CCM.P-K4 and EUROMET.M.P-K1.a for nominal pressures 1 Pa, 3 Pa, 10 Pa, 30 Pa,100 Pa, 300 Pa, and 1000 Pa
CCM.P-K4 and EURAMET.M.P-K4.2010 for nominal pressures 3 Pa, 10 Pa, and 30 Pa
CCM.P-K4, EUROMET.M.P-K1.a, EUROMET.M.P-K1.b and SIM-EUROMET.M.P-BK3 at a pressure close to 1 Pa

This file covers the results of participants in key comparisons CCM.P-K4 and EUROMET.M.P-K1.a linked for 7 nominal pressures in the range 1 Pa to 1000 Pa.
Additional link is carried out with the results of participants in key comparisons EUROMET.M.P-K1.b and SIM-EUROMET.M.P-BK3 for a pressure close to 1 Pa, and in EURAMET.M.P-K4.2010 for nominal pressures of 3 Pa, 10 Pa and 30 Pa.
Results obtained in the framework of key comparisons EUROMET.M.P-K1.b and SIM-EUROMET.M.P-BK3 for the pressure range 0.3 mPa to 0.9 Pa are available from the KCDB Website by clicking on EUROMET.M.P-K1.b or SIM-EUROMET.M.P-BK3.

Key comparison CCM.P-K4

MEASURAND: **Pressure**
NOMINAL VALUES: **1 Pa, 3 Pa, 10 Pa, 30 Pa, 100 Pa, 300 Pa and 1000 Pa**

p_i: corrected mean gauge reading obtained by laboratory i (see CCM.P-K4 Final Report, page 15)
u_i: combined standard uncertainty of p_i (see CCM.P-K4 Final Report, page 22)

Lab i	Nominal pressure / Pa	p_i / Pa	u_i / Pa	Measurement method	Date of measurement
CSIRO-NML	1	1.211	0.023	Liquid-Column Manometer	24 Feb 1999 to 3 Mar 1999
	3	3.301	0.025		
	10	10.566	0.046		
	30	30.906	0.069		
	100	100.831	0.093		
	300	300.57	0.16		
	1000	1000.33	0.16		
CNR-IMGC	1	1.0023	0.0031	Static Expansion System	19 Jan 1999 to 8 Feb 1999
	3	3.0042	0.0091		
	10	10.015	0.030		
	30	30.057	0.091		
	100	100.176	0.051	Liquid-Column Manometer	
	300	300.132	0.060		
	1000	1000.178	0.061		
KRISS	10	10.003	0.013	Liquid-Column Manometer	15 Jun 1999 to 22 Jun 1999
	30	30.022	0.014		
	100	100.036	0.021		
	300	300.010	0.023		
	1000	1000.056	0.055		

Lab *i*	Nominal pressure / Pa	p_i / Pa	u_i / Pa	Measurement method	Date of measurement
NIST	1	1.0003	0.0010	Liquid-Column Manometer(s)	17 Mar to 03 Apr and 08 Jul to 24 Jul 1998, 23 Apr to 06 May and 23 Aug to 10 Sep 1999
	3	3.0008	0.0015		
	10	9.9997	0.0018		
	30	29.9898	0.0026		
	100	99.9909	0.0053		
	300	299.9871	0.0054		
	1000	1000.0308	0.0059		
NPLI	1	0.9952	0.0010	Static Expansion System	01 Jan 1999 to 14 Jan 1999
	3	2.9929	0.0019		
	10	9.9817	0.0058		
	30	29.953	0.017		
	100	99.874	0.055		
	300	299.76	0.16		
	1000	999.12	0.74		
NPL	1	1.0013	0.0031	Static Expansion System	17 Nov 1998 to 25 Nov 1998
	3	3.0008	0.0091		
	10	10.003	0.030		
	30	29.966	0.057		
	100	99.92	0.18		
	300	299.80	0.54		
	1000	1000.7	1.8		
PTB	1	1.0002	0.0015	Static Expansion System	28 May 1998 to 04 Jun 1998
	3	2.9987	0.0038		
	10	9.995	0.013		
	30	30.002	0.033		
	100	100.00	0.11		
	300	299.92	0.32		
	1000	999.7	1.1		

CCM.P-K4 and EUROMET.M.P-K1.a for nominal pressures 1 Pa, 3 Pa, 10 Pa, 30 Pa,100 Pa, 300 Pa, and 1000 Pa
CCM.P-K4 and EURAMET.M.P-K4.2010 for nominal pressures 3 Pa, 10 Pa, and 30 Pa
CCM.P-K4, EUROMET.M.P-K1.a, EUROMET.M.P-K1.b and SIM-EUROMET.M.P-BK3 at a pressure close to 1 Pa

Key comparison EUROMET.M.P-K1.a

MEASURAND: Pressure
NOMINAL VALUES: 1 Pa, 3 Pa, 10 Pa, 30 Pa, 100 Pa, 300 Pa and 1000 Pa

The laboratory individual measurements of the participants in the key comparison EUROMET.M.P-K1.a are given in Table 7 and 8 on pages 17, 18 and 19 of the EUROMET.M.P-K1.a Final Report.
All measurements used a Static Expansion System and were carried out between September 1998 and April 2004.

Key comparison EUROMET.M.P-K1.b

MEASURAND: Pressure
NOMINAL VALUE: 0.9 Pa

p_i **pressure measurement carried out at laboratory *i***
u_i **standard uncertainty of laboratory *i***
(values taken from Table 13 of the EUROMET.M.P-K1.b Final Report)

Lab *i*	p_i / Pa	u_i / Pa	Date of measurement
NPL	9.004E-01	2.6E-03	May 2000
BNM-LNE	9.000E-01	5.1E-03	Jun 2000
MIRS/IMT	9.059E-01	2.7E-03	Sep 2000
CNR-IMGC	9.016E-01	2.3E-03	Oct 2000 to Nov 2000
CEM	9.021E-01	6.4E-03	Apr 2001
UME	8.988E-01	2.5E-03	Dec 2001 to Jan 2002
PTB	8.994E-01	1.7E-03	Apr 2000 - Jul 2000 - Mar 2001 - Nov 2001 - Feb 2002

CCM.P-K4 and EUROMET.M.P-K1.a for nominal pressures 1 Pa, 3 Pa, 10 Pa, 30 Pa,100 Pa, 300 Pa, and 1000 Pa
CCM.P-K4 and EURAMET.M.P-K4.2010 for nominal pressures 3 Pa, 10 Pa, and 30 Pa
CCM.P-K4, EUROMET.M.P-K1.a, EUROMET.M.P-K1.b and SIM-EUROMET.M.P-BK3 at a pressure close to 1 Pa

Key comparison SIM-EUROMET.M.P-BK3

MEASURAND: Pressure
NOMINAL VALUE: 0.9 Pa

d **relative difference between the pressures p_{CENAM} and p_{PTB}: $d = [p_{CENAM} / p_{PTB}) - 1]$**
U **expanded uncertainty $k = 2$ of *d***

(values taken from Table 11 of the SIM-EUROMET.M.P-BK3 Final Report)

Date of measurement: April 2002 to June 2002

Nominal pressure	*d*	*U*
0.9 Pa	-0.0018	0.0041

Key comparison EUROMET.M.P-K4.2010

MEASURAND: Pressure
NOMINAL VALUES: 1 Pa, 3 Pa, 10 Pa, 30 Pa, 100 Pa, 300 Pa, 1000 Pa, 3000 Pa, 10000 Pa, and 15000 Pa

The laboratory individual measurements of the participants in the key comparison EURAMET.M.P-K4.2010 are given in Table 10.7a on page 23 of the EURAMET.M.P-K4.2010 Final Report.

CCM.P-K4 and EUROMET.M.P-K1.a for nominal pressures 1 Pa, 3 Pa, 10 Pa, 30 Pa,100 Pa, 300 Pa, and 1000 Pa
CCM.P-K4 and EURAMET.M.P-K4.2010 for nominal pressures 3 Pa, 10 Pa, and 30 Pa
CCM.P-K4, EUROMET.M.P-K1.a, EUROMET.M.P-K1.b and SIM-EUROMET.M.P-BK3 at a pressure close to 1 Pa

Key comparison CCM.P-K4

NOMINAL VALUES: 1 Pa, 3 Pa, 10 Pa, 30 Pa, 100 Pa, 300 Pa and 1000 Pa

For each nominal pressure value, the key comparison reference value, p_R, is obtained from an unweighted mean of the measurement method means. Outliers at pressures up to and including 100 Pa are excluded.
A correction is applied to set p_R numerically equal to the nominal pressure (see CCM.P-K4 Final Report, page 41).
The combined standard uncertainty of p_R is u_R (see CCM.P-K4 Final Report, page 42).

Nominal pressure / Pa	1	3	10	30	100	300	1000
p_R / Pa	1	3	10	30	100	300	1000
u_R / Pa	0.0008	0.0019	0.0066	0.015	0.038	0.11	0.37

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of terms: $D_i = (p_i - p_R)$ and U_i, its expanded uncertainty at a 95% level of confidence, both expressed in Pa.

The degree of equivalence between two laboratories is given by a pair of terms: $D_{ij} = D_i - D_j = (p_i - p_j)$ and U_{ij}, its expanded uncertainty at a 95% level of confidence, both expressed in Pa.

Linking EUROMET.M.P-K1.a to CCM.P-K4

The results of EUROMET.M.P-K1.a are linked to those of CCM.P-K4 for 7 pressure nominal values in the range 1 Pa to 1000 Pa, through the common participation of three laboratories: CNR-IMGC, PTB, and NPL. The CNR-IMGC, however, does not participate in the linking process in the pressure range 100 Pa to 1000 Pa, because it did not use a Static Expansion System for that range of measurements in CCM.P-K4. The detailed calculation used in the linking process is presented on pages 20 and 21 of the EUROMET.M.P-K1.a Final Report.

The degrees of equivalence of laboratories having participated in EUROMET.M.P-K1.a only (plus those of CNR-IMGC in the range 100 Pa to 1000 Pa) relative to the CCM.P-K4 key comparison reference values are obtained from the linking process and are given in Table 11 on page 22 of the EUROMET.M.P-K1.a Final Report.

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EUROMET.M.P-K1.a.

Key comparison EUROMET.M.P-K1.b

NOMINAL PRESSURE: 0.9 Pa

The key comparison reference value, $p_{R\text{-}EUR}$, is computed as the weighted average of the results of the BNM-LNE, CNR-IMGC, NPL, PTB and UME. The weights are inversely proportional to the square of the individual uncertainties u_i. The standard uncertainty, $u_{R\text{-}EUR}$, of $p_{R\text{-}EUR}$ is the standard uncertainty of the weighted average.
$p_{R\text{-}EUR}$ = 9.000E-01 Pa and $u_{R\text{-}EUR}$ = 1.1E-03 Pa.

The EUROMET degree of equivalence of each laboratory participant in EUROMET.M.P.K1. b with respect to the reference value $p_{R\text{-}EUR}$ is given by a pair of terms: $D_{i\text{-}EUR} = [(p_i / p_{R\text{-}EUR}) - 1]$ and $U_{i\text{-}EUR}$, its expanded uncertainty (k = 2) computed according to Equations 29 and 30 on page 29 of the EUROMET.M.P-K1.b Final report. $D_{i\text{-}EUR}$ and $U_{i\text{-}EUR}$ are dimensionless.

	$D_{i\text{-}EUR}$	$U_{i\text{-}EUR}$
NPL	**0.0005**	0.0052
BNM-LNE	**0.0000**	0.011
MIRS/IMT	**0.0065**	0.0063
CNR-IMGC	**0.0018**	0.0044
CEM	**0.0023**	0.014
UME	**-0.0013**	0.0051
PTB	**-0.0006**	0.0029

No pair-wise degrees of equivalence are computed for the key comparison EUROMET.M.P-K1.b.

Linking EUROMET.M.P-K1.b to CCM.P-K4

Taking into account the nominal pressure ranges involved in the key comparisons CCM.P-K4 and EUROMET.M.P-K1.b, the linkage between both can be computed only for a pressure close to 1 Pa.

For a nominal pressure close to 1 Pa, three laboratories, CNR-IMGC, NPL and PTB, are common participants to both comparisons. Examination of their performance in both comparisons leads to the conclusions (see Section 12 of the EUROMET.M.P-K1.b Final Report) that the CCM.P-K4 key comparison reference value and the EUROMET reference value are in agreement. The EUROMET degrees of equivalence relative to the reference value may thus be transferred to CCM.P-K4.

The CCM.P-K4 degrees of equivalence, D_i and U_i, are expressed in Pa, while the EUROMET.M.P-K1.b ones, $D_{i\text{-}EUR}$ and $U_{i\text{-}EUR}$, are expressed in relative terms. The transfer to CCM.P-K4 is thus obtained by multiplying by $p_{R\text{-}EUR}$ the $D_{i\text{-}EUR}$ and $U_{i\text{-}EUR}$ values. It follows that at a nominal pressure of 1 Pa, $D_i = (D_{i\text{-}EUR} \times p_{R\text{-}EUR})$ and $U_i = (U_{i\text{-}EUR} \times p_{R\text{-}EUR})$ for participants taking part only in EUROMET.M.P-K1.b.
The CCM.P-K4 graph of equivalence can thus be extended to include the BNM-LNE, MIRS/IMT, CEM and UME results.

Linking SIM-EUROMET.M.P-BK3 to EUROMET.M.P-K1.b

The stability of the PTB primary standard between both comparisons was substantiated by the same check standard.
It follows it is possible to link the CENAM value to the EUROMET.M.P-K1.b reference value $p_{R\text{-}EUR}$ via the PTB primary standard.

By multiplying the ratio $r = (d + 1)$ with the pressure p_{PTB} obtained during EUROMET.M.P-K1.b, one obtains a fictive value for the pressure p_{CENAM} which can be compared with the EUROMET reference value $p_{R\text{-}EUR}$:
$p_{CENAM} = r\, p_{PTB}$ with the uncertainty u_{CENAM} given in Equation 27 of the SIM-EUROMET.M.P-BK3 Final Report.

The degrees of equivalence of CENAM relative to the EUROMET.M.P-K1.b reference value is then computed from p_{CENAM} and u_{CENAM}, as if CENAM had participated in EUROMET.M.P-K1.b.

At a nominal pressure close to 1 Pa:

p_{CENAM} / Pa	u_{CENAM} / Pa	$D_{CENAM\text{-}EUR}$	$U_{CENAM\text{-}EUR}$
8.978E-01	1.063E-03	**-0.0024**	0.003

No pair-wise degrees of equivalence involving CENAM are computed.

Linking SIM-EUROMET.M.P-BK3 to CCM.P-K4

The conclusions of the linkage between EUROMET.M.P-K1.b and CCM.P-K4 for a nominal pressure of 1 Pa apply to the results of CENAM.

It follows that at a nominal pressure of 1 Pa, $D_{CENAM} = (D_{CENAM\text{-}EUR} \times p_{R\text{-}EUR})$ and $U_{CENAM} = (U_{CENAM\text{-}EUR} \times p_{R\text{-}EUR})$.
The CCM.P-K4 graph of equivalence can thus be extended to include the CENAM results.

Linking EURAMET.M.P-K4.2010 to CCM.P-K4

PTB provides the link between key comparisons CCM.P-K4 and EURAMET.M.P-K4.2010 for nominal pressures 3 Pa, 10 Pa, and 30 Pa.
The linkage process is described in Section 11 of the EURAMET.M.P-K4.2010 Final Report.

CCM.P-K4, EUROMET.M.P-K1.a, EUROMET.M.P-K1.b and SIM-EUROMET.M.P-BK3

MEASURAND: Pressure
NOMINAL PRESSURE: 1 Pa

Lab *i* ⇩ **Lab *j*** ⟹

Participants in CCM.P-K4

	D_i / Pa	U_i / Pa	CSIRO-NML		CNR-IMGC		NIST		NPLI		NPL		PTB	
			D_{ij} / Pa	U_{ij} / Pa	D_{ij} / Pa	U_{ij} / Pa	D_{ij} / Pa	U_{ij} / Pa	D_{ij} / Pa	U_{ij} / Pa	D_{ij} / Pa	U_{ij} / Pa	D_{ij} / Pa	U_{ij} / Pa
CSIRO-NML	**0.211**	0.046			**0.209**	0.046	**0.211**	0.046	**0.216**	0.046	**0.210**	0.046	**0.211**	0.046
CNR-IMGC	**0.0023**	0.0054	**-0.209**	0.046			**0.0021**	0.0064	**0.0071**	0.0063	**0.0011**	0.0085	**0.0022**	0.0067
NIST	**0.0003**	0.0015	**-0.211**	0.046	**-0.0021**	0.0064			**0.0051**	0.0028	**-0.0010**	0.0063	**0.0001**	0.0035
NPLI	**-0.0048**	0.0023	**-0.216**	0.046	**-0.0071**	0.0063	**-0.0051**	0.0028			**-0.0061**	0.0063	**-0.0050**	0.0035
NPL	**0.0013**	0.0054	**-0.210**	0.046	**-0.0011**	0.0085	**0.0010**	0.0063	**0.0061**	0.0063			**0.0011**	0.0066
PTB	**0.0002**	0.0029	**-0.211**	0.046	**-0.0022**	0.0067	**-0.0001**	0.0035	**0.0050**	0.0035	**-0.0011**	0.0066		

Participants in EUROMET.M.P-K1.b

BNM-LNE	**0.0000**	0.010
MIRS/IMT	**0.0059**	0.0057
CEM	**0.0021**	0.013
UME	**-0.0012**	0.0046

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EUROMET.M.P-K1.b.

Participant in SIM-EUROMET.M.P-BK3

CENAM	**-0.0022**	0.003

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison SIM-EUROMET.M.P-BK3.

Participants in EUROMET.M.P-K1.a

BNM-LNE	**-0.0056**	0.0051
MIKES	**0.039**	0.044
SP	**0.0028**	0.038
CEM	**0.0031**	0.0090
OMH	**0.00082**	0.082
UME	**0.0062**	0.0060
NMi-VSL	**0.0036**	0.035

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EUROMET.M.P-K1.a.

CCM.P-K4, EUROMET.M.P-K1.a, and EURAMET.M.P-K4.2010

MEASURAND: Pressure

NOMINAL PRESSURE: 3 Pa

Lab *j* ⇨

Lab *i* ⇩

Lab *i*	D_i / Pa	U_i / Pa	CSIRO-NML D_{ij} / Pa	CSIRO-NML U_{ij} / Pa	CNR-IMGC D_{ij} / Pa	CNR-IMGC U_{ij} / Pa	NIST D_{ij} / Pa	NIST U_{ij} / Pa	NPLI D_{ij} / Pa	NPLI U_{ij} / Pa	NPL D_{ij} / Pa	NPL U_{ij} / Pa	PTB D_{ij} / Pa	PTB U_{ij} / Pa
CSIRO-NML	**0.301**	0.052			**0.297**	0.054	**0.300**	0.052	**0.308**	0.052	**0.300**	0.054	**0.302**	0.052
CNR-IMGC	**0.004**	0.016	**-0.297**	0.054			**0.003**	0.018	**0.011**	0.018	**0.003**	0.025	**0.006**	0.019
NIST	**0.0008**	0.0037	**-0.300**	0.052	**-0.003**	0.018			**0.0079**	0.0048	**0.000**	0.018	**0.0022**	0.0081
NPLI	**-0.0071**	0.0049	**-0.308**	0.052	**-0.011**	0.018	**-0.0079**	0.0048			**-0.008**	0.018	**-0.0057**	0.0084
NPL	**0.001**	0.016	**-0.300**	0.054	**-0.003**	0.025	**0.000**	0.018	**0.008**	0.018			**0.002**	0.019
PTB	**-0.0013**	0.0075	**-0.302**	0.052	**-0.006**	0.019	**-0.0022**	0.0081	**0.0057**	0.0084	**-0.002**	0.019		

BNM-LNE	**-0.017**	0.013
MIKES	**0.041**	0.052
SP	**0.0056**	0.068
CEM	**0.0020**	0.024
OMH	**-0.093**	0.23
UME	**0.018**	0.018
NMi-VSL	**-0.033**	0.036

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EUROMET.M.P-K1.a.

CMI	**0.008**	0.026
INRIM	**0.010**	0.026
LNE	**0.003**	0.026
MIKES	**0.022**	0.072

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EURAMET.M.P-K4.2010.

CCM.P-K4, EUROMET.M.P-K1.a, and EURAMET.M.P-K4.2010

NOMINAL PRESSURE: 10 Pa

Lab *j* ⇨

Lab *i* ⇩

	D_i / Pa	U_i / Pa	CSIRO-NML D_{ij} / Pa	CSIRO-NML U_{ij} / Pa	CNR-IMGC D_{ij} / Pa	CNR-IMGC U_{ij} / Pa	KRISS D_{ij} / Pa	KRISS U_{ij} / Pa	NIST D_{ij} / Pa	NIST U_{ij} / Pa	NPLI D_{ij} / Pa	NPLI U_{ij} / Pa	NPL D_{ij} / Pa	NPL U_{ij} / Pa	PTB D_{ij} / Pa	PTB U_{ij} / Pa
CSIRO-NML	**0.57**	0.10			**0.55**	0.11	**0.56**	0.10	**0.57**	0.10	**0.58**	0.10	**0.56**	0.11	**0.57**	0.10
CNR-IMGC	**0.015**	0.053	**-0.55**	0.11			**0.012**	0.065	**0.015**	0.060	**0.033**	0.061	**0.012**	0.084	**0.020**	0.064
KRISS	**0.003**	0.023	**-0.56**	0.10	**-0.012**	0.065			**0.003**	0.027	**0.021**	0.029	**0.000**	0.065	**0.008**	0.036
NIST	**0.000**	0.013	**-0.57**	0.10	**-0.015**	0.060	**-0.003**	0.027			**0.018**	0.012	**-0.003**	0.059	**0.005**	0.025
NPLI	**-0.018**	0.016	**-0.58**	0.10	**-0.033**	0.061	**-0.021**	0.029	**-0.018**	0.012			**-0.021**	0.060	**-0.013**	0.027
NPL	**0.003**	0.053	**-0.56**	0.11	**-0.012**	0.084	**0.000**	0.065	**0.003**	0.059	**0.021**	0.060			**0.008**	0.064
PTB	**-0.005**	0.025	**-0.57**	0.10	**-0.020**	0.064	**-0.008**	0.036	**-0.005**	0.025	**0.013**	0.027	**-0.008**	0.064		

BNM-LNE	**-0.040**	0.041
MIKES	**0.043**	0.082
SP	**-0.0080**	0.13
CEM	**-0.0072**	0.079
OMH	**-0.40**	0.92
UME	**0.051**	0.058
NMi-VSL	**0.0058**	0.037

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EUROMET.M.P-K1.a.

CMI	**-0.010**	0.028
INRIM	**-0.003**	0.028
LNE	**-0.010**	0.028
MIKES	**0.001**	0.073

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EURAMET.M.P-K4.2010.

CCM.P-K4, EUROMET.M.P-K1.a, and EURAMET.M.P-K4.2010

NOMINAL PRESSURE: 30 Pa

Lab *i* ⇩	D_i / Pa	U_i / Pa	Lab *j* ⇨ CSIRO-NML D_{ij} / Pa	CSIRO-NML U_{ij} / Pa	CNR-IMGC D_{ij} / Pa	CNR-IMGC U_{ij} / Pa	KRISS D_{ij} / Pa	KRISS U_{ij} / Pa	NIST D_{ij} / Pa	NIST U_{ij} / Pa	NPLI D_{ij} / Pa	NPLI U_{ij} / Pa	NPL D_{ij} / Pa	NPL U_{ij} / Pa	PTB D_{ij} / Pa	PTB U_{ij} / Pa
CSIRO-NML	**0.91**	0.15			**0.85**	0.23	**0.88**	0.15	**0.92**	0.15	**0.95**	0.15	**0.94**	0.18	**0.90**	0.16
CNR-IMGC	**0.06**	0.16	**-0.85**	0.23			**0.03**	0.18	**0.07**	0.18	**0.10**	0.18	**0.09**	0.21	**0.06**	0.19
KRISS	**0.022**	0.035	**-0.88**	0.15	**-0.03**	0.18			**0.032**	0.028	**0.069**	0.044	**0.06**	0.12	**0.020**	0.070
NIST	**-0.010**	0.029	**-0.92**	0.15	**-0.07**	0.18	**-0.032**	0.028			**0.037**	0.035	**0.02**	0.11	**-0.012**	0.064
NPLI	**-0.047**	0.041	**-0.95**	0.15	**-0.10**	0.18	**-0.069**	0.044	**-0.037**	0.035			**-0.01**	0.12	**-0.049**	0.072
NPL	**-0.03**	0.10	**-0.94**	0.18	**-0.09**	0.21	**-0.06**	0.12	**-0.02**	0.11	**0.01**	0.12			**-0.04**	0.13
PTB	**0.002**	0.062	**-0.90**	0.16	**-0.06**	0.19	**-0.020**	0.070	**0.012**	0.064	**0.049**	0.072	**0.04**	0.13		

BNM-LNE	**-0.078**	0.11
MIKES	**0.050**	0.20
SP	**-0.055**	0.32
CEM	**-0.037**	0.20
OMH	**2.0**	3.2
UME	**0.11**	0.14
NMi-VSL	**0.064**	0.042

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EUROMET.M.P-K1.a.

CMI	**-0.016**	0.028
INRIM	**-0.004**	0.028
LNE	**-0.014**	0.028
MIKES	**-0.007**	0.074

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EURAMET.M.P-K4.2010.

CCM.P-K4 and EUROMET.M.P-K1.a

NOMINAL PRESSURE: 100 Pa

Lab *i* ⇩ **Lab *j*** ⇨

Lab *i*	D_i / Pa	U_i / Pa	CSIRO-NML D_{ij} / Pa	CSIRO-NML U_{ij} / Pa	CNR-IMGC D_{ij} / Pa	CNR-IMGC U_{ij} / Pa	KRISS D_{ij} / Pa	KRISS U_{ij} / Pa	NIST D_{ij} / Pa	NIST U_{ij} / Pa	NPLI D_{ij} / Pa	NPLI U_{ij} / Pa	NPL D_{ij} / Pa	NPL U_{ij} / Pa	PTB D_{ij} / Pa	PTB U_{ij} / Pa
CSIRO-NML	**0.83**	0.20			**0.65**	0.21	**0.79**	0.19	**0.84**	0.19	**0.96**	0.21	**0.91**	0.40	**0.83**	0.28
CNR-IMGC	**0.18**	0.11	**-0.65**	0.21			**0.14**	0.13	**0.18**	0.11	**0.30**	0.15	**0.25**	0.37	**0.17**	0.23
KRISS	**0.036**	0.081	**-0.79**	0.19	**-0.14**	0.13			**0.045**	0.043	**0.16**	0.11	**0.11**	0.36	**0.03**	0.21
NIST	**-0.009**	0.074	**-0.84**	0.19	**-0.18**	0.11	**-0.045**	0.043			**0.12**	0.11	**0.07**	0.36	**-0.01**	0.21
NPLI	**-0.13**	0.11	**-0.96**	0.21	**-0.30**	0.15	**-0.16**	0.11	**-0.12**	0.11			**-0.05**	0.37	**-0.13**	0.23
NPL	**-0.08**	0.30	**-0.91**	0.40	**-0.25**	0.37	**-0.11**	0.36	**-0.07**	0.36	**0.05**	0.37			**-0.08**	0.42
PTB	**0.00**	0.19	**-0.83**	0.28	**-0.17**	0.23	**-0.03**	0.21	**0.01**	0.21	**0.13**	0.23	**0.08**	0.42		

BNM-LNE	**-0.17**	0.38
MIKES	**0.077**	0.70
SP	**-0.15**	0.96
CEM	**-0.15**	0.63
OMH	**2.5**	3.1
UME	**0.32**	0.47
NMi-VSL	**0.096**	0.069
CNR-IMGC	**-0.080**	0.40

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EUROMET.M.P-K1.a.

CCM.P-K4 and EUROMET.M.P-K1.a

NOMINAL PRESSURE: 300 Pa

Lab *i* ⇩ / Lab *j* ⇨

Lab *i*	D_i / Pa	U_i / Pa	CSIRO-NML D_{ij} / Pa	CSIRO-NML U_{ij} / Pa	CNR-IMGC D_{ij} / Pa	CNR-IMGC U_{ij} / Pa	KRISS D_{ij} / Pa	KRISS U_{ij} / Pa	NIST D_{ij} / Pa	NIST U_{ij} / Pa	NPLI D_{ij} / Pa	NPLI U_{ij} / Pa	NPL D_{ij} / Pa	NPL U_{ij} / Pa	PTB D_{ij} / Pa	PTB U_{ij} / Pa
CSIRO-NML	0.57	0.34			0.44	0.33	0.56	0.31	0.58	0.31	0.81	0.44	0.8	1.1	0.65	0.70
CNR-IMGC	0.13	0.24	-0.44	0.33			0.12	0.17	0.15	0.13	0.38	0.33	0.3	1.1	0.21	0.64
KRISS	0.01	0.22	-0.56	0.31	-0.12	0.17			0.02	0.05	0.25	0.31	0.2	1.1	0.09	0.63
NIST	-0.01	0.22	-0.58	0.31	-0.15	0.13	-0.02	0.05			0.23	0.31	0.2	1.1	0.06	0.63
NPLI	-0.24	0.33	-0.81	0.44	-0.38	0.33	-0.25	0.31	-0.23	0.31			0.0	1.1	-0.17	0.70
NPL	-0.20	0.90	-0.8	1.1	-0.3	1.1	-0.2	1.1	-0.2	1.1	0.0	1.1			-0.1	1.2
PTB	-0.08	0.56	-0.65	0.70	-0.21	0.64	-0.09	0.63	-0.06	0.63	0.17	0.70	0.1	1.2		

BNM-LNE	-0.30	0.57
MIKES	-0.10	1.3
SP	-0.30	1.3
CEM	-0.30	1.3
CNR-IMGC	0.13	0.61

No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EUROMET.M.P-K1.a.

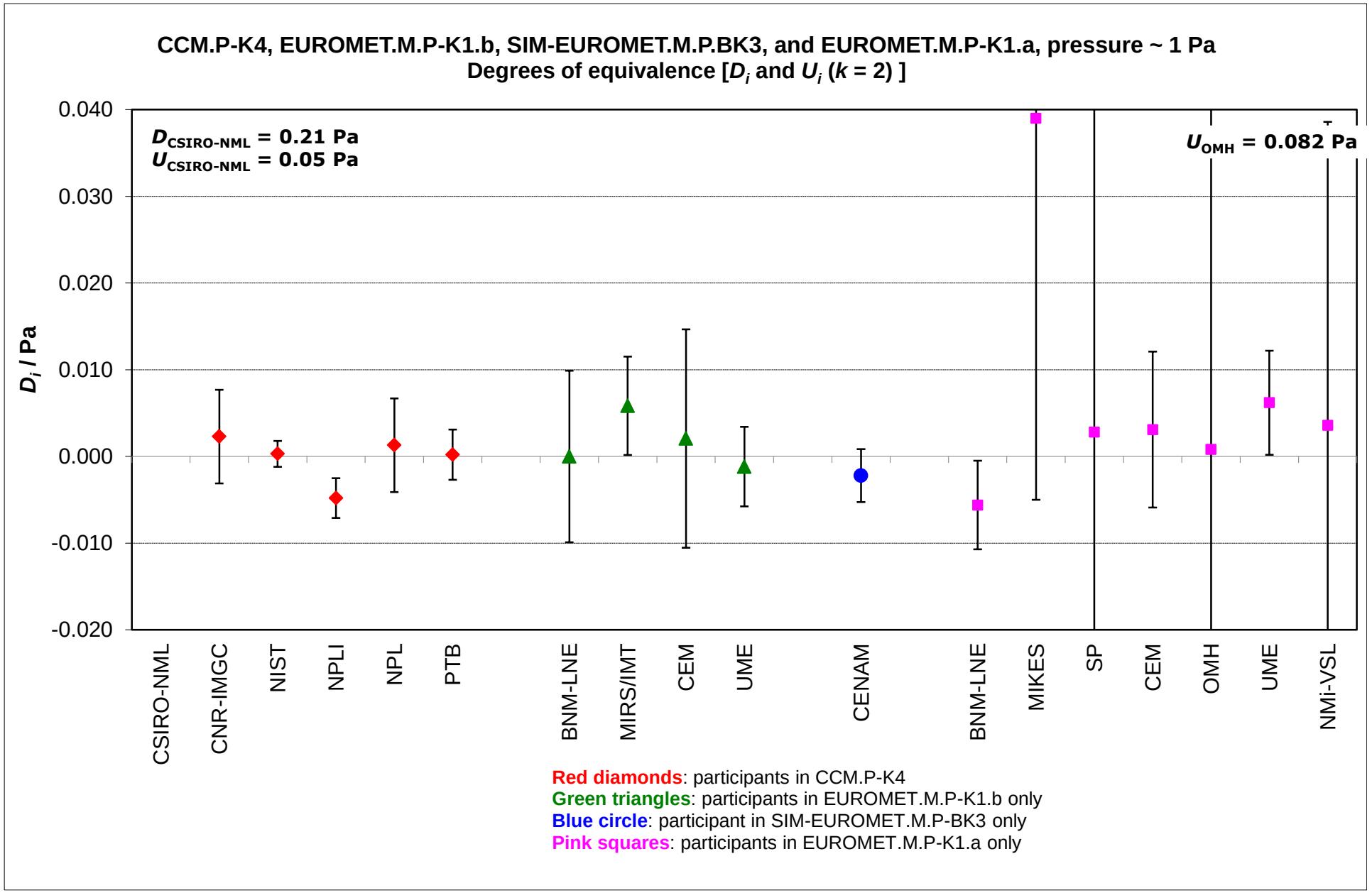
NOMINAL PRESSURE: 1000 Pa

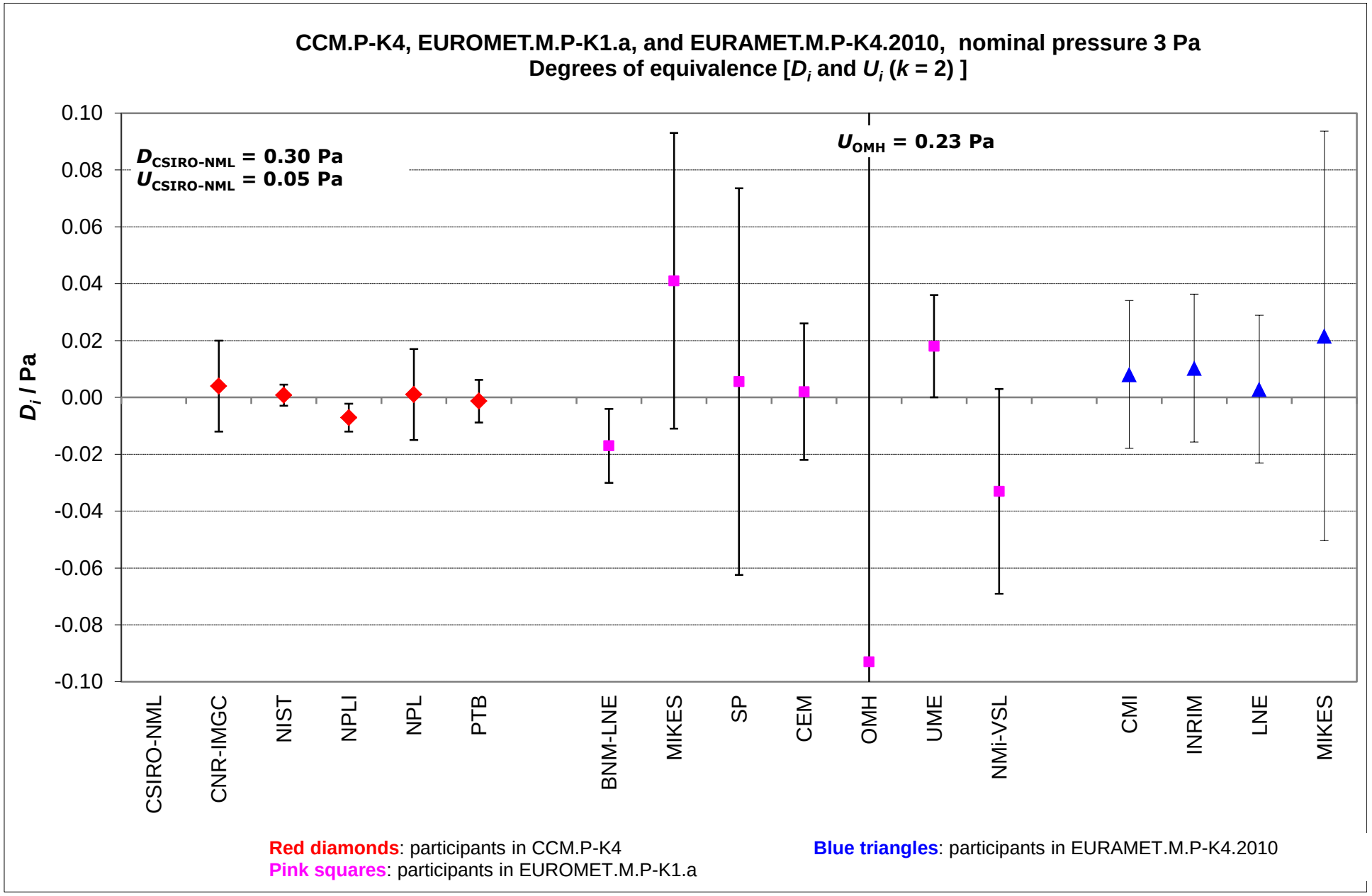
Lab *i* ⇩ / Lab *j* ⇨

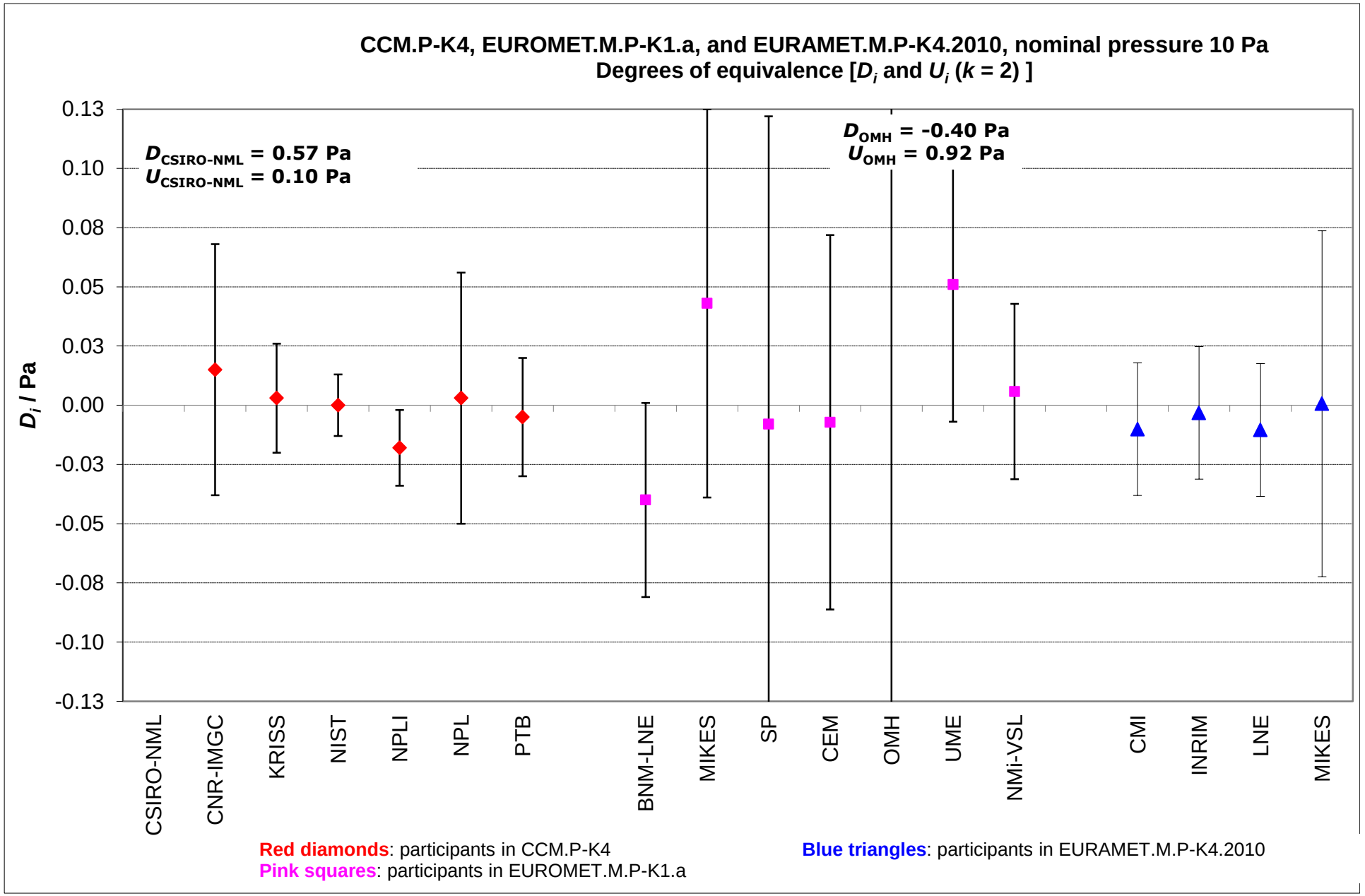
Lab *i*	D_i / Pa	U_i / Pa	CSIRO-NML D_{ij} / Pa	CSIRO-NML U_{ij} / Pa	CNR-IMGC D_{ij} / Pa	CNR-IMGC U_{ij} / Pa	KRISS D_{ij} / Pa	KRISS U_{ij} / Pa	NIST D_{ij} / Pa	NIST U_{ij} / Pa	NPLI D_{ij} / Pa	NPLI U_{ij} / Pa	NPL D_{ij} / Pa	NPL U_{ij} / Pa	PTB D_{ij} / Pa	PTB U_{ij} / Pa
CSIRO-NML	0.33	0.78			0.15	0.34	0.28	0.33	0.30	0.32	1.2	1.5	-0.4	3.5	0.6	2.2
CNR-IMGC	0.18	0.74	-0.15	0.34			0.12	0.18	0.15	0.13	1.1	1.5	-0.5	3.5	0.4	2.2
KRISS	0.06	0.74	-0.28	0.33	-0.12	0.18			0.03	0.11	0.9	1.5	-0.6	3.5	0.3	2.2
NIST	0.03	0.73	-0.30	0.32	-0.15	0.13	-0.03	0.11			0.9	1.5	-0.7	3.5	0.3	2.2
NPLI	-0.9	1.4	-1.2	1.5	-1.1	1.5	-0.9	1.5	-0.9	1.5			-1.6	3.8	-0.6	2.6
NPL	0.7	3.0	0.4	3.5	0.5	3.5	0.6	3.5	0.7	3.5	1.6	3.8			1.0	4.2
PTB	-0.3	1.9	-0.6	2.2	-0.4	2.2	-0.3	2.2	-0.3	2.2	0.6	2.6	-1.0	4.2		

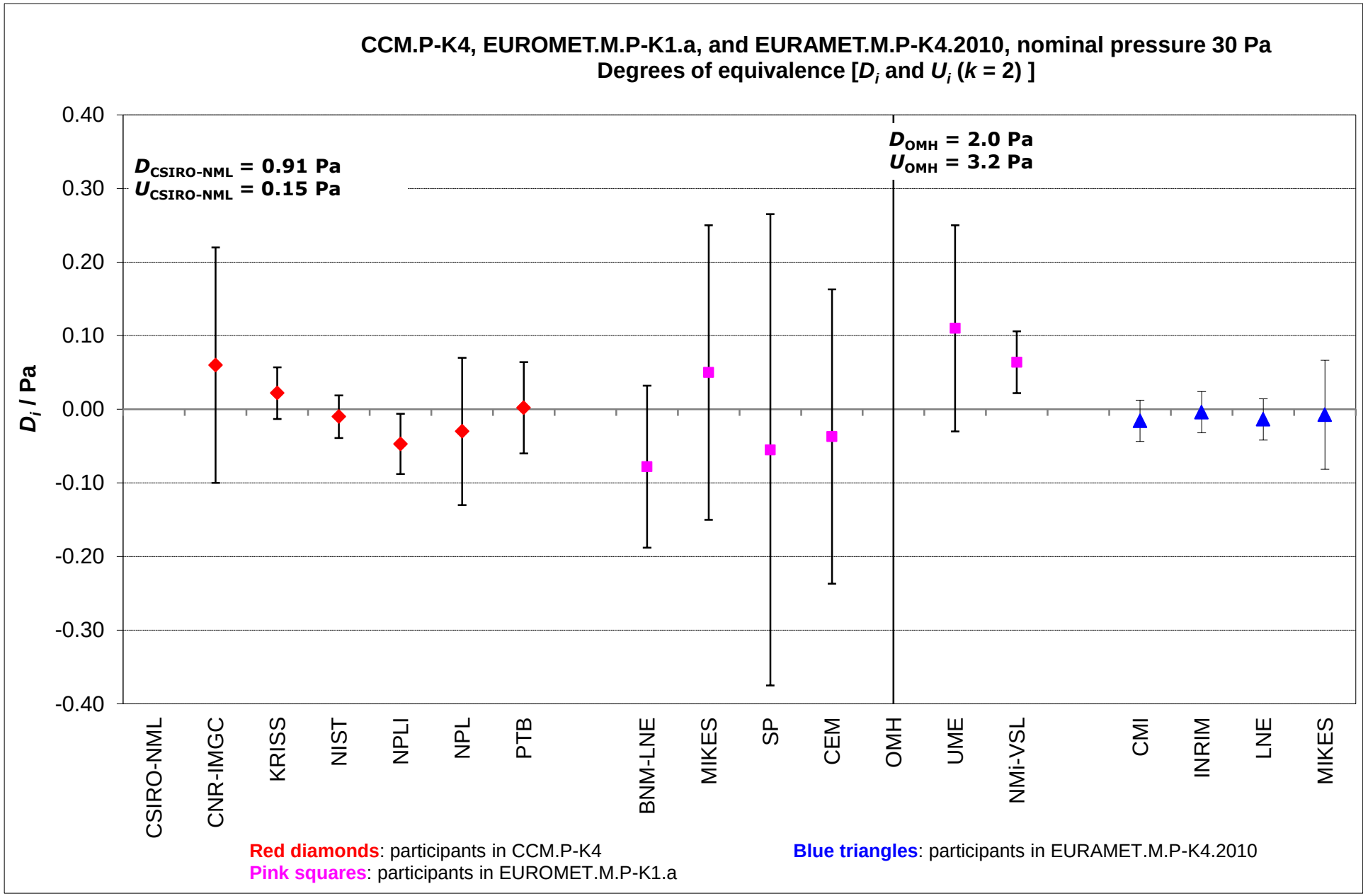
BNM-LNE	-0.38	1.9
MIKES	0.32	4.5
SP	0.51	2.3
CEM	-0.38	4.2
CNR-IMGC	0.38	2.0

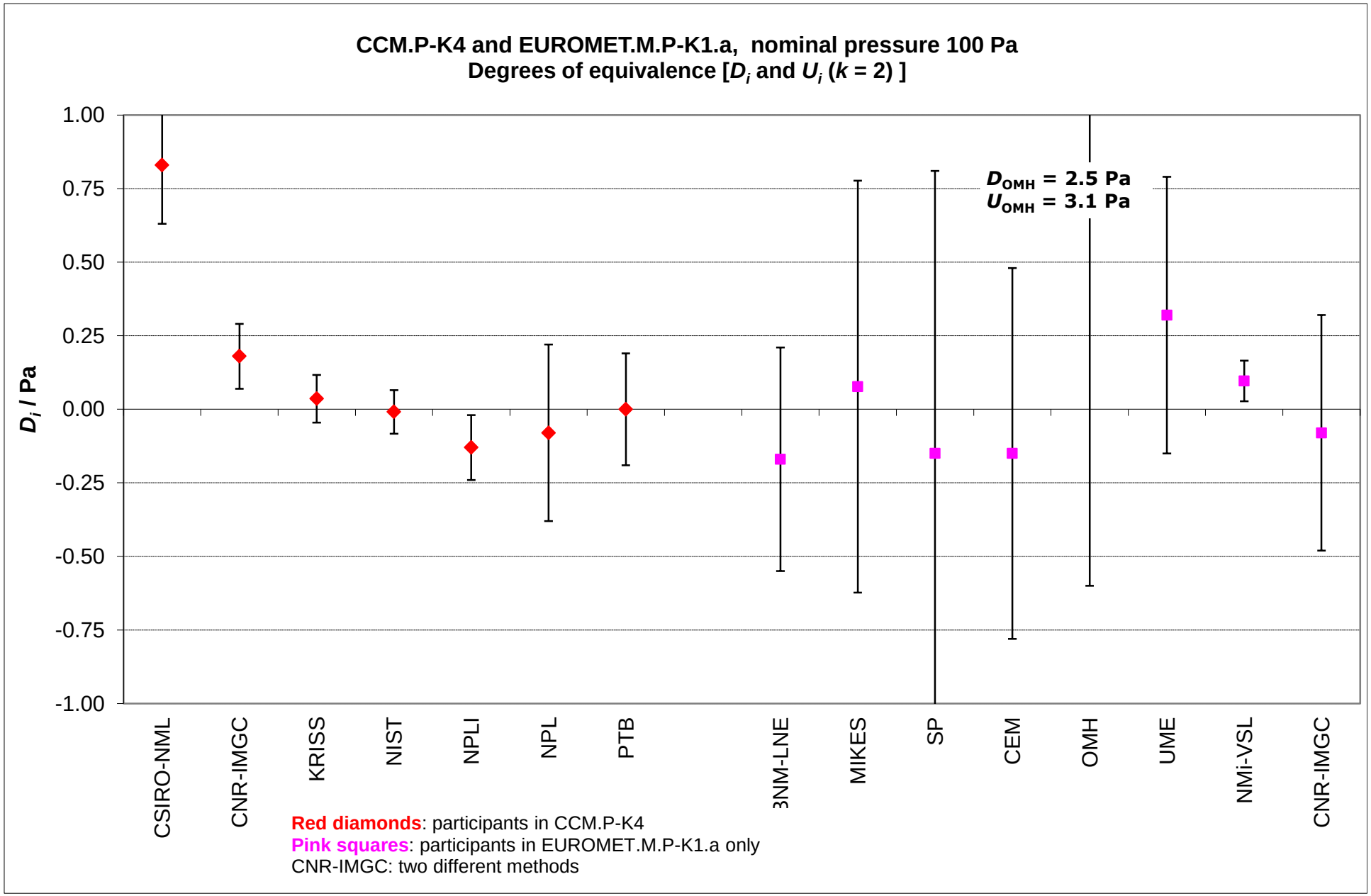
No pair-wise degrees of equivalence are deduced from the measurements carried out in the framework of key comparison EUROMET.M.P-K1.a.

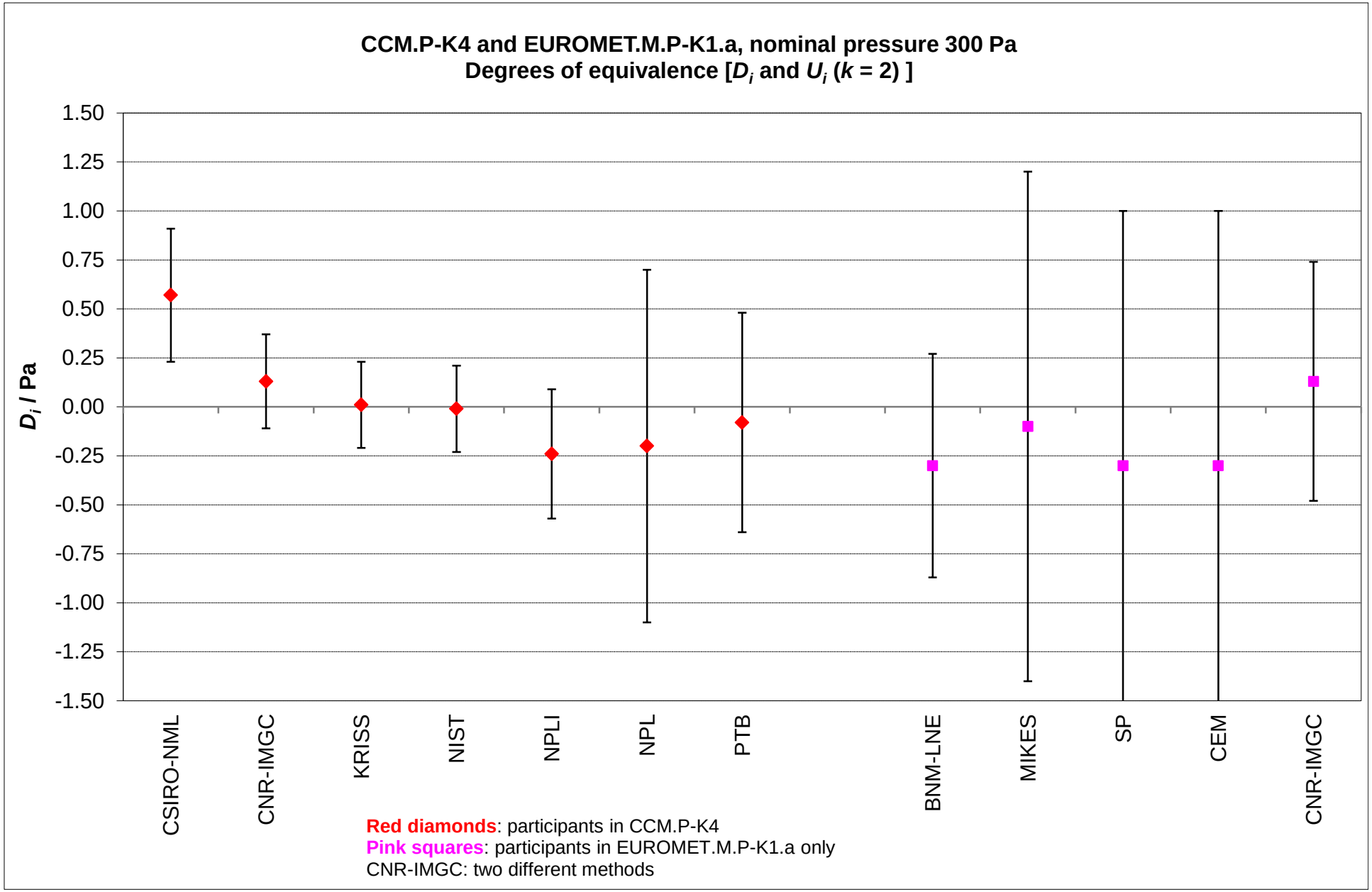

CCM.P-K4, EUROMET.M.P-K1.b, SIM-EUROMET.M.P.BK3, and EUROMET.M.P-K1.a, pressure ~ 1 Pa
Degrees of equivalence [D_i and U_i (k = 2)]
$D_{CSIRO-NML}$ = 0.21 Pa
$U_{CSIRO-NML}$ = 0.05 Pa
U_{OMH} = 0.082 Pa
D_i / Pa
0.040
0.030
0.020
0.010
0.000
-0.010
-0.020
CSIRO-NML
CNR-IMGC
NIST
NPLI
NPL
PTB
BNM-LNE
MIRS/IMT
CEM
UME
CENAM
BNM-LNE
MIKES
SP
CEM
OMH
UME
NMi-VSL
Red diamonds: participants in CCM.P-K4
Green triangles: participants in EUROMET.M.P-K1.b only
Blue circle: participant in SIM-EUROMET.M.P-BK3 only
Pink squares: participants in EUROMET.M.P-K1.a only

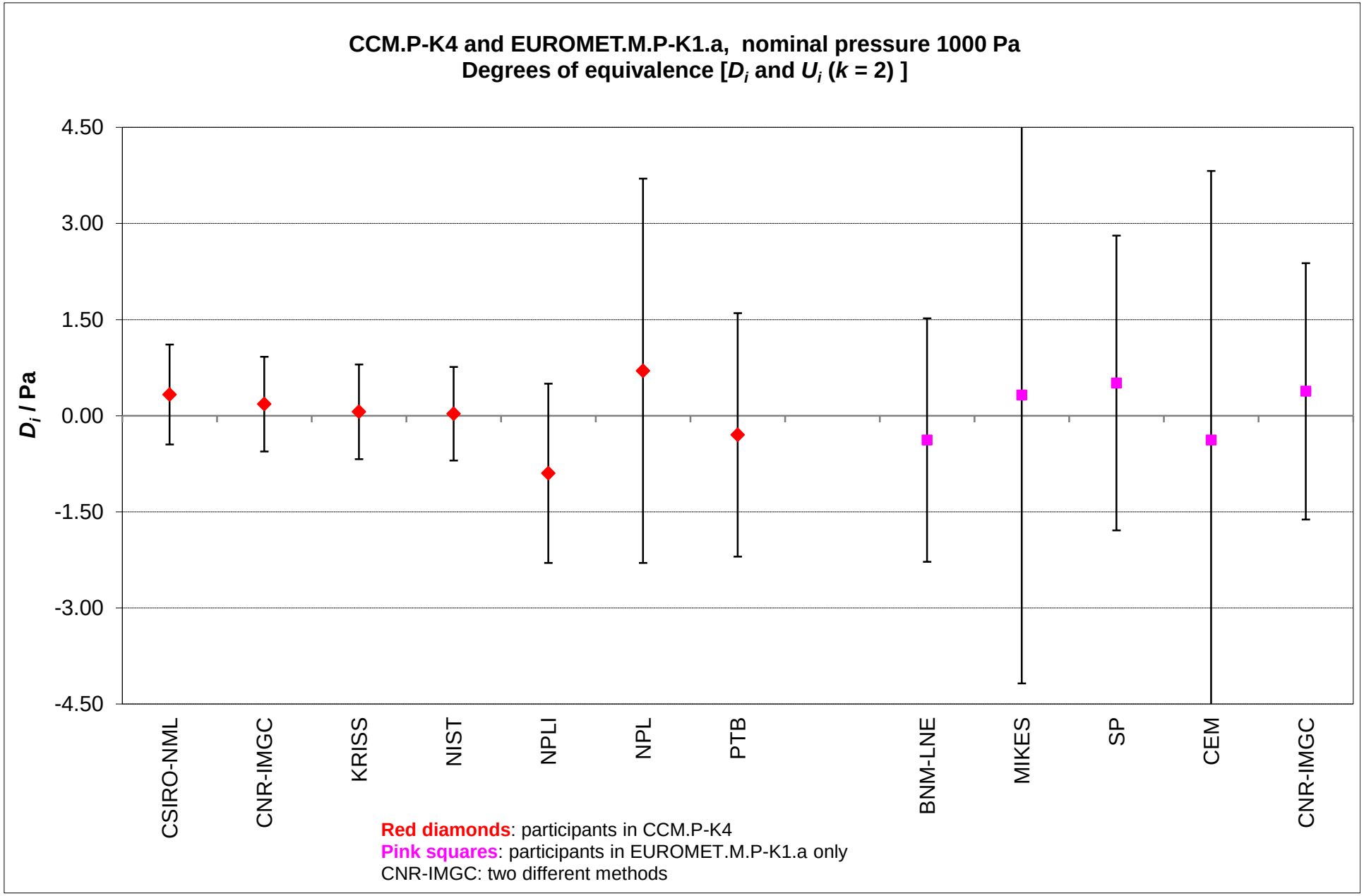

CCM.P-K4, EUROMET.M.P-K1.a, and EURAMET.M.P-K4.2010, nominal pressure 3 Pa
Degrees of equivalence [D_i and U_i (k = 2)]
$D_{CSIRO-NML}$ = 0.30 Pa
$U_{CSIRO-NML}$ = 0.05 Pa
U_{OMH} = 0.23 Pa
D_i / Pa
0.10
0.08
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
-0.08
-0.10
CSIRO-NML
CNR-IMGC
NIST
NPLI
NPL
PTB
BNM-LNE
MIKES
SP
CEM
OMH
UME
NMi-VSL
CMI
INRIM
LNE
MIKES
Red diamonds: participants in CCM.P-K4
Pink squares: participants in EUROMET.M.P-K1.a
Blue triangles: participants in EURAMET.M.P-K4.2010


CCM.P-K4, EUROMET.M.P-K1.a, and EURAMET.M.P-K4.2010, nominal pressure 10 Pa
Degrees of equivalence [D_i and U_i (k = 2)]
$D_{CSIRO-NML}$ = 0.57 Pa
$U_{CSIRO-NML}$ = 0.10 Pa
D_{OMH} = -0.40 Pa
U_{OMH} = 0.92 Pa
D_i / Pa
0.13
0.10
0.08
0.05
0.03
0.00
-0.03
-0.05
-0.08
-0.10
-0.13
CSIRO-NML
CNR-IMGC
KRISS
NIST
NPLI
NPL
PTB
BNM-LNE
MIKES
SP
CEM
OMH
UME
NMi-VSL
CMI
INRIM
LNE
MIKES
Red diamonds: participants in CCM.P-K4
Pink squares: participants in EUROMET.M.P-K1.a
Blue triangles: participants in EURAMET.M.P-K4.2010


CCM.P-K4, EUROMET.M.P-K1.a, and EURAMET.M.P-K4.2010, nominal pressure 30 Pa
Degrees of equivalence [D_i and U_i (k = 2)]
$D_{CSIRO-NML}$ = 0.91 Pa
$U_{CSIRO-NML}$ = 0.15 Pa
D_{OMH} = 2.0 Pa
U_{OMH} = 3.2 Pa
D_i / Pa
0.40
0.30
0.20
0.10
0.00
-0.10
-0.20
-0.30
-0.40
CSIRO-NML
CNR-IMGC
KRISS
NIST
NPLI
NPL
PTB
BNM-LNE
MIKES
SP
CEM
OMH
UME
NMi-VSL
CMI
INRIM
LNE
MIKES
Red diamonds: participants in CCM.P-K4
Pink squares: participants in EUROMET.M.P-K1.a
Blue triangles: participants in EURAMET.M.P-K4.2010


CCM.P-K4 and EUROMET.M.P-K1.a, nominal pressure 100 Pa
Degrees of equivalence [D_i and U_i (k = 2)]
D_{OMH} = 2.5 Pa
U_{OMH} = 3.1 Pa
D_i / Pa
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
CSIRO-NML
CNR-IMGC
KRISS
NIST
NPLI
NPL
PTB
BNM-LNE
MIKES
SP
CEM
OMH
UME
NMi-VSL
CNR-IMGC
Red diamonds: participants in CCM.P-K4
Pink squares: participants in EUROMET.M.P-K1.a only
CNR-IMGC: two different methods


CCM.P-K4 and EUROMET.M.P-K1.a, nominal pressure 300 Pa
Degrees of equivalence [D_i and U_i (k = 2)]
D_i / Pa
1.50
1.25
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
-1.25
-1.50
CSIRO-NML
CNR-IMGC
KRISS
NIST
NPLI
NPL
PTB
BNM-LNE
MIKES
SP
CEM
CNR-IMGC
Red diamonds: participants in CCM.P-K4
Pink squares: participants in EUROMET.M.P-K1.a only
CNR-IMGC: two different methods


CCM.P-K4 and EUROMET.M.P-K1.a, nominal pressure 1000 Pa
Degrees of equivalence [D_i and U_i (k = 2)]
D_i / Pa
4.50
3.00
1.50
0.00
-1.50
-3.00
-4.50
CSIRO-NML
CNR-IMGC
KRISS
NIST
NPLI
NPL
PTB
BNM-LNE
MIKES
SP
CEM
CNR-IMGC
Red diamonds: participants in CCM.P-K4
Pink squares: participants in EUROMET.M.P-K1.a only
CNR-IMGC: two different methods