Key comparisons CCM.P-K6, APMP.M.P-K6, APMP.M.P-K6.1 and EURAMET.M.P-K8

Key comparison CCM.P-K6

MEASURAND : Effective area of a piston-cylinder assembly

NOMINAL VALUE : 335.7 mm^2

NOMINAL PRESSURE : p , 12 values from 10 kPa to 120 kPa

x_i : result obtained from the mean of measurements by laboratory i

u_i : combined standard uncertainty of x_i

Laboratory i	VSL		METAS		PTB		NIST	
Date of measurement	Aug-Sep 1998		Nov-Dec 1998		Feb-Mar 1999		Sep-Oct 1999	
p / kPa	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}
10	-	-	335.699 2	110	335.744 4	7.0	335.744 0	3.2
20	335.745 4	16	335.718 3	74	335.744 4	5.6	335.743 3	3.1
30	335.745 7	16	335.723 7	51	335.744 2	4.9	335.742 9	3.0
40	335.745 8	16	335.720 7	49	335.744 6	4.1	335.743 0	3.0
50	335.745 5	16	335.727 6	39	335.744 8	4.2	335.743 0	3.1
60	335.745 4	16	335.722 4	34	335.744 9	4.5	335.743 0	3.1
70	335.745 3	16	335.728 5	26	335.745 3	5.0	335.742 9	3.1
80	335.745 2	16	335.733 2	34	335.745 3	5.3	335.742 6	3.1
90	335.745 1	16	335.733 5	27	335.745 4	5.3	335.742 8	3.0
100	335.745 0	16	335.730 4	24	335.745 3	3.8	335.742 9	3.0
110	335.745 9	16	335.732 6	28	335.745 3	3.3	335.742 8	3.0
120	335.745 0	16	335.733 9	24	335.745 3	2.7	335.742 9	3.0

Laboratory i	NIM		NPL		NRC	
Date of measurement	Nov-Dec 1999		Aug-Sep 2000		Jul-Sep 2001	
p / kPa	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}
10	335.747 1	4.3	335.742 1	15	335.745 6	4.2
20	335.746 2	4.3	335.743 9	6.8	335.744 6	3.4
30	335.745 7	4.0	335.744 0	4.8	335.744 2	3.1
40	335.745 3	4.2	335.744 1	3.7	335.743 9	3.0
50	335.744 3	4.2	335.744 3	3.0	335.743 3	2.9
60	335.744 6	4.0	335.744 3	2.6	335.743 8	2.8
70	335.745 2	4.2	335.744 3	2.3	335.743 3	2.8
80	335.745 3	4.2	335.744 5	2.1	335.743 3	2.8
90	335.745 5	4.2	335.744 5	1.9	335.743 6	2.8
100	335.745 7	4.1	335.744 5	1.8	335.743 1	2.7
110	335.745 5	4.3	335.744 4	1.7	335.743 6	2.7
120	335.746 3	4.0	-	-	335.743 3	2.7

Key comparison APMP.M.P-K6

MEASURAND : Effective area of a piston-cylinder assembly

NOMINAL VALUE : 335.7 mm^2

NOMINAL PRESSURE : p , 5 values from 20 kPa to 105 kPa

x_i : result obtained from the mean of measurements by laboratory i

u_i : combined standard uncertainty of x_i

	Laboratories which are maintaining primary standards											
Laboratory i	NPLI		KRISS		NMIA		NMIJ		PTB		MSL	
Date of measurement	Oct 1998		Apr 1999		Feb 2001		Sep 1999		Mar 2001		May 1999	
p / kPa	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}
21.4	335.737 3	15.80	335.742 1	11.10	335.749 7	12.60	335.738 8	8.80	335.737 6	6.40	335.749 3	11.80
41.3	335.737 2	15.80	335.742 1	11.10	335.744 1	12.60	335.738 9	8.80	335.737 9	6.00	335.741 6	11.60
61.3	335.737 8	15.80	335.741 1	11.10	335.742 4	12.60	335.738 3	8.80	335.738 7	6.20	335.740 6	11.70
81.3	335.737 7	15.80	335.739 9	11.10	335.741 1	12.60	335.737 8	8.80	335.739 3	5.90	335.740 3	11.70
101.2	335.737 7	15.80	335.739 7	11.10	335.741 0	12.60	335.737 8	8.80	335.739 7	5.90	335.741 0	11.70

	Laboratories which are maintaining secondary standards							
Laboratory i	A*STAR		NML-SIRIM		SCL		NMISA	
Date of measurement	Nov 1998		Jan 1999		Jun 1999		Oct 1999	
p / kPa	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}	x_i / mm^2	u_i / x_i / 10^{-6}
21.4	335.737 5	19.20	335.744 8	11.40	335.747 7	18.00	335.740 7	14.60
41.3	335.735 3	19.20	335.742 1	11.50	335.743 9	17.90	335.733 8	14.60
61.3	335.735 0	19.20	335.740 5	11.40	335.743 4	17.70	335.732 2	14.60
81.3	335.734 8	19.20	335.740 6	11.40	335.742 0	17.60	335.731 4	14.60
101.2	335.734 0	19.10	335.742 0	11.40	335.742 0	17.60	335.732 0	14.60

Key comparison APMP.M.P-K6.1

MEASURAND : Effective area of a piston-cylinder assembly

NOMINAL VALUE : 335.75 mm^2

NOMINAL PRESSURE : p , 5 values from 20 kPa to 105 kPa

x_i : result obtained from the mean of measurements by laboratory i

$U_{Lab\,i}$: relative expanded uncertainty (k = 2) of x_i

The measurements were carried out between April 2003 and April 2004

Laboratory i	CMS/ITRI		A*STAR		NIMT	
p / kPa	x_i / mm^2	$U_{Lab\,i}$ / 10^{-6}	x_i / mm^2	$U_{Lab\,i}$ / 10^{-6}	x_i / mm^2	$U_{Lab\,i}$ / 10^{-6}
21.4	335.623 5	30.2	335.633 9	22.0	335.635 1	18.6
41.4	335.623 5	30.0	335.632 2	21.8	335.636 8	18.0
61.4	335.624 2	30.0	335.632 9	21.4	335.636 4	17.8
81.4	335.624 8	30.0	335.631 2	21.2	335.636 8	17.8
101.4	335.624 4	30.0	335.632 2	21.2	335.636 7	17.8

Key comparison EURAMET.M.P-K8

MEASURAND: Effective area of a piston-cylinder determined in gauge pressure mode

NOMINAL VALUES: 980 mm^2

NOMINAL PRESSURES: 8 values from 25 kPa to 200 kPa with pressure steps of 25 kPa

The laboratory individual measurements in gauge pressure of the participants in the key comparison EURAMET.M.P-K8 are given in Table 7 on page 26 of the EURAMET.M.P-K8 Final Report.

Key comparison CCM.P-K6

MEASURAND : Effective area of a piston-cylinder assembly
NOMINAL VALUE : 335.7 mm^2
NOMINAL PRESSURE : p , 12 values from 10 kPa to 120 kPa

The key comparison reference value, x_R, is calculated at each nominal pressure p as the median of the participants' values obtained at this pressure. The standard uncertainty of the key comparison reference value at each pressure p , u_R, is calculated by the formula $u_R = 1.858\ MAD\ /\ (n - 1)^{1/2}$, where MAD is the median of absolute deviations from the median, and n is the number of participants contributing to the reference value.

p / kPa	x_R / mm^2	u_R / mm^2
10	335.744 2	0.001 5
20	335.744 4	0.000 7
30	335.744 2	0.001 0
40	335.744 1	0.000 9
50	335.744 3	0.000 8
60	335.744 3	0.000 5

p / kPa	x_R / mm^2	u_R / mm^2
70	335.744 3	0.000 8
80	335.744 5	0.000 6
90	335.744 5	0.000 7
100	335.744 5	0.000 9
110	335.744 4	0.000 7
120	335.744 1	0.001 0

For each nominal pressure p, the degree of equivalence of laboratory i with respect to the key comparison reference value is given by a pair of terms expressed in mm^2: $D_i = (x_i - x_R)$ and $U_i = 2(u_i^2 + u_R^2)^{1/2}$, its expanded uncertainty ($k = 2$).

For each nominal pressure p , the degree of equivalence between two laboratories i and j is given by a pair of terms expressed in mm^2: $D_{ij} = D_i - D_j = (x_i - x_j)$ and $U_{ij} = 2(u_i^2 + u_j^2)^{1/2}$, its expanded uncertainty ($k = 2$).

Linking key comparison APMP.M.P-K6 to key comparison CCM.P-K6

PTB is the common participant to both key comparisons CCM.P-K6 and APMP.M.P-K6: its results are used to compute the linkage as explained in Sections 5.1 and 5.2 of the APMP.M.P-K6 Final Report.

Degrees of equivalence relative to the CCM.P-K6 key comparison reference value are obtained for laboratories having participated in APMP.M.P-K6 only, and for the five values of the pressure used in APMP.M.P-K6, as explained in Section 5.3 of the APMP.M.P-K6 Final Report. They are expressed in mm^2.

Pair-wise degrees of equivalence among pairs of participants in APMP.M.P-K6 are obtained as explained in Section 5.4 of the APMP.M.P-K6 Final Report. They are expressed in relative terms.

Linking key comparison APMP.M.P-K6.1 to key comparison CCM.P-K6

The key comparison APMP.M.P-K6.1 is linked to the CCM.P-K6 key comparison through the APMP.M.P-K6 key comparison.
A*STAR is the common participant to both key comparisons APMP.M.P-K6 and APMP.M.P-K6.1: its results are used to compute the linkage as explained in paragraph 4.1 of the APMP.M.P-K6.1 Final Report.

Degrees of equivalence relative to the CCM.P-K6 key comparison reference value are obtained for laboratories having participated in APMP.M.P-K6.1 only, and for the five values of the pressure used in APMP.M.P-K6.1, as explained in paragraph 4.2 of the APMP.M.P-K6.1 Final Report. They are expressed in mm^2.

Pair-wise degrees of equivalence among pairs of participants in APMP.M.P-K6.1 are obtained as explained in paragraph 4.3 of the APMP.M.P-K6.1 Final Report. They are expressed in relative terms.

Linking key comparison EURAMET.M.P-K8 to key comparison CCM.P-K6

PTB and VSL provide the link between key comparisons CCM.P-K6 and EURAMET.M.P-K8 for the following nominal pressures: 25 kPa, 50 kPa, 75 kPa and 100 kPa.
The linkage process is described in Section 11 of the EURAMET.M.P-K8 Final Report.

The measurements of EURAMET.M.P-K8 at the nominal pressure 25 kPa are linked with the averaged value of the 20 kPa and 30 kPa measurements of the CCM comparison, and those at the nominal pressure 75 kPa are linked with the averaged value of the 70 kPa and 80 kPa measurements of the CCM comparison.
Therefore, the degrees of equivalence of the laboratories having participated in EURAMET.M.P-K8 for 25 kPa and 75 kPa are are shown on a different graph from the ones for the participants in CCM.P-K6.

Key comparison CCM.P-K6

NOMINAL PRESSURE : **10 kPa**

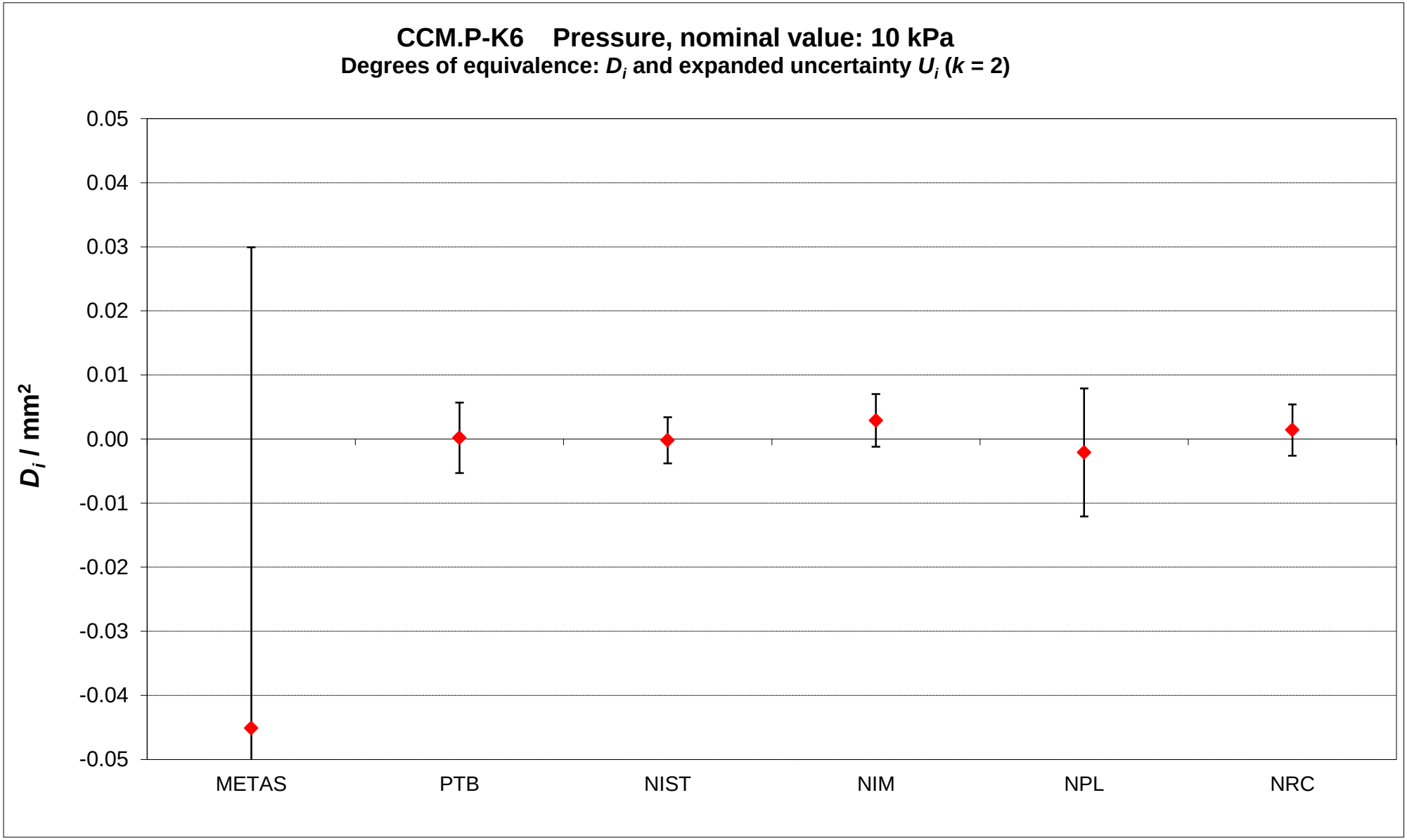
Matrix of equivalence

Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	METAS		PTB		NIST		NIM		NPL		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
METAS	**-0.0451**	0.075			**-0.0453**	0.075	**-0.0449**	0.075	**-0.0479**	0.075	**-0.0429**	0.076	**-0.0465**	0.075
PTB	**0.0002**	0.0055	**0.0453**	0.075			**0.0004**	0.0051	**-0.0027**	0.0055	**0.0023**	0.011	**-0.0012**	0.0054
NIST	**-0.0002**	0.0036	**0.0449**	0.075	**-0.0004**	0.0051			**-0.0031**	0.0035	**0.0019**	0.0097	**-0.0016**	0.0035
NIM	**0.0029**	0.0041	**0.0479**	0.075	**0.0027**	0.0055	**0.0031**	0.0035			**0.0050**	0.0099	**0.0015**	0.0039
NPL	**-0.0021**	0.0100	**0.0429**	0.076	**-0.0023**	0.011	**-0.0019**	0.0097	**-0.0050**	0.0099			**-0.0035**	0.0099
NRC	**0.0014**	0.0040	**0.0465**	0.075	**0.0012**	0.0054	**0.0016**	0.0035	**-0.0015**	0.0039	**0.0035**	0.0099		

No measurements at this pressure for key comparisons APMP.M.P-K6 and APMP.M.P-K6.1


CCM.P-K6 Pressure, nominal value: 10 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
METAS
PTB
NIST
NIM
NPL
NRC

Key comparisons CCM.P-K6, APMP.M.P-K6, APMP.M.P-K6.1 and EURAMET.M.P-K8

NOMINAL PRESSURE : **20 kPa**

Degrees of equivalence **Pair-wise degrees of equivalence inside CCM.P-K6**

Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	VSL		METAS		PTB		NIST		NIM		NPL		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
VSL	**0.0010**	0.011			**0.0271**	0.051	**0.0010**	0.012	**0.0021**	0.011	**-0.0008**	0.011	**0.0015**	0.012	**0.0008**	0.011
METAS	**-0.0261**	0.050	**-0.0271**	0.051			**-0.0261**	0.050	**-0.0250**	0.050	**-0.0279**	0.050	**-0.0256**	0.050	**-0.0263**	0.050
PTB	**0.0000**	0.0041	**-0.0010**	0.012	**0.0261**	0.050			**0.0011**	0.0043	**-0.0018**	0.0047	**0.0005**	0.0059	**-0.0002**	0.0044
NIST	**-0.0011**	0.0026	**-0.0021**	0.011	**0.0250**	0.050	**-0.0011**	0.0043			**-0.0029**	0.0035	**-0.0006**	0.0050	**-0.0013**	0.0031
NIM	**0.0018**	0.0032	**0.0008**	0.011	**0.0279**	0.050	**0.0018**	0.0047	**0.0029**	0.0035			**0.0023**	0.0054	**0.0016**	0.0036
NPL	**-0.0005**	0.0048	**-0.0015**	0.012	**0.0256**	0.050	**-0.0005**	0.0059	**0.0006**	0.0050	**-0.0023**	0.0054			**-0.0007**	0.0051
NRC	**0.0002**	0.0027	**-0.0008**	0.011	**0.0263**	0.050	**0.0002**	0.0044	**0.0013**	0.0031	**-0.0016**	0.0036	**0.0007**	0.0051		

NPLI	**-0.0003**	0.0110
KRISS	**0.0045**	0.0080
NMIA	**0.0121**	0.0090
NMIJ	**0.0012**	0.0066
MSL	**0.0117**	0.0085
A*STAR	**-0.0001**	0.0132
NML-SIRIM	**0.0072**	0.0082
SCL	**0.0101**	0.0124
NMISA	**0.0031**	0.0102

CMS/ITRI	**-0.0105**	0.0141
NIMT	**0.0011**	0.0116

Pair-wise degrees of equivalence inside APMP.M.P-K6

Lab *j* ⟹

Lab *i* ⇩

	NPLI		KRISS		NMIA		NMIJ		MSL	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
NPLI			**-14.30**	38.62	**-36.84**	40.42	**-4.47**	36.18	**-35.74**	39.44
KRISS	**14.30**	38.62			**-22.55**	33.58	**9.83**	28.34	**-21.45**	32.40
NMIA	**36.84**	40.42	**22.55**	33.58			**32.38**	30.74	**1.10**	34.53
NMIJ	**4.47**	36.18	**-9.83**	28.34	**-32.38**	30.74			**-31.27**	29.45
MSL	**35.74**	39.44	**21.45**	32.40	**-1.10**	34.53	**31.27**	29.45		
A*STAR	**0.60**	49.65	**-13.70**	44.27	**-36.25**	45.85	**-3.87**	42.15	**-35.15**	44.99
NML-SIRIM	**22.34**	38.97	**8.04**	31.82	**-14.51**	33.98	**17.87**	28.81	**-13.40**	32.82
SCL	**30.98**	47.90	**16.68**	42.30	**-5.87**	43.95	**26.51**	40.08	**-4.77**	43.05
NMISA	**10.13**	43.03	**-4.17**	36.68	**-26.72**	38.57	**5.66**	34.10	**-25.62**	37.55

Lab *i* ⇩

	A*STAR		NML-SIRIM		SCL		NMISA	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
NPLI	**-0.60**	49.65	**-22.34**	38.97	**-30.98**	47.90	**-10.13**	43.03
KRISS	**13.70**	44.27	**-8.04**	31.82	**-16.68**	42.30	**4.17**	36.68
NMIA	**36.25**	45.85	**14.51**	33.98	**5.87**	43.95	**26.72**	38.57
NMIJ	**3.87**	42.15	**-17.87**	28.81	**-26.51**	40.08	**-5.66**	34.10
MSL	**35.15**	44.99	**13.40**	32.82	**4.77**	43.05	**25.62**	37.55
A*STAR			**-21.74**	44.57	**-30.38**	52.56	**-9.53**	48.16
NML-SIRIM	**21.74**	44.57			**-8.64**	42.61	**12.21**	37.05
SCL	**30.38**	52.56	**8.64**	42.61			**20.85**	46.35
NMISA	**9.53**	48.16	**-12.21**	37.05	**-20.85**	46.35		

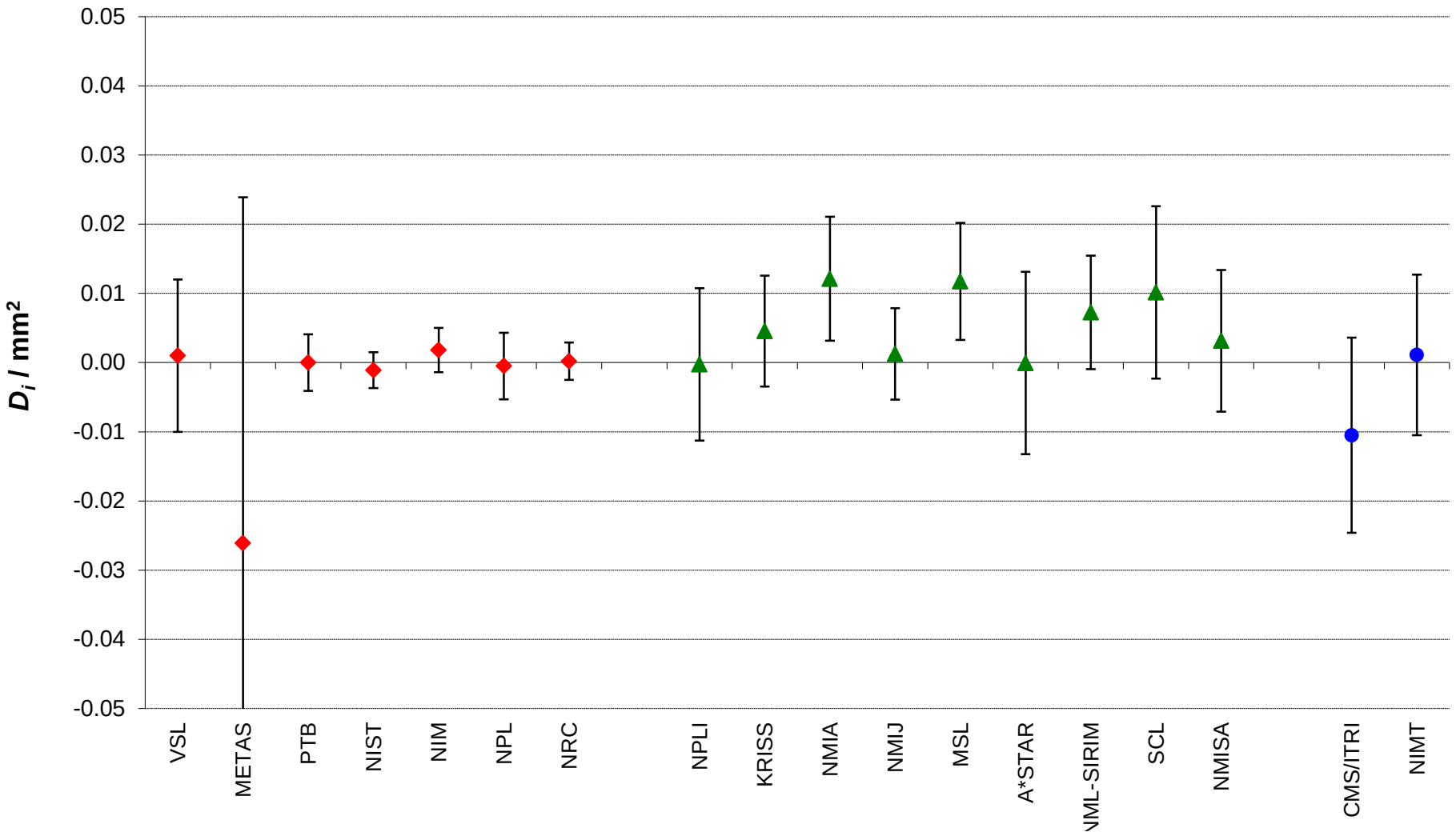
Pair-wise degrees of equivalence inside APMP.M.P-K6.1

Lab *j* ⟹

Lab *i* ⇩

	CMS/ITRI		NIMT	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
CMS/ITRI			**-34.6**	35.5
NIMT	**34.6**	35.5		

CCM.P-K6, APMP.M.P-K6 and APMP.M.P-K6.1 Pressure, nominal value: 20 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)



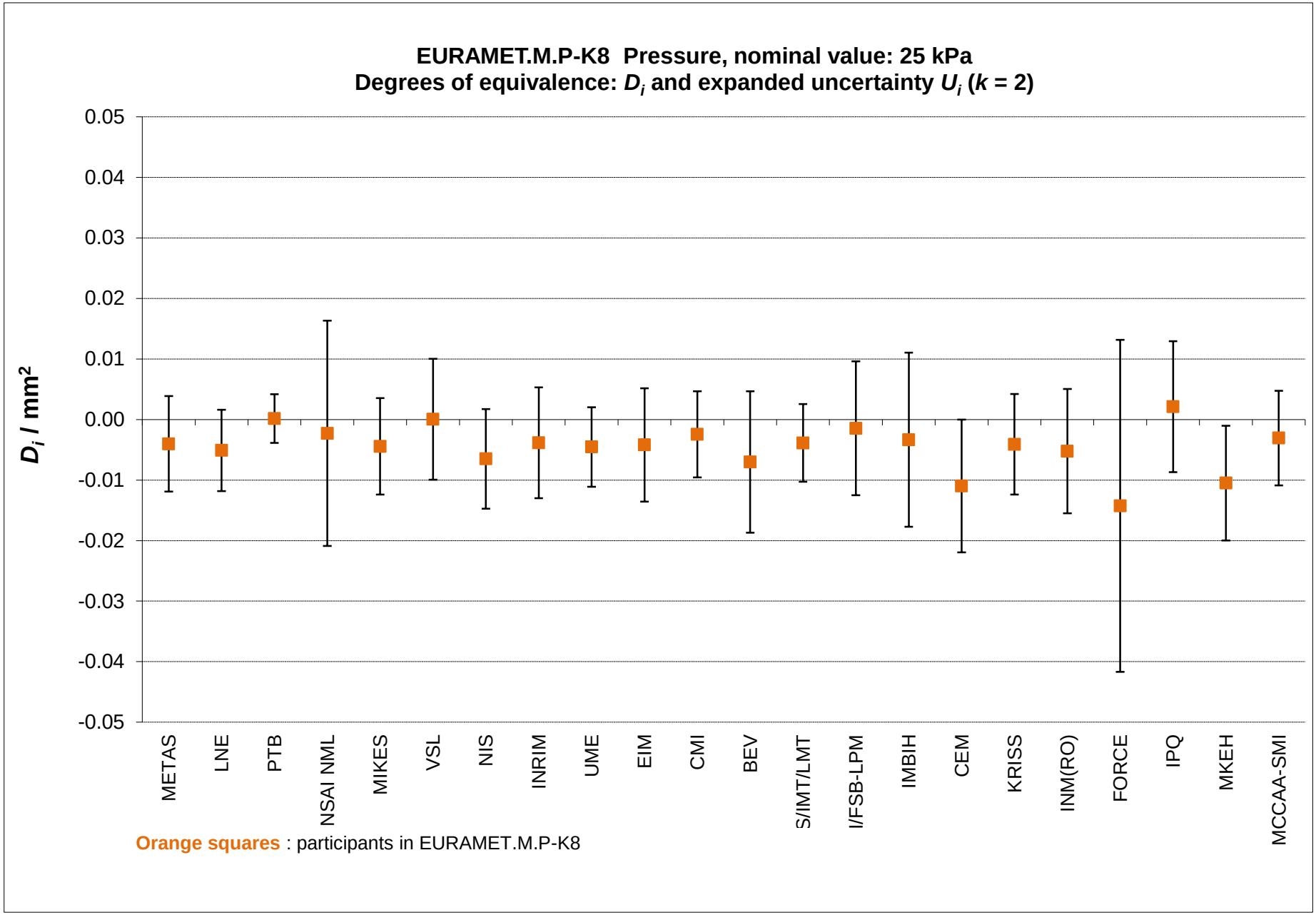
Red diamonds: participants in CCM.P-K6
Green triangles: participants in APMP.M.P-K6 only
Blue circles: participants in APMP.M.P-K6.1 only

Linking EURAMET.M.P-K8 to CCM.P-K6

MEASURAND: Effective area of a piston-cylinder determined in gauge pressure mode
NOMINAL PRESSURE : 25 kPa

Degrees of equivalence with respect to the CCM.P-K6 key comparison reference value, D_i and expanded uncertainty U_i (k = 2) expressed in mm^2 for the participants in key comparison EURAMET.M.P-K8

Lab *i* ⇩	D_i / mm^2	U_i / mm^2
METAS	-0.0040	0.0079
LNE	-0.0051	0.0067
PTB	0.0002	0.0040
NSAI NML	-0.0023	0.0186
MIKES	-0.0044	0.0080
VSL	0.0001	0.0100
NIS	-0.0065	0.0082
INRIM	-0.0039	0.0092
UME	-0.0045	0.0066
EIM	-0.0042	0.0094
CMI	-0.0024	0.0071
BEV	-0.0070	0.0117
MIRS/IMT/LMT	-0.0039	0.0064
HMI/FSB-LPM	-0.0015	0.0111
IMBIH	-0.0033	0.0144
CEM	-0.0110	0.0110
KRISS	-0.0041	0.0083
INM(RO)	-0.0052	0.0103
FORCE	-0.0143	0.0274
IPQ	0.0021	0.0108
MKEH	-0.0105	0.0095
MCCAA-SMI	-0.0031	0.0078


EURAMET.M.P-K8 Pressure, nominal value: 25 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
METAS
LNE
PTB
NSAI NML
MIKES
VSL
NIS
INRIM
UME
EIM
CMI
BEV
S/IMT/LMT
I/FSB-LPM
IMBIH
CEM
KRISS
INM(RO)
FORCE
IPQ
MKEH
MCCAA-SMI
Orange squares : participants in EURAMET.M.P-K8

Key comparison CCM.P-K6

NOMINAL PRESSURE : **30 kPa**

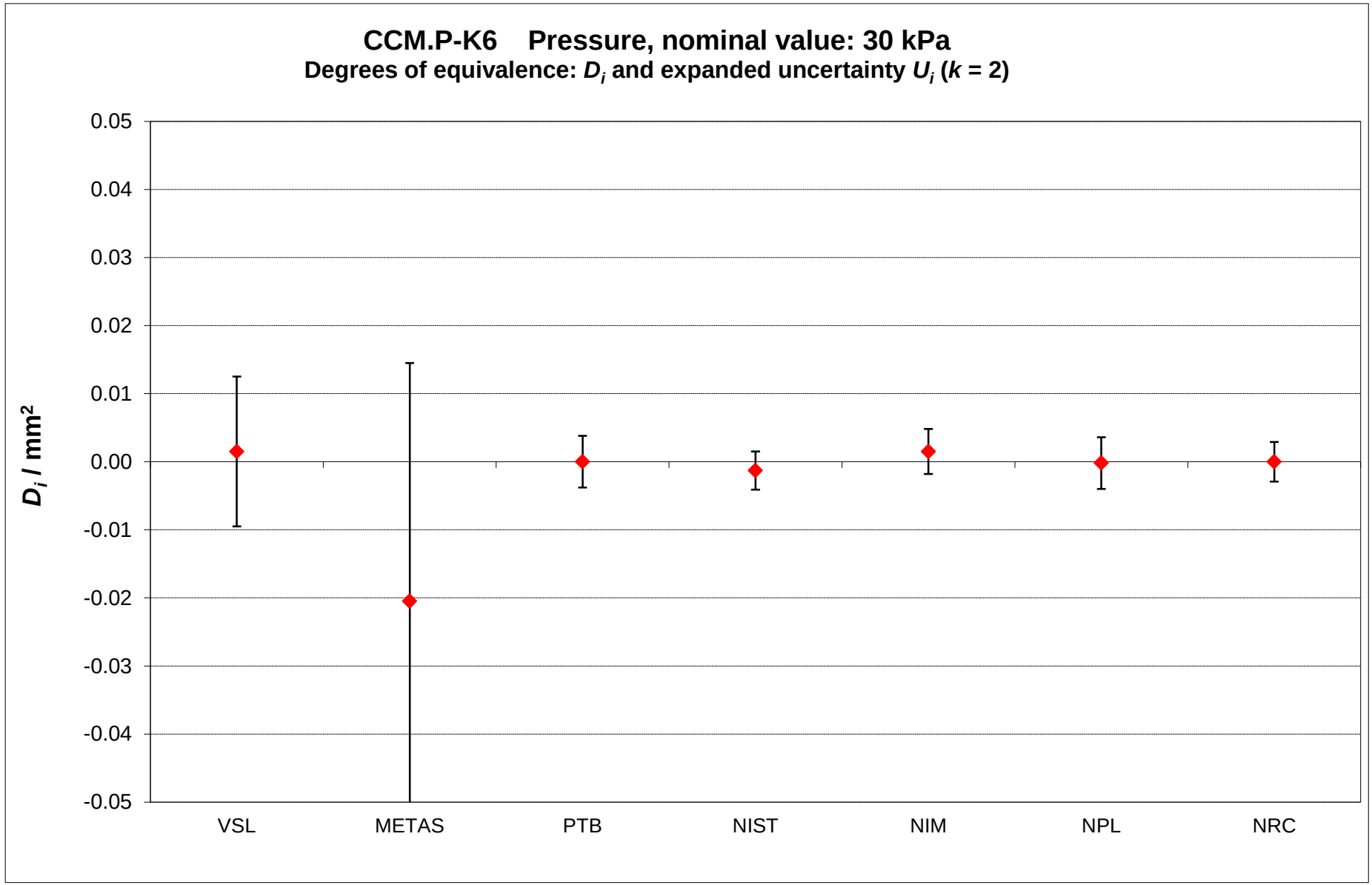
Matrix of equivalence

Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	VSL		METAS		PTB		NIST		NIM		NPL		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
VSL	**0.0015**	0.011			**0.0220**	0.036	**0.0015**	0.011	**0.0028**	0.011	**0.0000**	0.011	**0.0017**	0.011	**0.0015**	0.011
METAS	**-0.0205**	0.035	**-0.0220**	0.036			**-0.0205**	0.035	**-0.0192**	0.035	**-0.0220**	0.035	**-0.0203**	0.035	**-0.0205**	0.035
PTB	**0.0000**	0.0038	**-0.0015**	0.011	**0.0205**	0.035			**0.0013**	0.0039	**-0.0015**	0.0042	**0.0002**	0.0046	**0.0000**	0.0039
NIST	**-0.0013**	0.0028	**-0.0028**	0.011	**0.0192**	0.035	**-0.0013**	0.0039			**-0.0028**	0.0033	**-0.0011**	0.0038	**-0.0013**	0.0029
NIM	**0.0015**	0.0033	**0.0000**	0.011	**0.0220**	0.035	**0.0015**	0.0042	**0.0028**	0.0033			**0.0017**	0.0042	**0.0015**	0.0034
NPL	**-0.0002**	0.0038	**-0.0017**	0.011	**0.0203**	0.035	**-0.0002**	0.0046	**0.0011**	0.0038	**-0.0017**	0.0042			**-0.0002**	0.0039
NRC	**0.0000**	0.0029	**-0.0015**	0.011	**0.0205**	0.035	**0.0000**	0.0039	**0.0013**	0.0029	**-0.0015**	0.0034	**0.0002**	0.0039		

No measurements at this pressure for key comparisons APMP.M.P-K6 and APMP.M.P-K6.1


CCM.P-K6 Pressure, nominal value: 30 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
VSL
METAS
PTB
NIST
NIM
NPL
NRC

Key comparisons CCM.P-K6, APMP.M.P-K6 and APMP.M.P-K6.1

NOMINAL PRESSURE : **40 kPa**

Degrees of equivalence **Pair-wise degrees of equivalence inside CCM.P-K6**

Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	VSL		METAS		PTB		NIST		NIM		NPL		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
VSL	**0.0017**	0.011			**0.0251**	0.035	**0.0012**	0.011	**0.0028**	0.011	**0.0005**	0.011	**0.0017**	0.011	**0.0019**	0.011
METAS	**-0.0234**	0.033	**-0.0251**	0.035			**-0.0239**	0.033	**-0.0223**	0.033	**-0.0246**	0.033	**-0.0235**	0.033	**-0.0232**	0.033
PTB	**0.0005**	0.0033	**-0.0012**	0.011	**0.0239**	0.033			**0.0016**	0.0034	**-0.0007**	0.0039	**0.0005**	0.0037	**0.0007**	0.0034
NIST	**-0.0011**	0.0027	**-0.0028**	0.011	**0.0223**	0.033	**-0.0016**	0.0034			**-0.0023**	0.0035	**-0.0011**	0.0032	**-0.0009**	0.0029
NIM	**0.0012**	0.0033	**-0.0005**	0.011	**0.0246**	0.033	**0.0007**	0.0039	**0.0023**	0.0035			**0.0012**	0.0037	**0.0014**	0.0034
NPL	**0.0000**	0.0030	**-0.0017**	0.011	**0.0235**	0.033	**-0.0005**	0.0037	**0.0011**	0.0032	**-0.0012**	0.0037			**0.0002**	0.0032
NRC	**-0.0002**	0.0027	**-0.0019**	0.011	**0.0232**	0.033	**-0.0007**	0.0034	**0.0009**	0.0029	**-0.0014**	0.0034	**-0.0002**	0.0032		

NPLI	**-0.0002**	0.0110
KRISS	**0.0047**	0.0081
NMIA	**0.0067**	0.0090
NMIJ	**0.0015**	0.0067
MSL	**0.0042**	0.0084
A*STAR	**-0.0021**	0.0132
NML-SIRIM	**0.0047**	0.0083
SCL	**0.0065**	0.0124
NMISA	**-0.0036**	0.0103

CMS/ITRI	**-0.0108**	0.0141
NIMT	**0.0025**	0.0116

Pair-wise degrees of equivalence inside APMP.M.P-K6

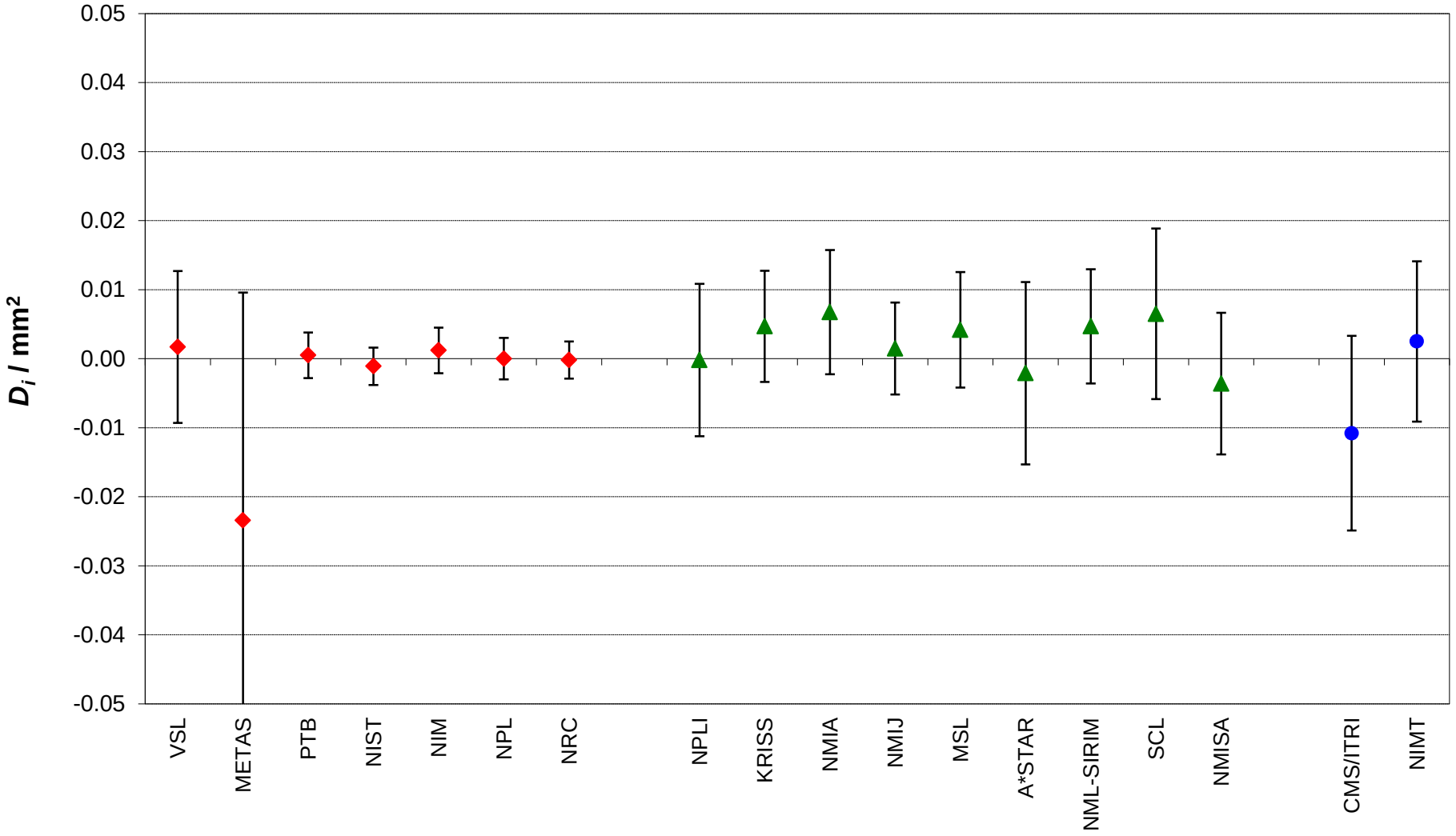
Lab *i* ⇩ / Lab *j* ⇨	NPLI		KRISS		NMIA		NMIJ		MSL	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
NPLI			**-14.59**	38.62	**-20.67**	40.42	**-5.00**	36.18	**-13.11**	39.20
KRISS	**14.59**	38.62			**-6.08**	33.58	**9.59**	28.34	**1.49**	32.11
NMIA	**20.67**	40.42	**6.08**	33.58			**15.67**	30.74	**7.57**	34.25
NMIJ	**5.00**	36.18	**-9.59**	28.34	**-15.67**	30.74			**-8.10**	29.13
MSL	**13.11**	39.20	**-1.49**	32.11	**-7.57**	34.25	**8.10**	29.13		
A*STAR	**-5.66**	49.65	**-20.25**	44.27	**-26.33**	45.85	**-10.66**	42.15	**-18.76**	44.78
NML-SIRIM	**14.59**	39.03	**0.00**	31.89	**-6.08**	34.05	**9.59**	28.89	**1.49**	32.60
SCL	**19.96**	47.68	**5.36**	42.04	**-0.71**	43.70	**14.95**	39.81	**6.85**	42.58
NMISA	**-10.13**	43.03	**-24.72**	36.68	**-30.80**	38.57	**-15.13**	34.10	**-23.23**	37.29

Lab *i* ⇩	SPRING		NML-SIRIM		SCL		NMISA	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
NPLI	**5.66**	49.65	**-14.59**	39.03	**-19.96**	47.68	**10.13**	43.03
KRISS	**20.25**	44.27	**0.00**	31.89	**-5.36**	42.04	**24.72**	36.68
NMIA	**26.33**	45.85	**6.08**	34.05	**0.71**	43.70	**30.80**	38.57
NMIJ	**10.66**	42.15	**-9.59**	28.89	**-14.95**	39.81	**15.13**	34.10
MSL	**18.76**	44.78	**-1.49**	32.60	**-6.85**	42.58	**23.23**	37.29
SPRING			**-20.25**	44.62	**-25.62**	52.36	**4.47**	48.16
NML-SIRIM	**20.25**	44.62			**-5.36**	42.41	**24.72**	37.11
SCL	**25.62**	52.36	**5.36**	42.41			**30.08**	46.12
NMISA	**-4.47**	48.16	**-24.72**	37.11	**-30.08**	46.12		

Pair-wise degrees of equivalence inside APMP.M.P-K6.1

Lab *i* ⇩ / Lab *j* ⇨	CMS/ITRI		NIMT	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
CMS/ITRI			**-39.6**	35.0
NIMT	**39.6**	35.0		

CCM.P-K6, APMP.M.P-K6 and APMP.M.P-K6 .1 Pressure, nominal value: 40 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)



Red diamonds: participants in CCM.P-K6
Green triangles: participants in APMP.M.P-K6 only
Blue circles: participants in APMP.M.P-K6.1 only

Key comparison CCM.P-K6 and EURAMET.M.P-K8

No measurements at this pressure for key comparisons APMP.M.P-K6 and APMP.M.P-K6.1

NOMINAL PRESSURE : **50 kPa**

Matrix of equivalence

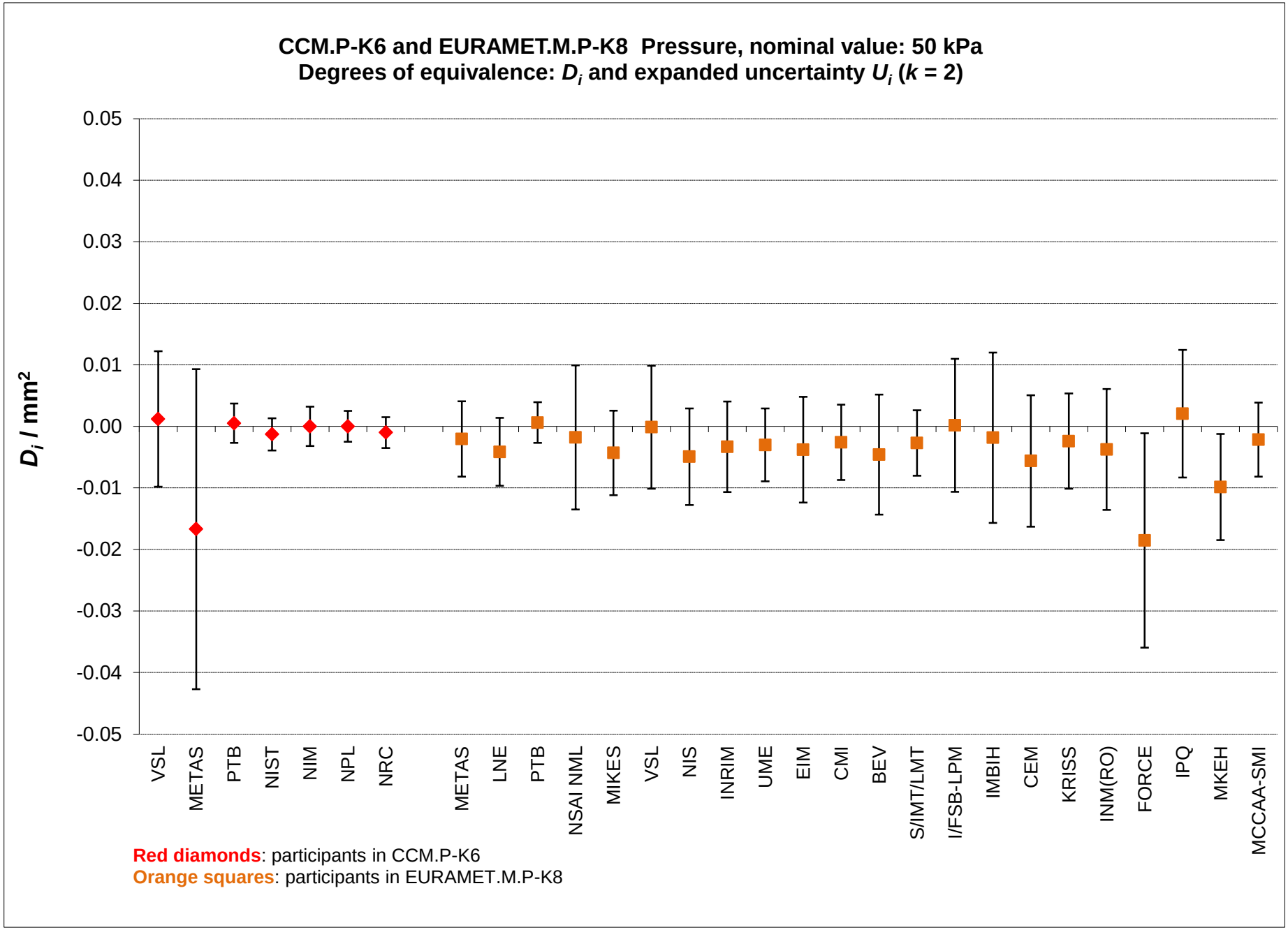
Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	VSL		METAS		PTB		NIST		NIM		NPL		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
VSL	**0.0012**	0.011			**0.0179**	0.028	**0.0007**	0.011	**0.0025**	0.011	**0.0012**	0.011	**0.0012**	0.011	**0.0022**	0.011
METAS	**-0.0167**	0.026	**-0.0179**	0.028			**-0.0172**	0.026	**-0.0154**	0.026	**-0.0167**	0.026	**-0.0167**	0.026	**-0.0157**	0.026
PTB	**0.0005**	0.0032	**-0.0007**	0.011	**0.0172**	0.026			**0.0018**	0.0035	**0.0005**	0.0040	**0.0005**	0.0035	**0.0015**	0.0034
NIST	**-0.0013**	0.0026	**-0.0025**	0.011	**0.0154**	0.026	**-0.0018**	0.0035			**-0.0013**	0.0035	**-0.0013**	0.0029	**-0.0003**	0.0028
NIM	**0.0000**	0.0032	**-0.0012**	0.011	**0.0167**	0.026	**-0.0005**	0.0040	**0.0013**	0.0035			**0.0000**	0.0034	**0.0010**	0.0034
NPL	**0.0000**	0.0025	**-0.0012**	0.011	**0.0167**	0.026	**-0.0005**	0.0035	**0.0013**	0.0029	**0.0000**	0.0034			**0.0010**	0.0028
NRC	**-0.0010**	0.0025	**-0.0022**	0.011	**0.0157**	0.026	**-0.0015**	0.0034	**0.0003**	0.0028	**-0.0010**	0.0034	**-0.0010**	0.0028		

METAS	**-0.0020**	0.0061
LNE	**-0.0041**	0.0055
PTB	**0.0006**	0.0033
NSAI NML	**-0.0018**	0.0117
MIKES	**-0.0043**	0.0069
VSL	**-0.0001**	0.0100
NIS	**-0.0049**	0.0078
INRIM	**-0.0033**	0.0073
UME	**-0.0030**	0.0059
EIM	**-0.0038**	0.0086
CMI	**-0.0026**	0.0061
BEV	**-0.0046**	0.0098
MIRS/IMT/LMT	**-0.0027**	0.0053
HMI/FSB-LPM	**0.0002**	0.0108
IMBIH	**-0.0018**	0.0138
CEM	**-0.0056**	0.0107
KRISS	**-0.0024**	0.0077
INM(RO)	**-0.0038**	0.0098
FORCE	**-0.0185**	0.0174
IPQ	**0.0021**	0.0104
MKEH	**-0.0099**	0.0086
MCCAA-SMI	**-0.0022**	0.0060

Orange: Participants in EURAMET.M.P-K8


CCM.P-K6 and EURAMET.M.P-K8 Pressure, nominal value: 50 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
VSL
METAS
PTB
NIST
NIM
NPL
NRC
METAS
LNE
PTB
NSAI NML
MIKES
VSL
NIS
INRIM
UME
EIM
CMI
BEV
S/IMT/LMT
I/FSB-LPM
IMBIH
CEM
KRISS
INM(RO)
FORCE
IPQ
MKEH
MCCAA-SMI
Red diamonds: participants in CCM.P-K6
Orange squares: participants in EURAMET.M.P-K8

Key comparisons CCM.P-K6, APMP.M.P-K6 and APMP.M.P-K6.1

NOMINAL PRESSURE : **60 kPa**

Degrees of equivalence **Pair-wise degrees of equivalence inside CCM.P-K6**

Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	VSL		METAS		PTB		NIST		NIM		NPL		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
VSL	**0.0011**	0.011			**0.0230**	0.025	**0.0005**	0.011	**0.0024**	0.011	**0.0008**	0.011	**0.0011**	0.011	**0.0016**	0.011
METAS	**-0.0219**	0.023	**-0.0230**	0.025			**-0.0225**	0.023	**-0.0206**	0.023	**-0.0222**	0.023	**-0.0219**	0.023	**-0.0214**	0.023
PTB	**0.0006**	0.0032	**-0.0005**	0.011	**0.0225**	0.023			**0.0019**	0.0036	**0.0003**	0.0040	**0.0006**	0.0035	**0.0012**	0.0036
NIST	**-0.0013**	0.0023	**-0.0024**	0.011	**0.0206**	0.023	**-0.0019**	0.0036			**-0.0016**	0.0034	**-0.0013**	0.0027	**-0.0007**	0.0028
NIM	**0.0003**	0.0028	**-0.0008**	0.011	**0.0222**	0.023	**-0.0003**	0.0040	**0.0016**	0.0034			**0.0003**	0.0032	**0.0008**	0.0033
NPL	**0.0000**	0.0020	**-0.0011**	0.011	**0.0219**	0.023	**-0.0006**	0.0035	**0.0013**	0.0027	**-0.0003**	0.0032			**0.0005**	0.0026
NRC	**-0.0005**	0.0021	**-0.0016**	0.011	**0.0214**	0.023	**-0.0012**	0.0036	**0.0007**	0.0028	**-0.0008**	0.0033	**-0.0005**	0.0026		

NPLI	**-0.0003**	0.0109
KRISS	**0.0030**	0.0079
NMIA	**0.0043**	0.0089
NMIJ	**0.0001**	0.0065
MSL	**0.0025**	0.0083
A*STAR	**-0.0031**	0.0131
NML-SIRIM	**0.0024**	0.0081
SCL	**0.0053**	0.0122
NMISA	**-0.0059**	0.0102

CMS/ITRI	**-0.0118**	0.0140
NIMT	**0.0004**	0.0115

Pair-wise degrees of equivalence inside APMP.M.P-K6

Lab *j* ⟹

Lab *i* ⇩	**NPLI**		**KRISS**		**NMIA**		**NMIJ**		**MSL**	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
NPLI			**-9.83**	38.62	**-13.70**	40.42	**-1.34**	36.18	**-8.34**	39.32
KRISS	**9.83**	38.62			**-3.87**	33.58	**8.49**	28.34	**1.49**	32.26
NMIA	**13.70**	40.42	**3.87**	33.58			**12.36**	30.74	**5.36**	34.39
NMIJ	**1.34**	36.18	**-8.49**	28.34	**-12.36**	30.74			**-7.00**	29.29
MSL	**8.34**	39.32	**-1.49**	32.26	**-5.36**	34.39	**7.00**	29.29		
A*STAR	**-8.34**	49.65	**-18.17**	44.27	**-22.04**	45.85	**-9.68**	42.15	**-16.68**	44.88
NML-SIRIM	**8.04**	38.97	**-1.79**	31.82	**-5.66**	33.98	**6.70**	28.81	**-0.30**	32.67
SCL	**16.68**	47.45	**6.85**	41.79	**2.98**	43.45	**15.34**	39.54	**8.34**	42.44
NMISA	**-16.68**	43.03	**-26.51**	36.68	**-30.38**	38.57	**-18.02**	34.10	**-25.02**	37.42

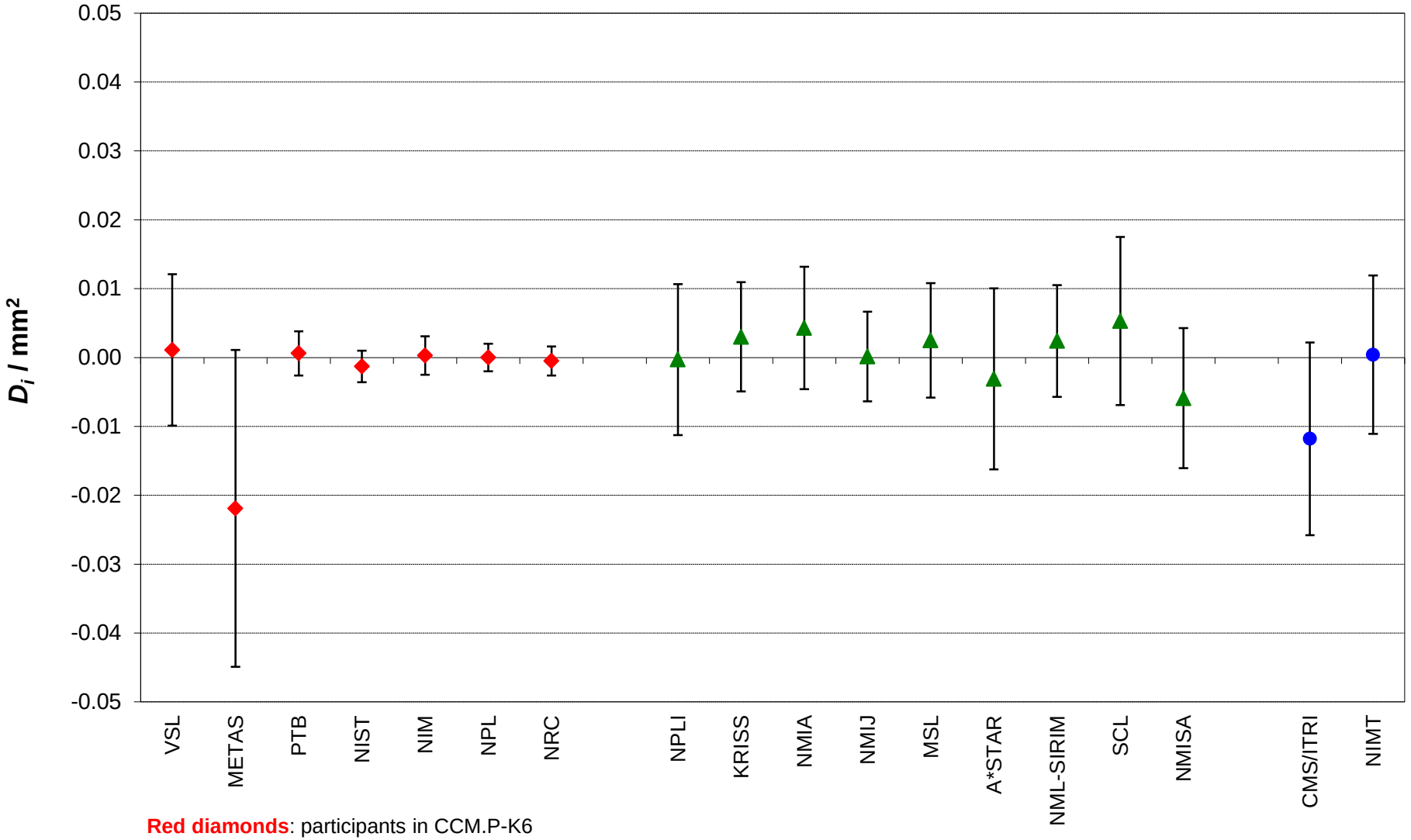
Lab *i* ⇩	**A*STAR**		**NML-SIRIM**		**SCL**		**NMISA**	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
NPLI	**8.34**	49.65	**-8.04**	38.97	**-16.68**	47.45	**16.68**	43.03
KRISS	**18.17**	44.27	**1.79**	31.82	**-6.85**	41.79	**26.51**	36.68
NMIA	**22.04**	45.85	**5.66**	33.98	**-2.98**	43.45	**30.38**	38.57
NMIJ	**9.68**	42.15	**-6.70**	28.81	**-15.34**	39.54	**18.02**	34.10
MSL	**16.68**	44.88	**0.30**	32.67	**-8.34**	42.44	**25.02**	37.42
A*STAR			**-16.38**	44.57	**-25.02**	52.15	**8.34**	48.16
NML-SIRIM	**16.38**	44.57			**-8.64**	42.11	**24.72**	37.05
SCL	**25.02**	52.15	**8.64**	42.11			**33.36**	45.89
NMISA	**-8.34**	48.16	**-24.72**	37.05	**-33.36**	45.89		

Pair-wise degrees of equivalence inside APMP.M.P-K6.1

Lab *j* ⟹

Lab *i* ⇩	**CMS/ITRI**		**NIMT**	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
CMS/ITRI			**-36.3**	34.9
NIMT	**36.3**	34.9		

CCM.P-K6, APMP.M.P-K6 and APMP.M.P-K6.1 Pressure, nominal value: 60 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)



Key comparison CCM.P-K6

NOMINAL PRESSURE : **70 kPa**

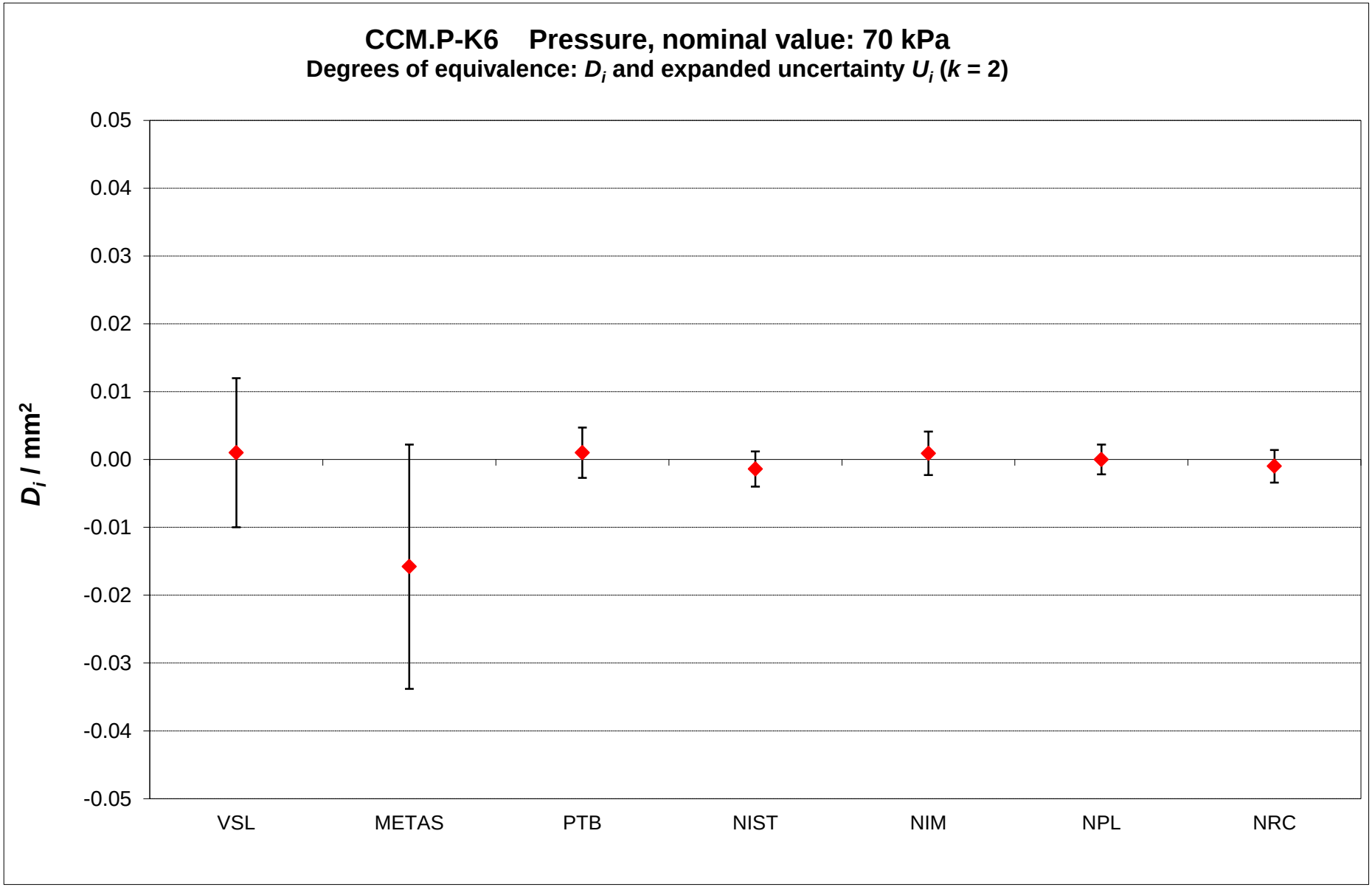
Matrix of equivalence

Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	VSL		METAS		PTB		NIST		NIM		NPL		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
VSL	**0.0010**	0.011			**0.0168**	0.020	**0.0000**	0.011	**0.0024**	0.011	**0.0001**	0.011	**0.0010**	0.011	**0.0020**	0.011
METAS	**-0.0158**	0.018	**-0.0168**	0.020			**-0.0168**	0.018	**-0.0144**	0.018	**-0.0167**	0.018	**-0.0158**	0.018	**-0.0148**	0.018
PTB	**0.0010**	0.0037	**0.0000**	0.011	**0.0168**	0.018			**0.0024**	0.0039	**0.0001**	0.0044	**0.0010**	0.0037	**0.0020**	0.0038
NIST	**-0.0014**	0.0026	**-0.0024**	0.011	**0.0144**	0.018	**-0.0024**	0.0039			**-0.0023**	0.0035	**-0.0014**	0.0026	**-0.0004**	0.0028
NIM	**0.0009**	0.0032	**-0.0001**	0.011	**0.0167**	0.018	**-0.0001**	0.0044	**0.0023**	0.0035			**0.0009**	0.0032	**0.0019**	0.0034
NPL	**0.0000**	0.0022	**-0.0010**	0.011	**0.0158**	0.018	**-0.0010**	0.0037	**0.0014**	0.0026	**-0.0009**	0.0032			**0.0010**	0.0024
NRC	**-0.0010**	0.0024	**-0.0020**	0.011	**0.0148**	0.018	**-0.0020**	0.0038	**0.0004**	0.0028	**-0.0019**	0.0034	**-0.0010**	0.0024		

No measurements at this pressure for key comparisons APMP.M.P-K6 and APMP.M.P-K6.1

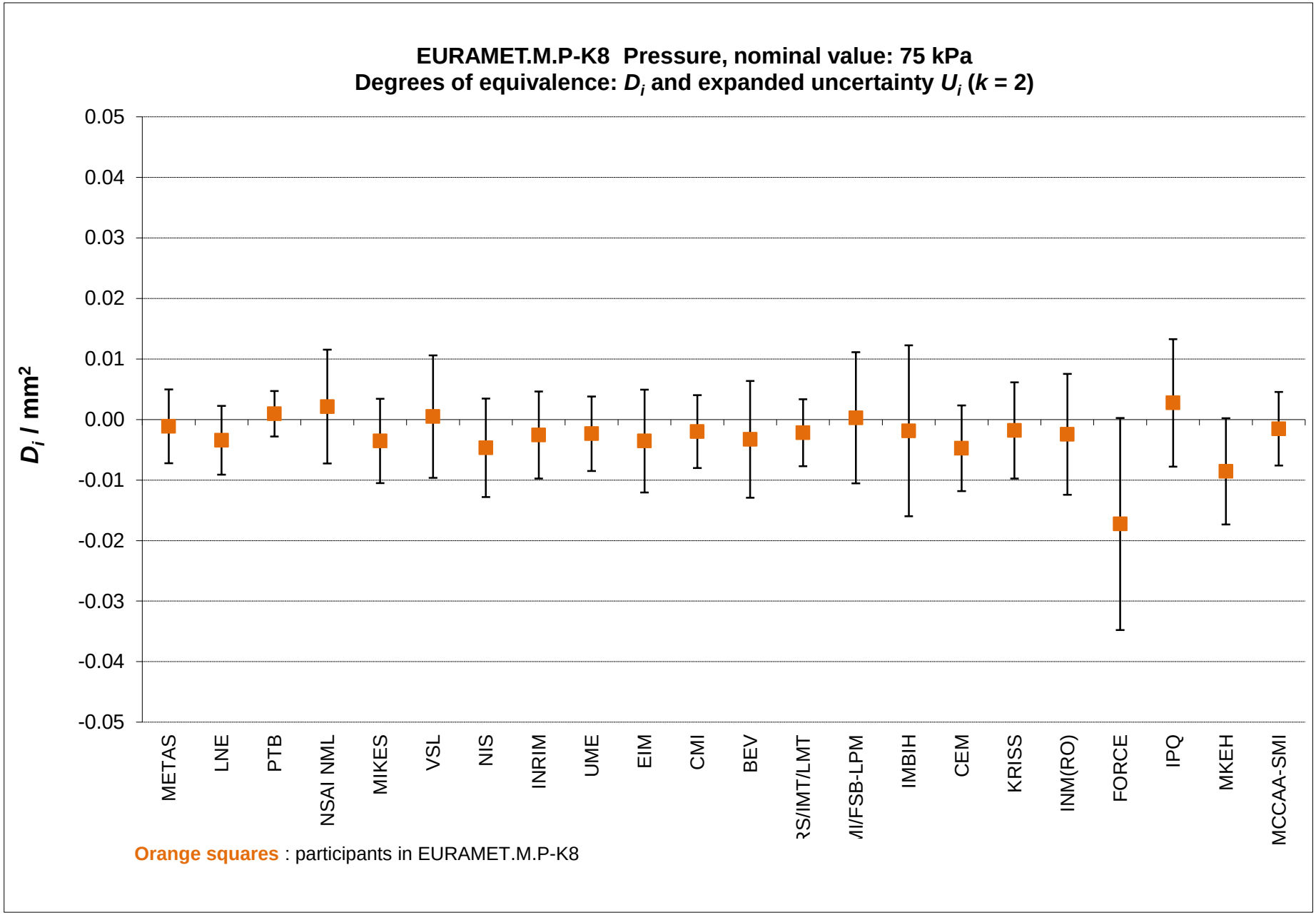

CCM.P-K6 Pressure, nominal value: 70 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
VSL
METAS
PTB
NIST
NIM
NPL
NRC

Linking EURAMET.M.P-K8 to CCM.P-K6

MEASURAND: Effective area of a piston-cylinder determined in a gauge pressure mode
NOMINAL PRESSURE : 75 kPa

Degrees of equivalence with respect to the CCM.P-K6 key comparison reference value, D_i and expanded uncertainty U_i (k = 2) expressed in mm^2 for the participants in key comparison EURAMET.M.P-K8

Lab *i* ⇩	D_i / mm^2	U_i / mm^2
METAS	-0.0011	0.0061
LNE	-0.0034	0.0057
PTB	0.0009	0.0038
NSAI NML	0.0021	0.0094
MIKES	-0.0035	0.0070
VSL	0.0005	0.0101
NIS	-0.0047	0.0081
INRIM	-0.0026	0.0072
UME	-0.0023	0.0061
EIM	-0.0035	0.0085
CMI	-0.0020	0.0060
BEV	-0.0033	0.0096
MIRS/IMT/LMT	-0.0022	0.0055
HMI/FSB-LPM	0.0003	0.0108
IMBIH	-0.0019	0.0141
CEM	-0.0047	0.0071
KRISS	-0.0018	0.0080
INM(RO)	-0.0025	0.0100
FORCE	-0.0173	0.0175
IPQ	0.0028	0.0105
MKEH	-0.0085	0.0088
MCCAA-SMI	-0.0015	0.0061


EURAMET.M.P-K8 Pressure, nominal value: 75 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
METAS
LNE
PTB
NSAI NML
MIKES
VSL
NIS
INRIM
UME
EIM
CMI
BEV
RS/IMT/LMT
MI/FSB-LPM
IMBIH
CEM
KRISS
INM(RO)
FORCE
IPQ
MKEH
MCCAA-SMI
Orange squares : participants in EURAMET.M.P-K8

Key comparisons CCM.P-K6, APMP.M.P-K6 and APMP.M.P-K6.1

NOMINAL PRESSURE : **80 kPa**

Degrees of equivalence **Pair-wise degrees of equivalence inside CCM.P-K6**

Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	VSL		METAS		PTB		NIST		NIM		NPL		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
VSL	**0.0007**	0.011			**0.0120**	0.026	**-0.0001**	0.011	**0.0026**	0.011	**-0.0001**	0.011	**0.0007**	0.011	**0.0019**	0.011
METAS	**-0.0113**	0.023	**-0.0120**	0.026			**-0.0121**	0.024	**-0.0094**	0.023	**-0.0121**	0.023	**-0.0113**	0.023	**-0.0101**	0.023
PTB	**0.0008**	0.0038	**0.0001**	0.011	**0.0121**	0.024			**0.0027**	0.0041	**0.0000**	0.0045	**0.0008**	0.0038	**0.0019**	0.0040
NIST	**-0.0019**	0.0024	**-0.0026**	0.011	**0.0094**	0.023	**-0.0027**	0.0041			**-0.0027**	0.0035	**-0.0019**	0.0025	**-0.0007**	0.0028
NIM	**0.0008**	0.0031	**0.0001**	0.011	**0.0121**	0.023	**0.0000**	0.0045	**0.0027**	0.0035			**0.0008**	0.0031	**0.0020**	0.0034
NPL	**0.0000**	0.0019	**-0.0007**	0.011	**0.0113**	0.023	**-0.0008**	0.0038	**0.0019**	0.0025	**-0.0008**	0.0031			**0.0012**	0.0023
NRC	**-0.0012**	0.0022	**-0.0019**	0.011	**0.0101**	0.023	**-0.0019**	0.0040	**0.0007**	0.0028	**-0.0020**	0.0034	**-0.0012**	0.0023		

NPLI	**-0.0008**	0.0109
KRISS	**0.0014**	0.0079
NMIA	**0.0026**	0.0089
NMIJ	**-0.0007**	0.0065
MSL	**0.0018**	0.0083
A*STAR	**-0.0037**	0.0131
NML-SIRIM	**0.0021**	0.0081
SCL	**0.0035**	0.0121
NMISA	**-0.0071**	0.0102

CMS/ITRI	**-0.0101**	0.0140
NIMT	**0.0019**	0.0115

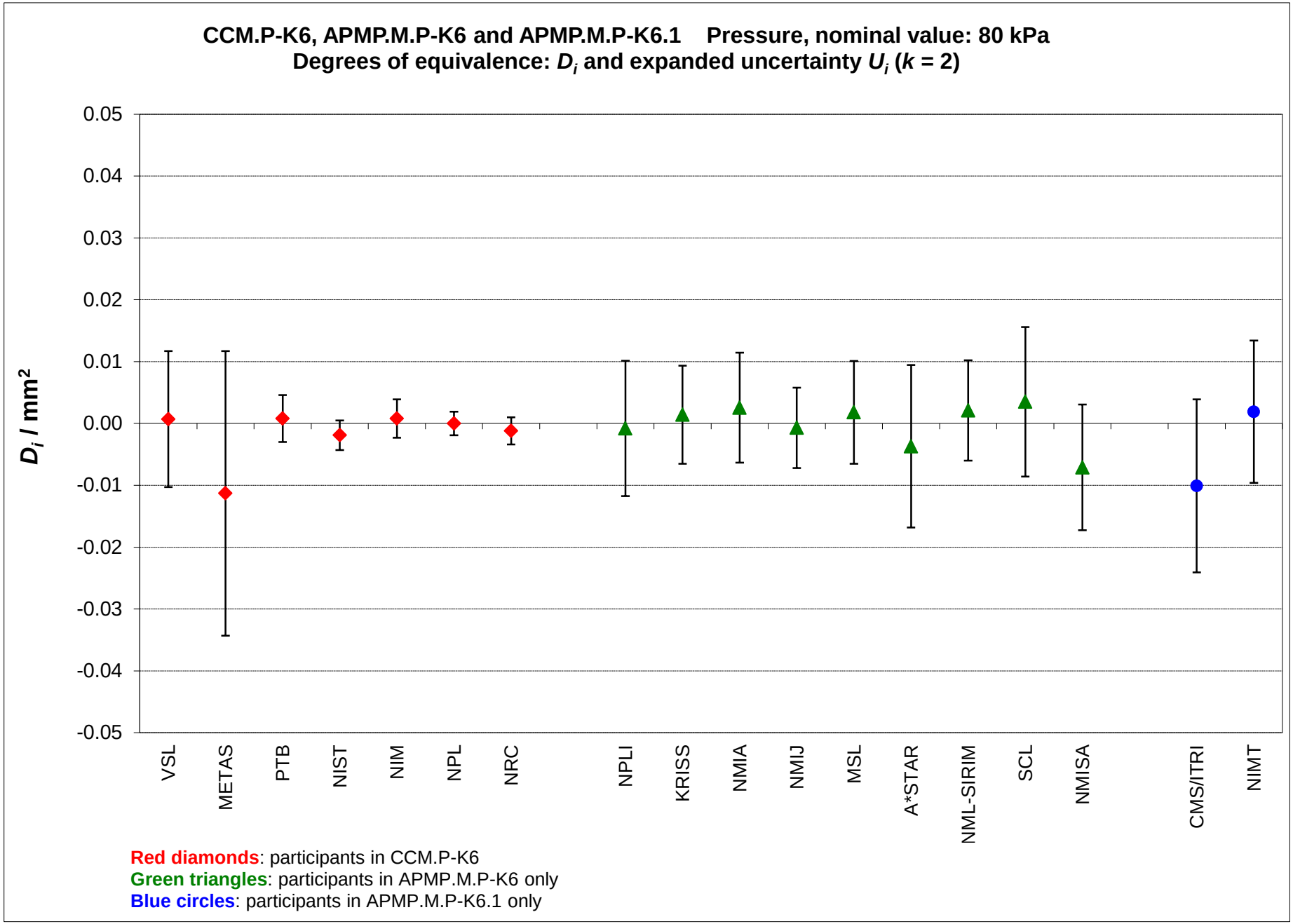
Pair-wise degrees of equivalence inside APMP.M.P-K6

Lab *i* ⇩ / Lab *j* ⇨	NPLI		KRISS		NMIA		NMIJ		MSL	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
NPLI			**-6.55**	38.62	**-9.98**	40.42	**-0.27**	36.18	**-7.74**	39.32
KRISS	**6.55**	38.62			**-3.43**	33.58	**6.28**	28.34	**-1.19**	32.26
NMIA	**9.98**	40.42	**3.43**	33.58			**9.71**	30.74	**2.23**	34.39
NMIJ	**0.27**	36.18	**-6.28**	28.34	**-9.71**	30.74			**-7.48**	29.29
MSL	**7.74**	39.32	**1.19**	32.26	**-2.23**	34.39	**7.48**	29.29		
A*STAR	**-8.64**	49.65	**-15.19**	44.27	**-18.62**	45.85	**-8.91**	42.15	**-16.38**	44.88
NML-SIRIM	**8.64**	38.97	**2.08**	31.82	**-1.34**	33.98	**8.37**	28.81	**0.89**	32.67
SCL	**12.81**	47.23	**6.25**	41.53	**2.83**	43.21	**12.54**	39.27	**5.06**	42.19
NMISA	**-18.76**	43.03	**-25.32**	36.68	**-28.74**	38.57	**-19.03**	34.10	**-26.51**	37.42

Lab *i* ⇩	A*STAR		NML-SIRIM		SCL		NMISA	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
NPLI	**8.64**	49.65	**-8.64**	38.97	**-12.81**	47.23	**18.76**	43.03
KRISS	**15.19**	44.27	**-2.08**	31.82	**-6.25**	41.53	**25.32**	36.68
NMIA	**18.62**	45.85	**1.34**	33.98	**-2.83**	43.21	**28.74**	38.57
NMIJ	**8.91**	42.15	**-8.37**	28.81	**-12.54**	39.27	**19.03**	34.10
MSL	**16.38**	44.88	**-0.89**	32.67	**-5.06**	42.19	**26.51**	37.42
A*STAR			**-17.28**	44.57	**-21.45**	51.95	**10.13**	48.16
NML-SIRIM	**17.28**	44.57			**-4.17**	41.86	**27.40**	37.05
SCL	**21.45**	51.95	**4.17**	41.86			**31.57**	45.66
NMISA	**-10.13**	48.16	**-27.40**	37.05	**-31.57**	45.66		

Pair-wise degrees of equivalence inside APMP.M.P-K6.1

Lab *i* ⇩ / Lab *j* ⇨	CMS/ITRI		NIMT	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
CMS/ITRI			**-35.8**	34.9
NIMT	**35.8**	34.9		


CCM.P-K6, APMP.M.P-K6 and APMP.M.P-K6.1 Pressure, nominal value: 80 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
VSL
METAS
PTB
NIST
NIM
NPL
NRC
NPLI
KRISS
NMIA
NMIJ
MSL
A*STAR
NML-SIRIM
SCL
NMISA
CMS/ITRI
NIMT
Red diamonds: participants in CCM.P-K6
Green triangles: participants in APMP.M.P-K6 only
Blue circles: participants in APMP.M.P-K6.1 only

Key comparison CCM.P-K6

NOMINAL PRESSURE : **90 kPa**

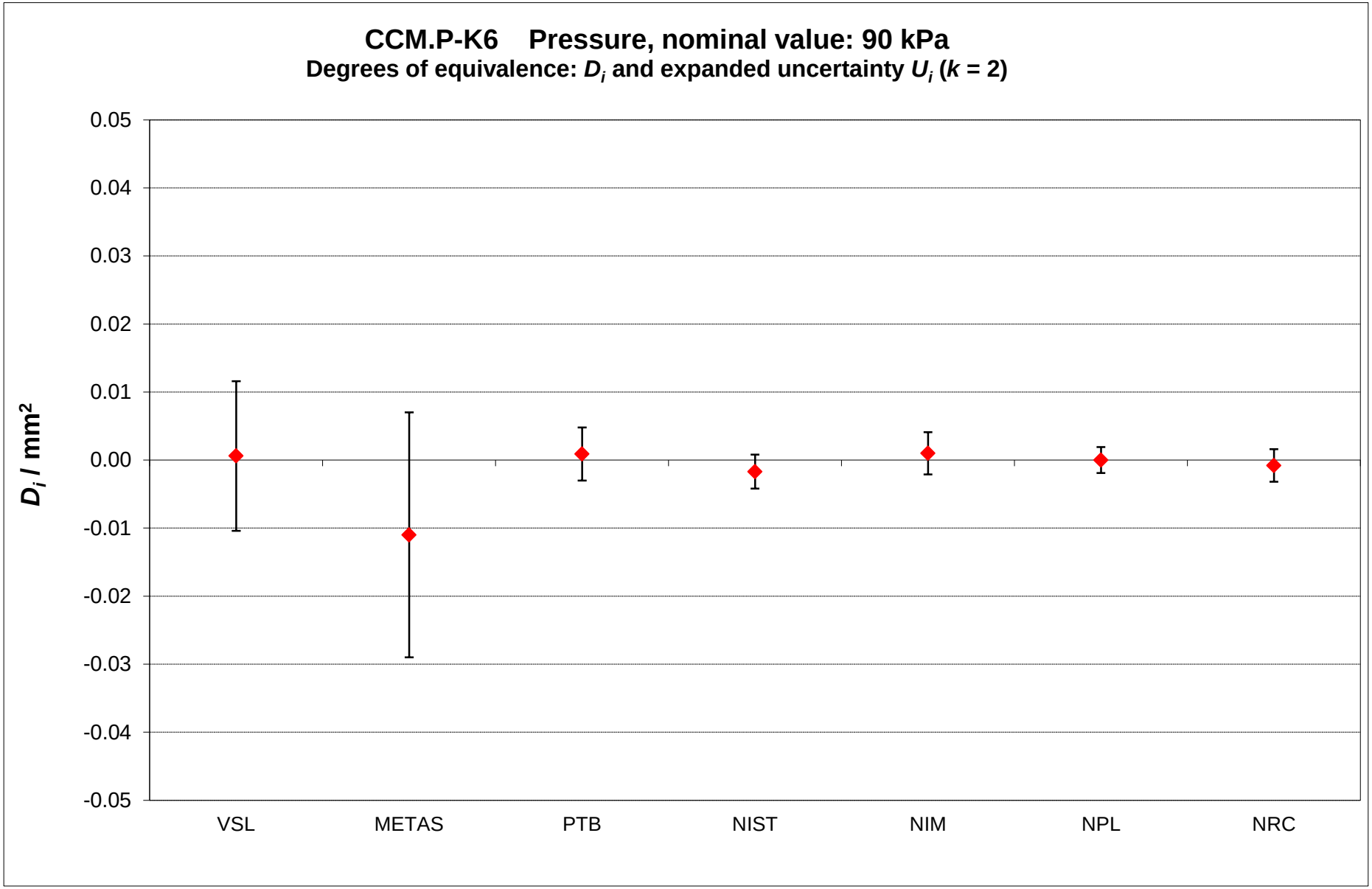
Matrix of equivalence

Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	VSL		METAS		PTB		NIST		NIM		NPL		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
VSL	**0.0006**	0.011			**0.0116**	0.021	**-0.0003**	0.011	**0.0023**	0.011	**-0.0004**	0.011	**0.0006**	0.011	**0.0015**	0.011
METAS	**-0.0110**	0.018	**-0.0116**	0.021			**-0.0119**	0.019	**-0.0093**	0.018	**-0.0120**	0.019	**-0.0110**	0.018	**-0.0102**	0.018
PTB	**0.0009**	0.0039	**0.0003**	0.011	**0.0119**	0.019			**0.0026**	0.0041	**-0.0001**	0.0045	**0.0009**	0.0038	**0.0018**	0.0040
NIST	**-0.0017**	0.0025	**-0.0023**	0.011	**0.0093**	0.018	**-0.0026**	0.0041			**-0.0027**	0.0034	**-0.0017**	0.0024	**-0.0008**	0.0028
NIM	**0.0010**	0.0031	**0.0004**	0.011	**0.0120**	0.019	**0.0001**	0.0045	**0.0027**	0.0034			**0.0010**	0.0031	**0.0019**	0.0034
NPL	**0.0000**	0.0019	**-0.0006**	0.011	**0.0110**	0.018	**-0.0009**	0.0038	**0.0017**	0.0024	**-0.0010**	0.0031			**0.0008**	0.0023
NRC	**-0.0008**	0.0024	**-0.0015**	0.011	**0.0102**	0.018	**-0.0018**	0.0040	**0.0008**	0.0028	**-0.0019**	0.0034	**-0.0008**	0.0023		

No measurements at this pressure for key comparisons APMP.M.P-K6 and APMP.M.P-K6.1


CCM.P-K6 Pressure, nominal value: 90 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
VSL
METAS
PTB
NIST
NIM
NPL
NRC

Key comparisons CCM.P-K6, APMP.M.P-K6, APMP.M.P-K6.1 and EURAMET.M.P-K8

NOMINAL PRESSURE : 100 kPa

Degrees of equivalence

Lab *i* ⇩	D_i / mm^2	U_i / mm^2
VSL	**0.0005**	0.011
METAS	**-0.0142**	0.016
PTB	**0.0008**	0.0032
NIST	**-0.0016**	0.0027
NIM	**0.0012**	0.0033
NPL	**0.0000**	0.0022
NRC	**-0.0014**	0.0026
NPLI	**-0.0012**	0.0110
KRISS	**0.0008**	0.0081
NMIA	**0.0021**	0.0090
NMIJ	**-0.0011**	0.0067
MSL	**0.0021**	0.0084
A*STAR	**-0.0049**	0.0132
NML-SIRIM	**0.0031**	0.0082
SCL	**0.0031**	0.0122
NMISA	**-0.0069**	0.0103
CMS/ITRI	**-0.0127**	0.0141
NIMT	**-0.0004**	0.0115

Lab *i* ⇩	D_i / mm^2	U_i / mm^2
METAS	**-0.0010**	0.0055
LNE	**-0.0030**	0.0052
PTB	**0.0008**	0.0033
NSAI NML	**0.0029**	0.0086
MIKES	**-0.0031**	0.0065
VSL	**0.0002**	0.0101
NIS	**-0.0044**	0.0078
INRIM	**-0.0025**	0.0067
UME	**-0.0023**	0.0055
EIM	**-0.0037**	0.0082
CMI	**-0.0019**	0.0054
BEV	**-0.0031**	0.0094
MIRS/IMT/LMT	**-0.0021**	0.0050
HMI/FSB-LPM	**-0.0005**	0.0104
IMBIH	**-0.0017**	0.0141
CEM	**-0.0036**	0.0070
KRISS	**-0.0017**	0.0076
INM(RO)	**-0.0022**	0.0097
FORCE	**-0.0185**	0.0174
IPQ	**0.0023**	0.0103
MKEH	**-0.0083**	0.0085
MCCAA-SMI	**-0.0014**	0.0055

Green: participants in APMP.M.P-K6 only
Blue: participants in APMP.M.P-K6.1 only
Orange : participants in EURAMET.M.P-K8

NOMINAL PRESSURE : 100 kPa

Pair-wise degrees of equivalence inside CCM.P-K6

Lab *j* ⟹

Lab *i* ⇩

	VSL		METAS		PTB		NIST		NIM		NPL		NRC	
	D_{ij} / mm^2	U_{ij} / mm^2	D_{ij} / mm^2	U_{ij} / mm^2	D_{ij} / mm^2	U_{ij} / mm^2	D_{ij} / mm^2	U_{ij} / mm^2	D_{ij} / mm^2	U_{ij} / mm^2	D_{ij} / mm^2	U_{ij} / mm^2	D_{ij} / mm^2	U_{ij} / mm^2
VSL			**0.0146**	0.019	**-0.0003**	0.011	**0.0021**	0.011	**-0.0007**	0.011	**0.0005**	0.011	**0.0019**	0.011
METAS	**-0.0146**	0.019			**-0.0149**	0.016	**-0.0125**	0.016	**-0.0153**	0.016	**-0.0142**	0.016	**-0.0127**	0.016
PTB	**0.0003**	0.011	**0.0149**	0.016			**0.0024**	0.0033	**-0.0004**	0.0038	**0.0008**	0.0028	**0.0022**	0.0032
NIST	**-0.0021**	0.011	**0.0125**	0.016	**-0.0024**	0.0033			**-0.0028**	0.0034	**-0.0016**	0.0023	**-0.0002**	0.0027
NIM	**0.0007**	0.011	**0.0153**	0.016	**0.0004**	0.0038	**0.0028**	0.0034			**0.0012**	0.0030	**0.0026**	0.0033
NPL	**-0.0005**	0.011	**0.0142**	0.016	**-0.0008**	0.0028	**0.0016**	0.0023	**-0.0012**	0.0030			**0.0014**	0.0022
NRC	**-0.0019**	0.011	**0.0127**	0.016	**-0.0022**	0.0032	**0.0002**	0.0027	**-0.0026**	0.0033	**-0.0014**	0.0022		

NOMINAL PRESSURE : **100 kPa**

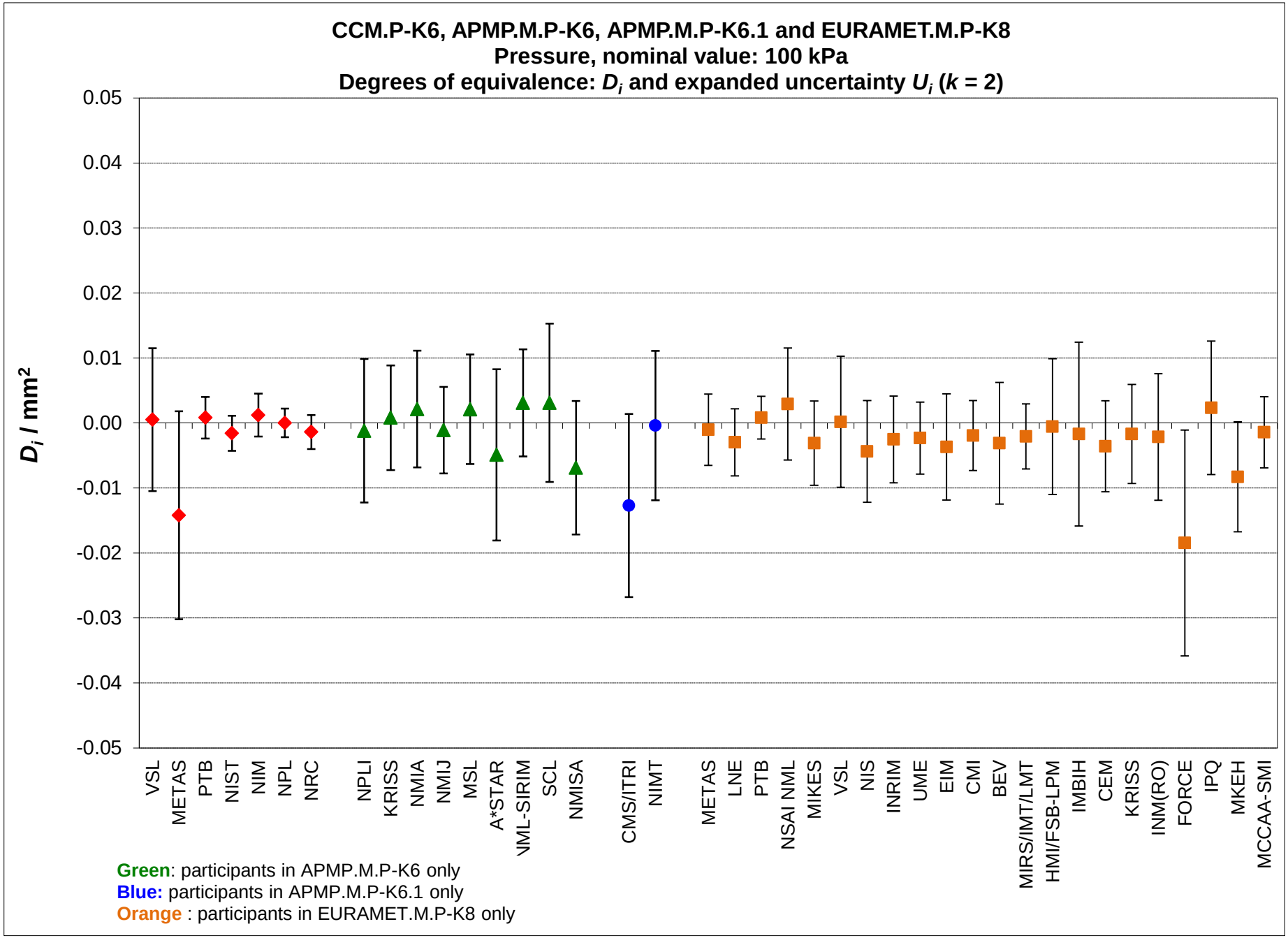
Pair-wise degrees of equivalence inside APMP.M.P-K6

Lab *i* ⇩ / Lab *j* ⇨	NPLI		KRISS		NMIA		NMIJ		MSL	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
NPLI			**-5.96**	38.62	**-9.95**	40.42	**-0.30**	36.18	**-9.83**	39.32
KRISS	**5.96**	38.62			**-3.99**	33.58	**5.66**	28.34	**-3.87**	32.26
NMIA	**9.95**	40.42	**3.99**	33.58			**9.65**	30.74	**0.12**	34.39
NMIJ	**0.30**	36.18	**-5.66**	28.34	**-9.65**	30.74			**-9.53**	29.29
MSL	**9.83**	39.32	**3.87**	32.26	**-0.12**	34.39	**9.53**	29.29		
A*STAR	**-11.02**	49.58	**-16.98**	44.18	**-20.97**	45.76	**-11.32**	42.06	**-20.85**	44.80
NML-SIRIM	**12.81**	38.97	**6.85**	31.82	**2.86**	33.98	**12.51**	28.81	**2.98**	32.67
SCL	**12.81**	47.23	**6.85**	41.53	**2.86**	43.21	**12.51**	39.27	**2.98**	42.19
NMISA	**-16.98**	43.03	**-22.93**	36.68	**-26.93**	38.57	**-17.28**	34.10	**-26.81**	37.42

Lab *i* ⇩	A*STAR		NML-SIRIM		SCL		NMISA	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
NPLI	**11.02**	49.58	**-12.81**	38.97	**-12.81**	47.23	**16.98**	43.03
KRISS	**16.98**	44.18	**-6.85**	31.82	**-6.85**	41.53	**22.93**	36.68
NMIA	**20.97**	45.76	**-2.86**	33.98	**-2.86**	43.21	**26.93**	38.57
NMIJ	**11.32**	42.06	**-12.51**	28.81	**-12.51**	39.27	**17.28**	34.10
MSL	**20.85**	44.80	**-2.98**	32.67	**-2.98**	42.19	**26.81**	37.42
A*STAR			**-23.83**	44.49	**-23.83**	51.88	**5.96**	48.08
NML-SIRIM	**23.83**	44.49			**0.00**	41.86	**29.79**	37.05
SCL	**23.83**	51.88	**0.00**	41.86			**29.79**	45.66
NMISA	**-5.96**	48.08	**-29.79**	37.05	**-29.79**	45.66		

Pair-wise degrees of equivalence inside APMP.M.P-K6.1

Lab *i* ⇩ / Lab *j* ⇨	CMS/ITRI		NIMT	
	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}	D_{ij} / 10^{-6}	U_{ij} / 10^{-6}
CMS/ITRI			**-36.6**	34.9
NIMT	**36.6**	34.9		


CCM.P-K6, APMP.M.P-K6, APMP.M.P-K6.1 and EURAMET.M.P-K8
Pressure, nominal value: 100 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
VSL
METAS
PTB
NIST
NIM
NPL
NRC
NPLI
KRISS
NMIA
NMIJ
MSL
A*STAR
VNIIM-SIRIM
SCL
NMISA
CMS/ITRI
NIMT
METAS
LNE
PTB
NSAI NML
MIKES
VSL
NIS
INRIM
UME
EIM
CMI
BEV
MIRS/IMT/LMT
HMI/FSB-LPM
IMBIH
CEM
KRISS
INM(RO)
FORCE
IPQ
MKEH
MCCAA-SMI
Green: participants in APMP.M.P-K6 only
Blue: participants in APMP.M.P-K6.1 only
Orange : participants in EURAMET.M.P-K8 only

Key comparison CCM.P-K6

NOMINAL PRESSURE : **110 kPa**

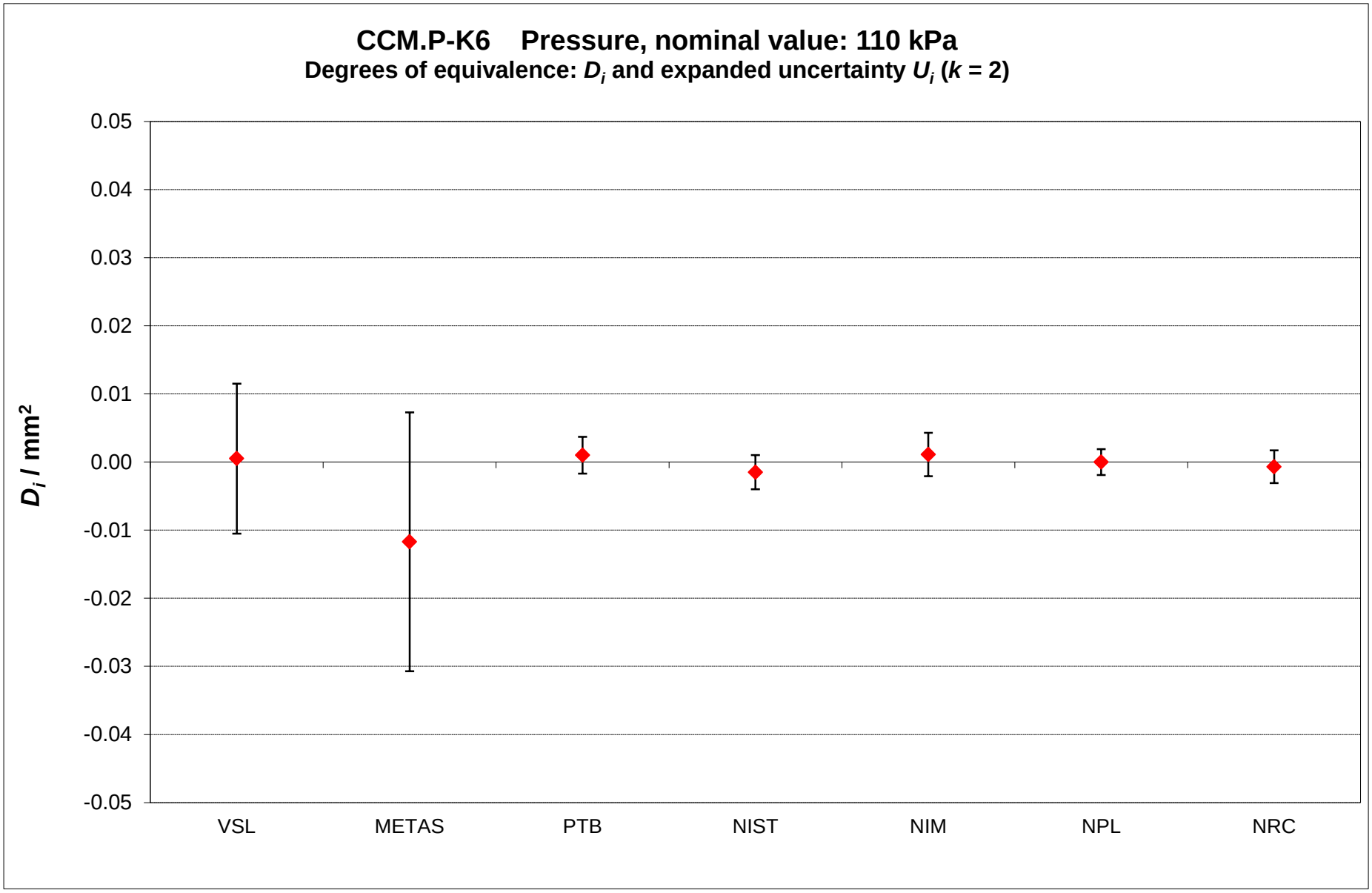
Matrix of equivalence

Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	VSL		METAS		PTB		NIST		NIM		NPL		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
VSL	**0.0005**	0.011			**0.0123**	0.021	**-0.0004**	0.011	**0.0021**	0.011	**-0.0006**	0.011	**0.0005**	0.011	**0.0013**	0.011
METAS	**-0.0117**	0.019	**-0.0123**	0.021			**-0.0127**	0.019	**-0.0102**	0.019	**-0.0129**	0.019	**-0.0117**	0.019	**-0.0110**	0.019
PTB	**0.0010**	0.0027	**0.0004**	0.011	**0.0127**	0.019			**0.0025**	0.0030	**-0.0002**	0.0036	**0.0010**	0.0025	**0.0017**	0.0029
NIST	**-0.0015**	0.0025	**-0.0021**	0.011	**0.0102**	0.019	**-0.0025**	0.0030			**-0.0027**	0.0035	**-0.0015**	0.0023	**-0.0008**	0.0027
NIM	**0.0011**	0.0032	**0.0006**	0.011	**0.0129**	0.019	**0.0002**	0.0036	**0.0027**	0.0035			**0.0011**	0.0031	**0.0019**	0.0034
NPL	**0.0000**	0.0019	**-0.0005**	0.011	**0.0117**	0.019	**-0.0010**	0.0025	**0.0015**	0.0023	**-0.0011**	0.0031			**0.0007**	0.0021
NRC	**-0.0007**	0.0024	**-0.0013**	0.011	**0.0110**	0.019	**-0.0017**	0.0029	**0.0008**	0.0027	**-0.0019**	0.0034	**-0.0007**	0.0021		

No measurements at this pressure for key comparisons APMP.M.P-K6 and APMP.M.P-K6.1


CCM.P-K6 Pressure, nominal value: 110 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
VSL
METAS
PTB
NIST
NIM
NPL
NRC

Key comparison CCM.P-K6

NOMINAL PRESSURE : **120 kPa**

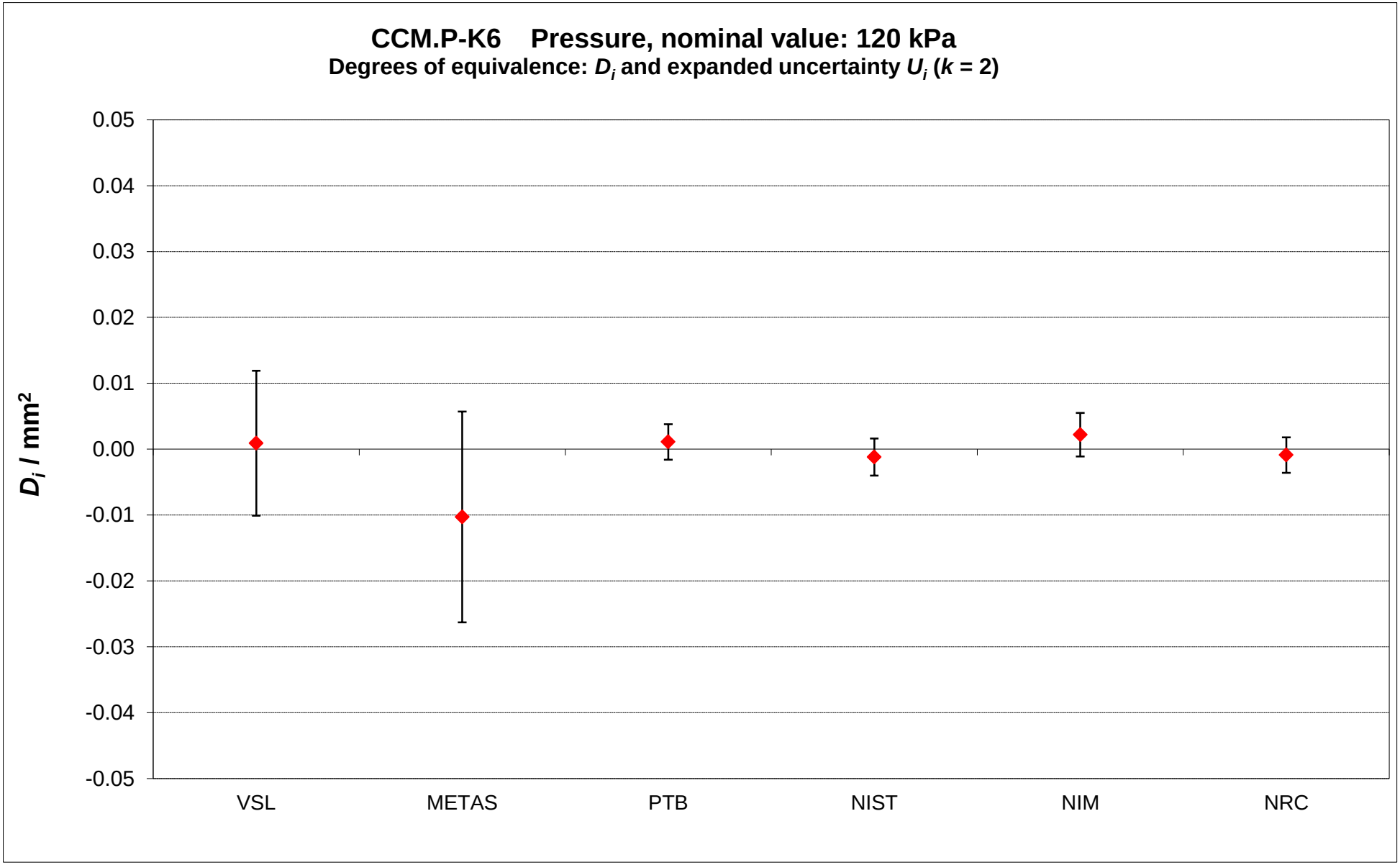
Matrix of equivalence

Lab *j* ⟹

Lab *i* ⇩

	D_i / mm²	U_i / mm²	VSL		METAS		PTB		NIST		NIM		NRC	
			D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²	D_{ij} / mm²	U_{ij} / mm²
VSL	**0.0009**	0.011			**0.0111**	0.019	**-0.0003**	0.011	**0.0021**	0.011	**-0.0013**	0.011	**0.0017**	0.011
METAS	**-0.0103**	0.016	**-0.0111**	0.019			**-0.0114**	0.016	**-0.0090**	0.016	**-0.0124**	0.016	**-0.0094**	0.016
PTB	**0.0011**	0.0027	**0.0003**	0.011	**0.0114**	0.016			**0.0024**	0.0027	**-0.0010**	0.0032	**0.0020**	0.0026
NIST	**-0.0012**	0.0028	**-0.0021**	0.011	**0.0090**	0.016	**-0.0024**	0.0027			**-0.0034**	0.0034	**-0.0004**	0.0027
NIM	**0.0022**	0.0033	**0.0013**	0.011	**0.0124**	0.016	**0.0010**	0.0032	**0.0034**	0.0034			**0.0030**	0.0032
NRC	**-0.0009**	0.0027	**-0.0017**	0.011	**0.0094**	0.016	**-0.0020**	0.0026	**0.0004**	0.0027	**-0.0030**	0.0032		

No measurements at this pressure for key comparisons APMP.M.P-K6 and APMP.M.P-K6.1


CCM.P-K6 Pressure, nominal value: 120 kPa
Degrees of equivalence: D_i and expanded uncertainty U_i (k = 2)
D_i / mm²
0.05
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
VSL
METAS
PTB
NIST
NIM
NRC