9	-10.6	60.3	12.5	83.0
NMi-VSL	-3.9	39.3	-2.7	107.8	-18.3	62.6	-13.9	68.9	9.2	89.5
INTI	-3.1	29.1	-	-	-	-	-	-	-	-
NMIA	13.9	21.8	-	-	-	-	-	-	-	-
NRC	0.9	22.9	-	-	-	-	-	-	-	-
VNIIM	-20.3	59.9	-	-	-	-	-	-	-	-
METAS	3.9	25.0	5.1	103.4	-10.5	54.8	-6.1	61.9	17.0	84.2
NIST	-7.1	16.2	-	-	-	-	-	-	-	-
NIM	-21.6	39.0	-	-	-	-	-	-	-	-
BEV	19.0	32.0	20.2	104.8	4.6	57.3	9.0	64.2	32.1	85.9
MIKES	-31.2	36.8	-30.0	106.3	-45.6	60.1	-41.2	66.7	-18.1	87.8
INETI	-12.0	72.4	-10.8	123.3	-26.4	86.6	-22.0	91.3	1.1	107.7
OMH	-1.2	100.3			-15.6	111.0	-11.2	114.7	11.9	128.1
JV	14.4	48.7	15.6	111.0			4.4	73.9	27.5	93.4
UME	10.0	56.6	11.2	114.7	-4.4	73.9			23.1	97.8
CMI	-13.1	80.4	-11.9	128.1	-27.5	93.4	-23.1	97.8		