Key comparison CCM.FF-K4.1.2011

MEASURAND: Water volume
NOMINAL VALUE: 20 L
TRANFERT INSTRUMENTS: Two pipettes, serial numbers TS 710-04 and TS 710-05

x $_i$**: volume measured by laboratory** *i*
u $_i$**: standard uncertainty of** ***x*** $_i$

Pipette	TS 710-04		TS 710-05	
Lab *i*	***x*** $_i$ **/ mL**	***u*** $_i$ **/ mL**	***x*** $_i$ **/ mL**	***u*** $_i$ **/ mL**
CENAM	19 990.75	0.40	19 993.50	0.40
NIST	19 990.92	0.58	19 993.39	0.58
IPQ	19 990.69	0.85	19 992.97	0.69
VSL	19 990.53	0.34	19 993.25	0.34
SP	19 990.62	0.25	19 993.45	0.25
INRIM	19 990.73	0.19	19 993.55	0.19
NIM	19 990.45	0.30	19 993.14	0.30
INMETRO	19 991.05	0.20	19 993.81	0.20

Key comparison CCM.FF-K4.1.2011

MEASURAND: Water volume
NOMINAL VALUE: 100 mL
TRANFERT INSTRUMENTS: Three glass pycnometers, serial numbers TS 03.01.12, TS 03.01.16 and TS 03.01.17

x_i: volume measured by laboratory i
u_i: standard uncertainty of x_i

Pycnometer	TS 03.01.12		TS 03.01.16		TS 03.01.17	
Lab i	x_i / mL	u_i / mL	x_i / mL	u_i / mL	x_i / mL	u_i / mL
CENAM	99.642 0	0.001 3	103.090 8	0.001 3	100.596 8	0.001 3
IPQ	99.643 8	0.000 77	103.092 0	0.000 8	100.597 3	0.000 8
VSL	99.643 9	0.001 9	103.091 9	0.001 9	100.595 4	0.001 9
SP	99.644 7	0.001 5	103.094 0	0.001 5	100.597 5	0.001 7
INRIM	99.643 6	0.000 83	103.092 1	0.000 83	100.595 7	0.000 83
NIM	99.639 1	0.001 4	103.091 1	0.001 1	100.593 8	0.001 7
INMETRO	99.643 3	0.000 48	103.091 9	0.000 46	100.595 5	0.000 44

Key comparison CCM.FF-K4.1.2011

MEASURAND: Water volume
NOMINAL VALUE: 20 L
TRANFERT INSTRUMENTS: Two pipettes, serial numbers TS 710-04 and TS 710-05

NOMINAL VALUE: 100 mL
TRANFERT INSTRUMENTS: Three glass pycnometers, serial numbers TS 03.01.12, TS 03.01.16 and TS 03.01.17

The key comparison reference values are basically obtained from the weighted means of the results, including a consistency check, as explained on page 9 of the Final Report.
They are denoted x_R in the following table. Their standard uncertainties are denoted u_R.

Pipette	TS 710-04	TS 710-05
x_R / mL	19 990.75	19 993.53
u_R / mL	0.10	0.096

Pycnometer	TS 03.01.12	TS 03.01.16	TS 03.01.17
x_R / mL	99.643 22	103.091 91	100.595 89
u_R / mL	0.000 33	0.000 32	0.000 32

For each pipette and each pycnometer, the degree of equivalence of laboratory *i* with respect to the key comparison reference value is computed as indicated in the headings of Tables 14 to 18. They are expressed in relative terms.

Pair-wise degrees of equivalence are available from Section 9 of the Final Report.

Key comparison CCM.FF-K4.1.2011

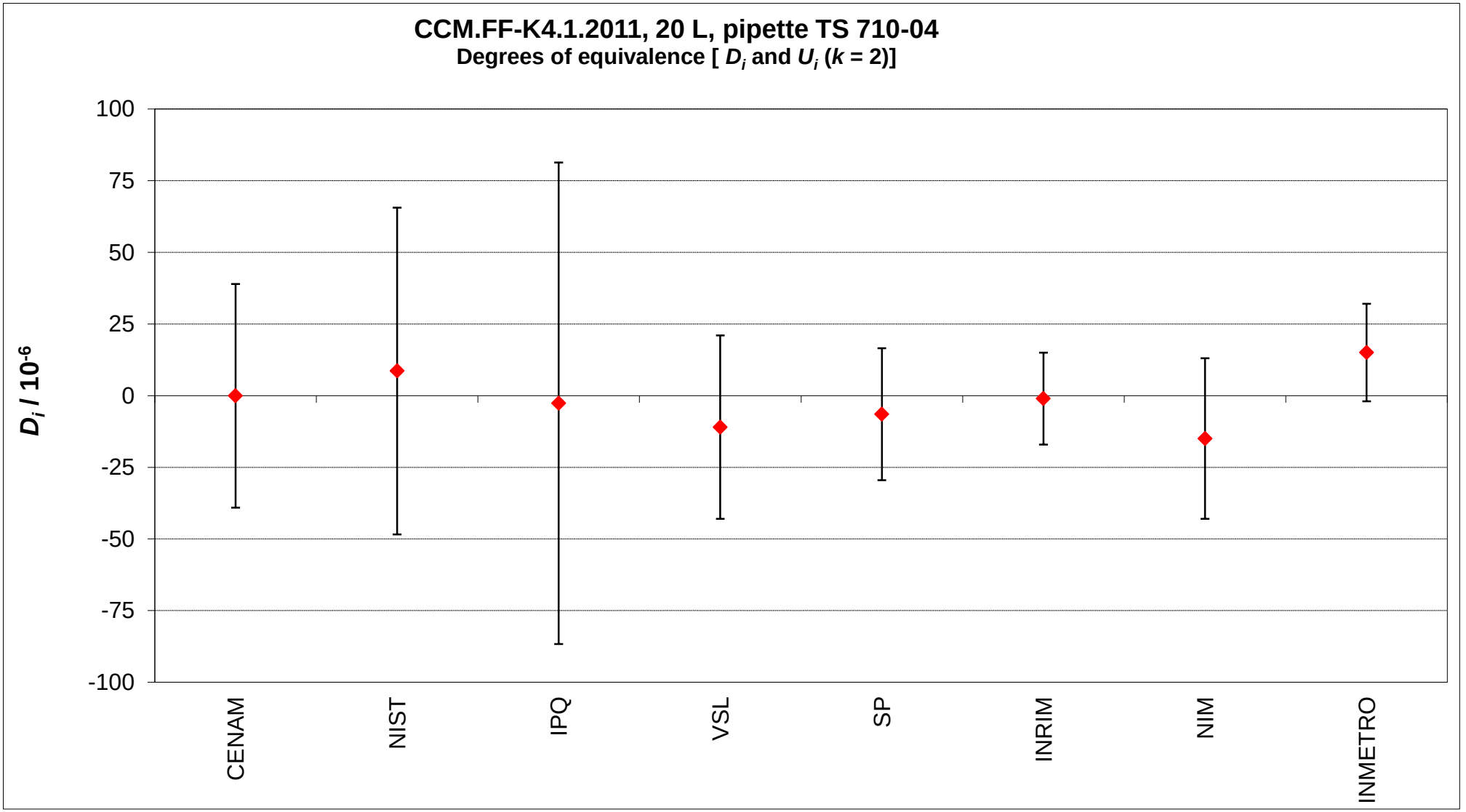
Degrees of equivalence relative to the key comparison reference values

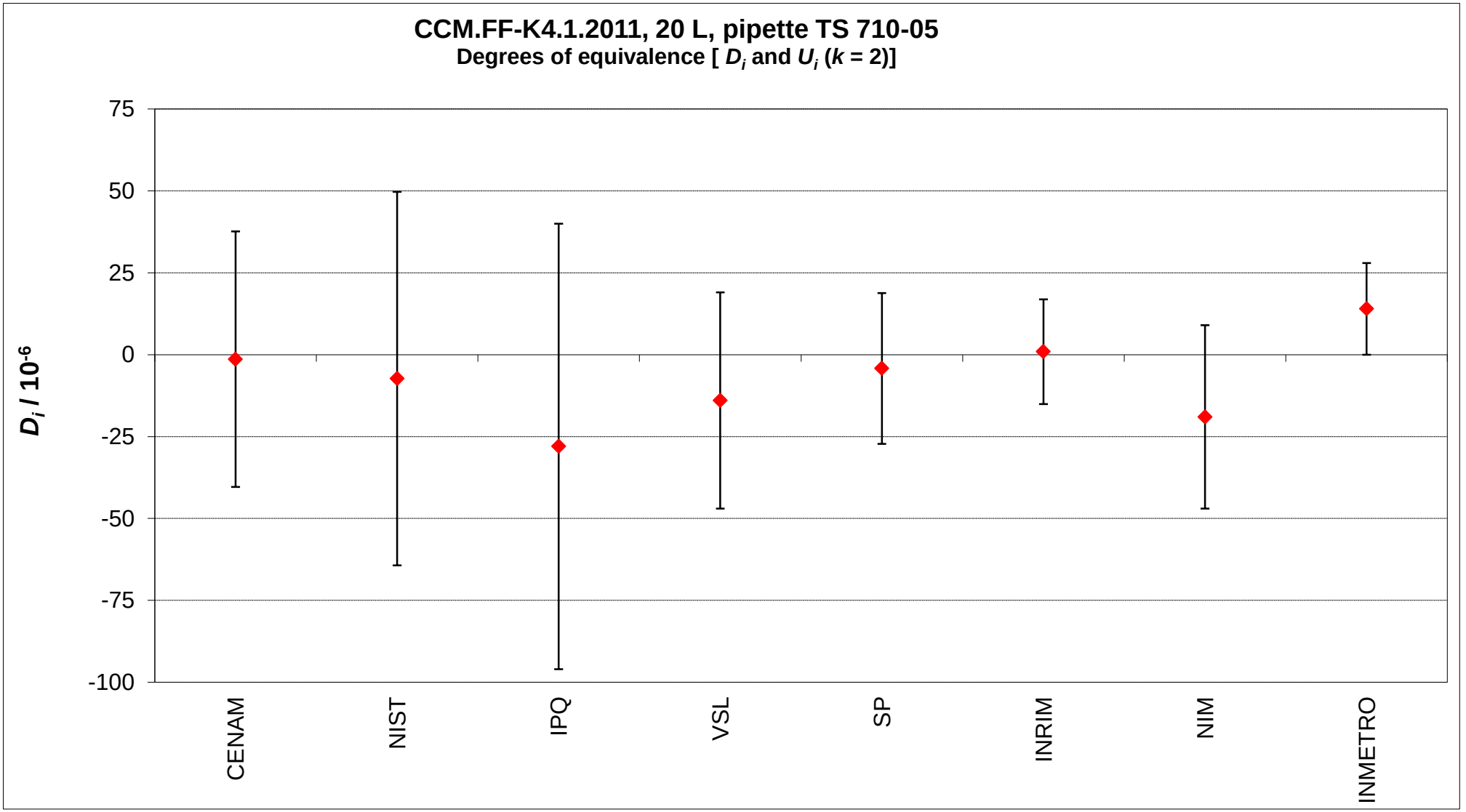
MEASURAND: Water volume
NOMINAL VALUE: 20 L
TRANFERT INSTRUMENTS: Two pipettes, serial numbers TS 710-04 and TS 710-05

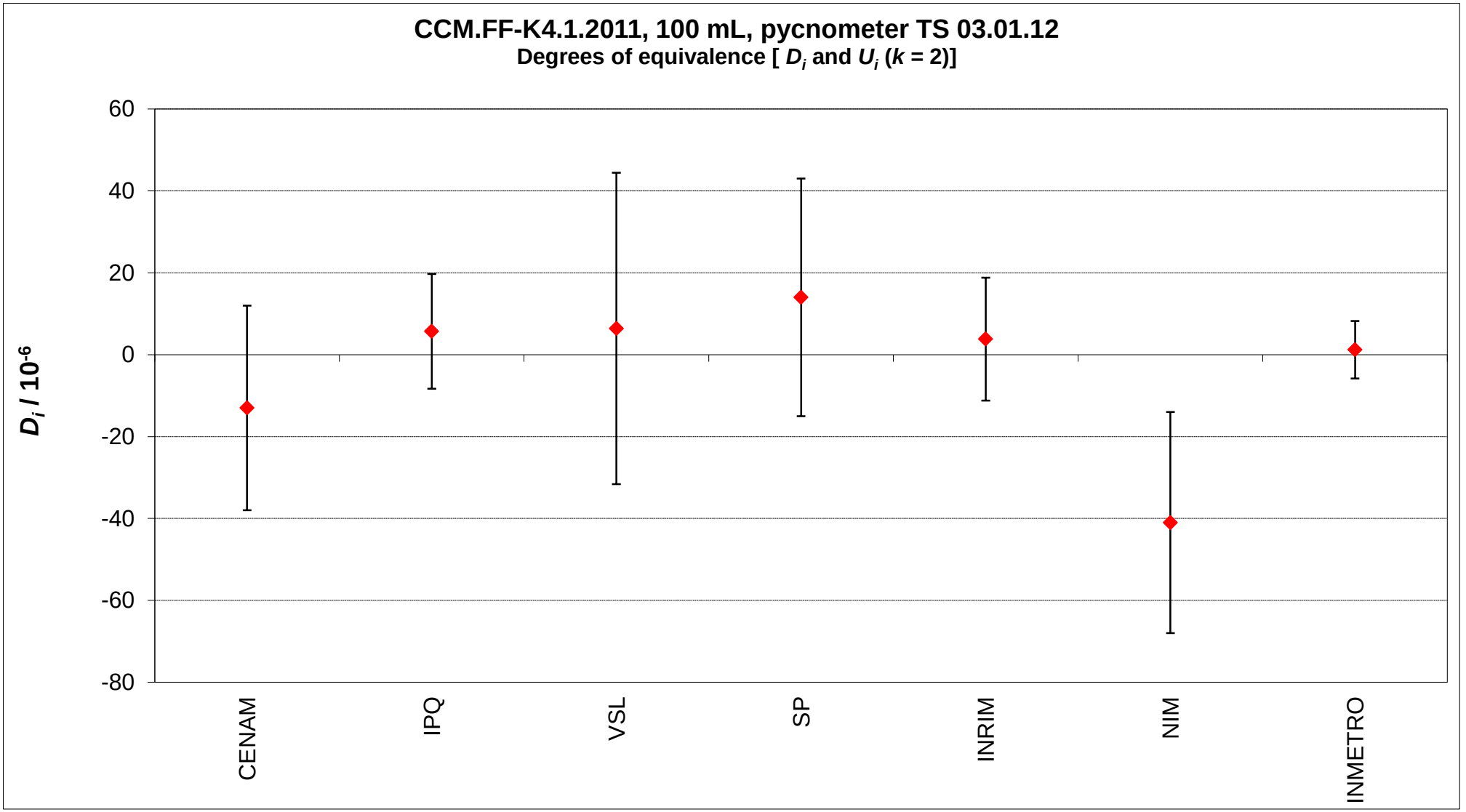
Pipette	TS 710-04		TS 710-05	
Lab *i*	D_i / 10^{-6}	U_i / 10^{-6}	D_i / 10^{-6}	U_i / 10^{-6}
CENAM	**-0.08**	39	**-1.4**	39
NIST	**8.6**	57	**-7.3**	57
IPQ	**-2.7**	84	**-28**	68
VSL	**-11**	32	**-14**	33
SP	**-6.5**	23	**-4.2**	23
INRIM	**-1.05**	16	**0.9**	16
NIM	**-15**	28	**-19**	28
INMETRO	**15**	17	**14**	14

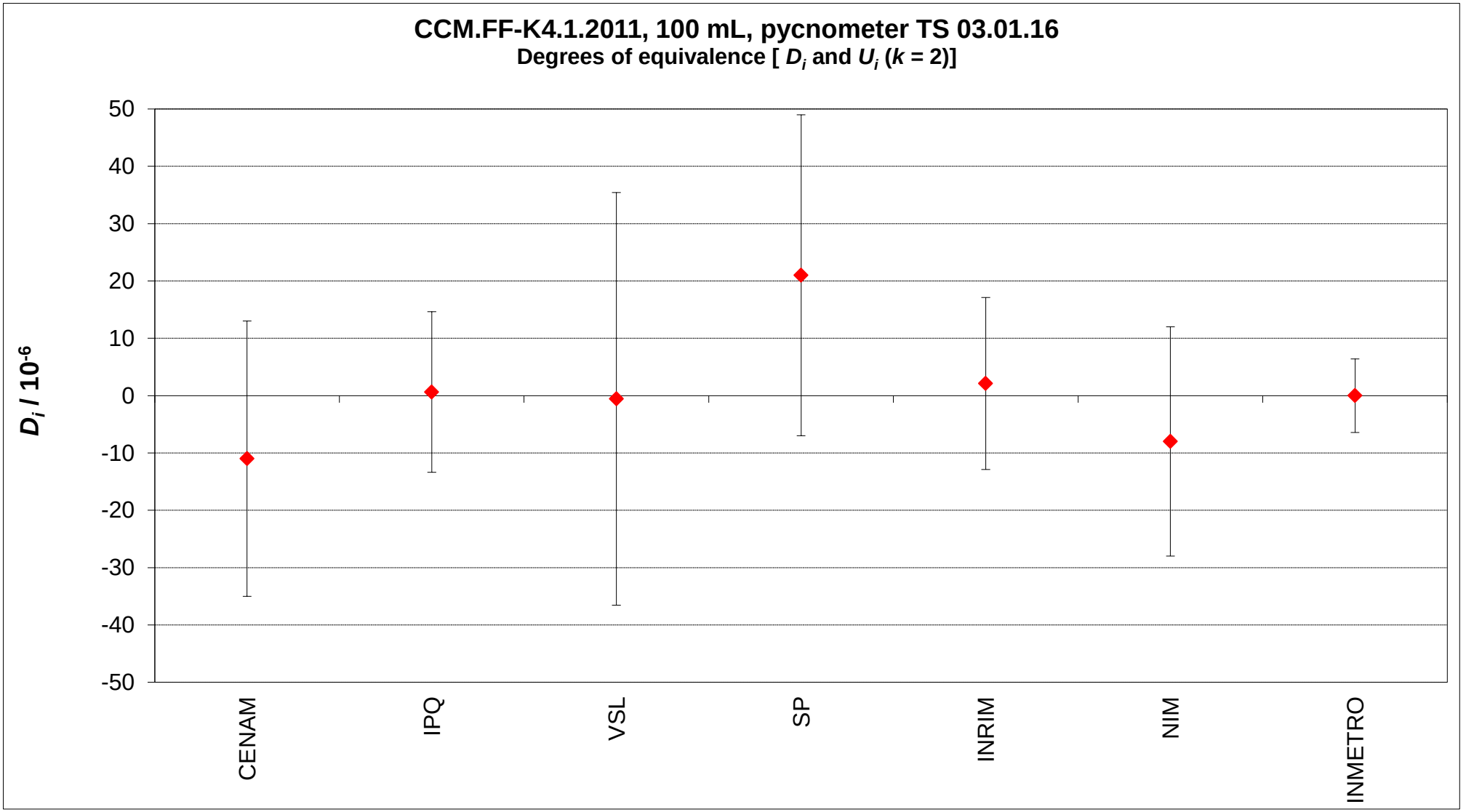
NOMINAL VALUE: 100 mL
TRANFERT INSTRUMENTS: Three glass pycnometers, serial numbers TS 03.01.12, TS 03.01.16 and TS 03.01.17

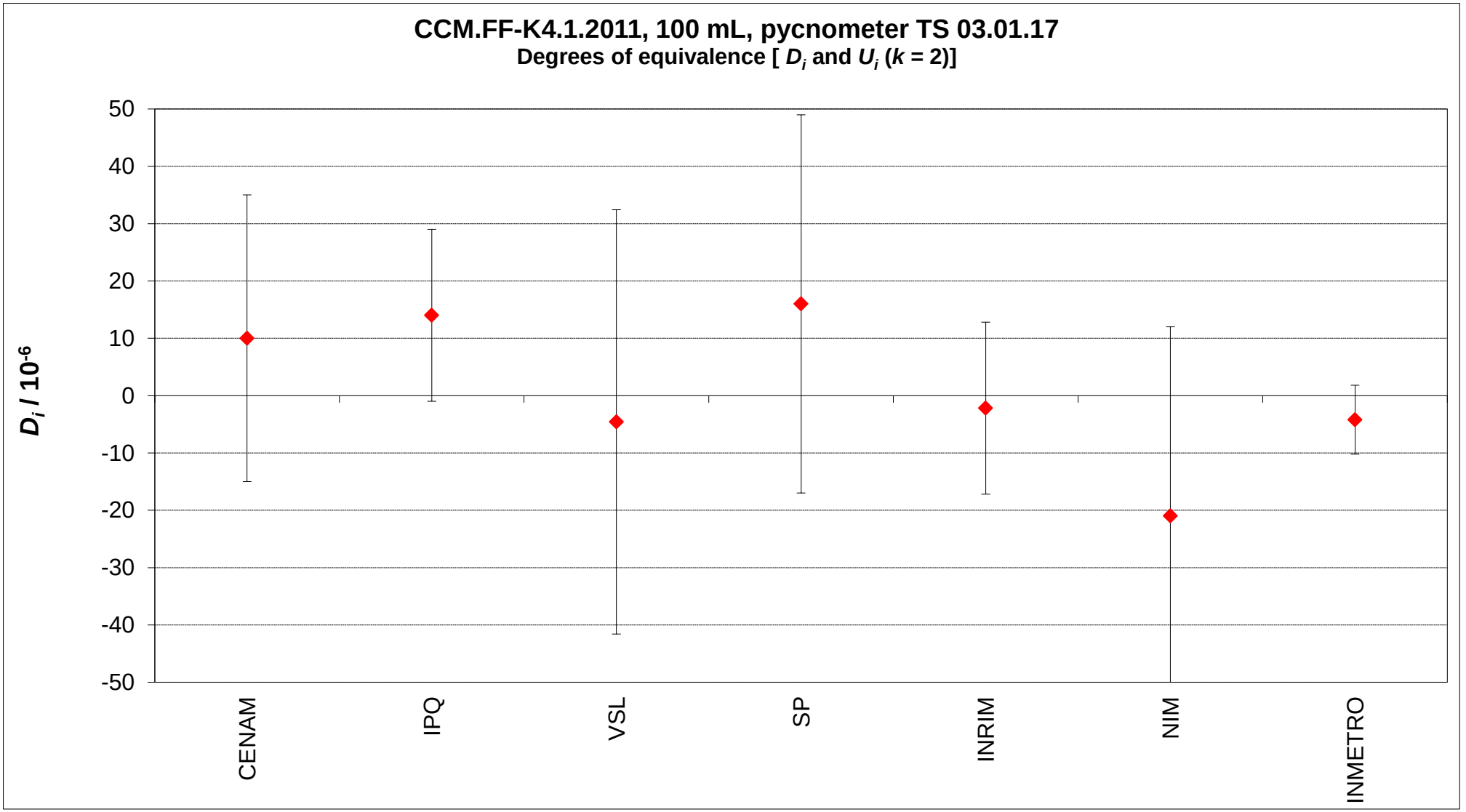
Pycnometer	TS 03.01.12		TS 03.01.16		TS 03.01.17	
Lab *i*	D_i / 10^{-6}	U_i / 10^{-6}	D_i / 10^{-6}	U_i / 10^{-6}	D_i / 10^{-6}	U_i / 10^{-6}
CENAM	**-13**	25	**-11**	24	**10**	25
IPQ	**5.7**	14	**0.63**	14	**14**	15
VSL	**6.4**	38	**-0.57**	36	**-4.6**	37
SP	**14**	29	**21**	28	**16**	33
INRIM	**3.8**	15	**2.1**	15	**-2.2**	15
NIM	**-41**	27	**-8.0**	20	**-21**	33
INMETRO	**1.2**	7.0	**-0.01**	6.4	**-4.2**	6


CCM.FF-K4.1.2011, 20 L, pipette TS 710-04
Degrees of equivalence [D_i and U_i (k = 2)]
D_i / 10^{-6}
100
75
50
25
0
-25
-50
-75
-100
CENAM
NIST
IPQ
VSL
SP
INRIM
NIM
INMETRO


CCM.FF-K4.1.2011, 20 L, pipette TS 710-05
Degrees of equivalence [D_i and U_i (k = 2)]
D_i / 10^{-6}
75
50
25
0
-25
-50
-75
-100
CENAM
NIST
IPQ
VSL
SP
INRIM
NIM
INMETRO


CCM.FF-K4.1.2011, 100 mL, pycnometer TS 03.01.12
Degrees of equivalence [D_i and U_i (k = 2)]
D_i / 10^{-6}
60
40
20
0
-20
-40
-60
-80
CENAM
IPQ
VSL
SP
INRIM
NIM
INMETRO


CCM.FF-K4.1.2011, 100 mL, pycnometer TS 03.01.16
Degrees of equivalence [D_i and U_i (k = 2)]
D_i / 10^{-6}
50
40
30
20
10
0
-10
-20
-30
-40
-50
CENAM
IPQ
VSL
SP
INRIM
NIM
INMETRO


CCM.FF-K4.1.2011, 100 mL, pycnometer TS 03.01.17
Degrees of equivalence [D_i and U_i (k = 2)]
D_i / 10^{-6}
50
40
30
20
10
0
-10
-20
-30
-40
-50
CENAM
IPQ
VSL
SP
INRIM
NIM
INMETRO