

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance ratio, W , at nominal temperature

NOMINAL TEMPERATURE: Near 13.8033 K, the triple point of spin-equilibrated hydrogen on the International Temperature Scale of 1990 (ITS-90)

W_i : dimensionless resistance ratio of thermometer from laboratory i

s/n : serial number of thermometer from laboratory i

u_i : combined standard uncertainty of measurement made using thermometer from laboratory i

Key comparison CCT-K2

Measurements were performed in two separate groups: **Group A** and **Group B**

Lab i Group A	CSPRT s/n	W_i	u_i / mK
LNE-INM	1886904	0.001 304 310	2.08
INRIM	1857277	0.001 191 521	0.16
NIST	1774095	0.001 348 515	0.17
NPL	213865	0.001 236 821	0.21
NRC	1872174	0.001 239 948	0.23

Lab i Group B	CSPRT s/n	W_i	u_i / mK
LNE-INM	1041	0.001 251 264	2.08
INRIM	1860951	0.001 215 793	0.16
NIST	1774092	0.001 165 881	0.17
NPL	1728839	0.001 351 002	0.18
NRC	1872174	0.001 240 055	0.23
PTB	1842379	0.001 186 724	0.22

Key comparison CCT-K2.1

Lab i	CSPRT s/n	W_i	u_i / mK
NRC	1872174	0.001 240 071	0.23
VNIIFTRI	356	0.001 416 012	0.64

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Key comparison CCT-K2.3

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1820627	0.001 177 949	0.20
VSL	1820627	0.001 177 856	0.11
NRC	1599	0.001 328 735	0.20
VSL	1599	0.001 328 760	0.11

Key comparison CCT-K2.4

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1866334	0.001 214 808	0.20
INTiBS	1866334	0.001 214 964	0.32
LNE-INM	1866334	0.001 214 793	0.37

Key comparison CCT-K2.5

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NMIJ	RS954-7	0.001 494 404	0.076
NMIJ	RS85A-6	0.001 230 288	0.076
NMIJ	1860951	0.001 215 825	0.096
INRIM	1860951	0.001 215 819	0.083
NRC	RS954-7	0.001 494 463	0.20
NRC	RS85A-6	0.001 230 289	0.20

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance Ratio, W , at nominal temperature

NOMINAL TEMPERATURE: All temperatures

Key comparison CCT-K2

Key comparison reference value: there is no single reference value for this comparison.

Measurements are performed in two separate Groups (**Group A** and **Group B**) that are evaluated separately. Resistance ratios are used with calibration equations for each thermometer to obtain temperature T_i .

For each group, the key comparison reference temperature, T_R , is the weighted average temperature calculated using the experimental variances to set the weights. They have zero uncertainty by definition.

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of terms:

$D_i = (T_i - T_R)$ and U_i , its expanded uncertainty (at 95% confidence level), both expressed in mK.

When required, the degree of equivalence between two laboratories is given by a pair of terms:

$D_{ij} = D_i - D_j = (T_i - T_R) - (T_j - T_R)$ and U_{ij} , its expanded uncertainty (95%), both expressed in mK.

Linking CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5 results to CCT-K2 results

The VNIIFTRI data obtained from CCT-K2.1, the VSL data obtained from CCT-K2.3, the INTiBS and LNE-INM data obtained from CCT-K2.4, and the NMIJ and INRIM data obtained in CCT-K2.5 are linked to CCT-K2 results via NRC, as may be seen on page 4, 5 and 6 of the CCT-K2.1 Final Report, and in Sections 3 of the CCT-K2.3, CCT-K2.4 and CCT-K2.5 Final Reports.

In CCT-K2 **Group A** and **Group B** thermometers have been analyzed separately. Degrees of equivalence of linked key comparisons are expressed with respect to the CCT-K2 key comparison reference values for Groups A and B.

No pair-wise degrees of equivalence are reported here.

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance Ratio, W , at nominal temperature
 NOMINAL TEMPERATURE: Near 13.8033 K, the triple point of spin-equilibrated hydrogen on the International Temperature Scale of 1990 (ITS-90)

Degrees of equivalence relative to the CCT-K2 key comparison reference values

Lab i ↓

	CSPRT s/n	D_i / mK	U_i / mK
Group A			
LNE-INM	1886904	-2.71	4.16
INRIM	1857277	-0.32	0.32
NIST	1774095	0.42	0.34
NPL	213865	0.07	0.42
NRC	1872174	-0.26	0.46
VNIIFTRI	356	-1.42	1.39
VSL	1820627	-0.12	0.63
VSL	1599	0.37	0.63
INTiBS	1866334	0.83	0.84
LNE-INM	1866334	0.12	0.92
NMIJ	RS954-7	0.03	0.61
NMIJ	RS85A-6	0.18	0.61
INRIM	1860951	0.04	0.66

Lab i ↓

	CSPRT s/n	D_i / mK	U_i / mK
Group B			
LNE-INM	1041	-2.60	4.16
INRIM	1860951	-0.17	0.32
NIST	1774092	0.42	0.34
NPL	1728839	-0.05	0.36
NRC	1872174	-0.27	0.46
PTB	1842379	-0.02	0.44
VNIIFTRI	356	-1.43	1.39
VSL	1820627	-0.13	0.63
VSL	1599	0.36	0.63
INTiBS	1866334	0.82	0.84
LNE-INM	1866334	0.11	0.92
NMIJ	RS954-7	0.02	0.61
NMIJ	RS85A-6	0.17	0.61
INRIM	1860951	0.03	0.66

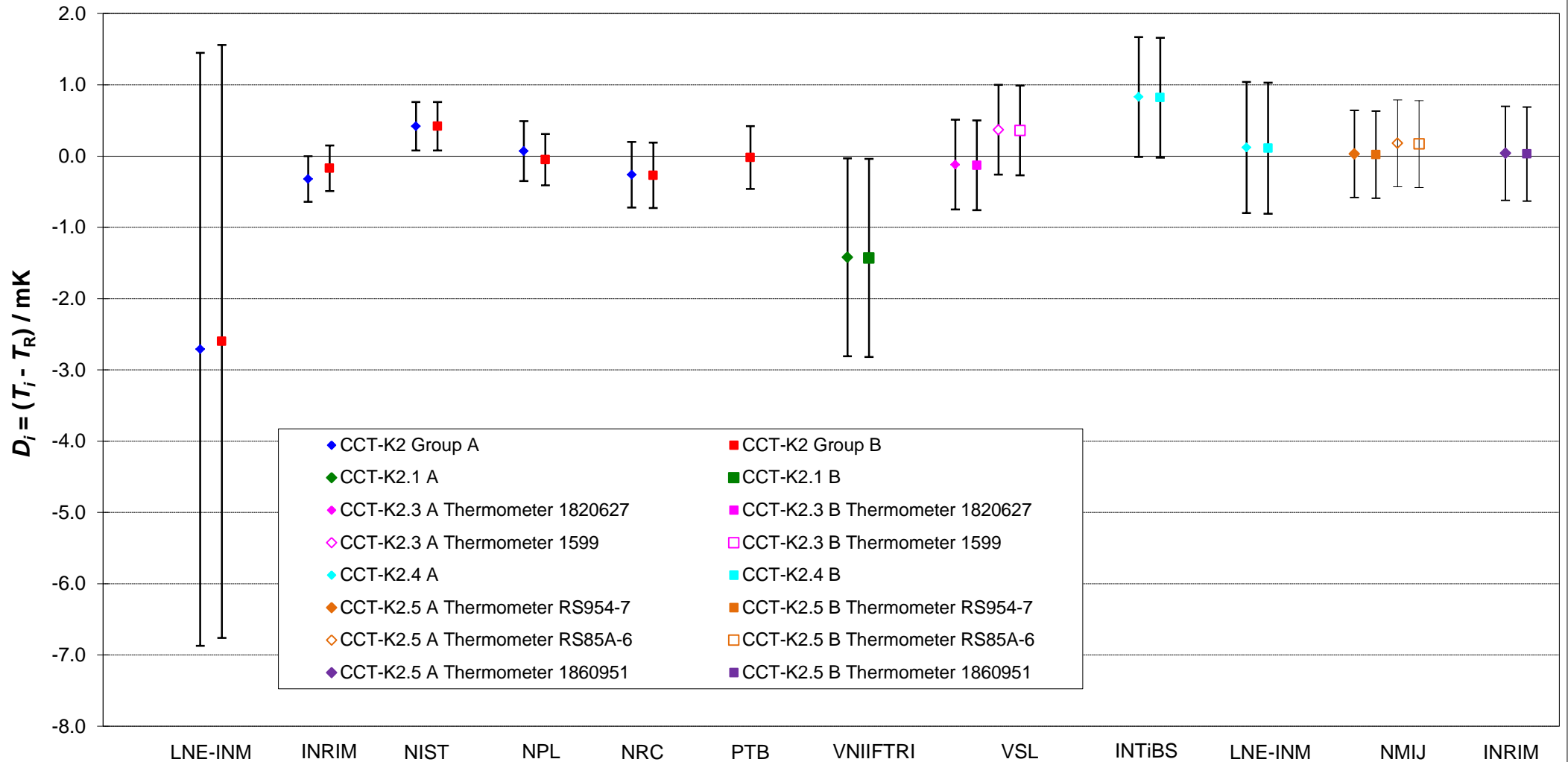
VNIIFTRI participant in CCT-K2.1

VSL participant in CCT-K2.3

INTiBS and LNE-INM participants in CCT-K2.4

NMIJ and INRIM participants in CCT-K2.5

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5 - CSPRT at nominal temperature near 13.8033 K (triple point of spin-equilibrated hydrogen on ITS-90)
Degrees of equivalence [D_i and U_i (expanded uncertainty at the 95% confidence level)]



In CCT-K2 Group A and Group B thermometers have been analyzed separately. Degrees of equivalence of linked key comparisons are expressed with respect to the CCT-K2 key comparison reference values for Groups A and B.

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance ratio, W , at nominal temperature

NOMINAL TEMPERATURE: Near 17.035 K, a defining fixed point
on the International Temperature Scale of 1990 (ITS-90)

W_i : dimensionless resistance ratio of thermometer from laboratory i

s/n: serial number of thermometer from laboratory i

u_i : combined standard uncertainty of measurement made using thermometer from laboratory i

Key comparison CCT-K2 Measurements were performed in two separate groups: **Group A** and **Group B**

Lab i	CSPRT s/n	W_i	u_i / mK
Group A			
NIST	1774095	0.002 465 229	0.15
NPL	213865	0.002 347 708	0.25
NRC	1872174	0.002 351 472	0.23

Lab i	CSPRT s/n	W_i	u_i / mK
Group B			
NIST	1774092	0.002 272 922	0.15
NPL	1728839	0.002 469 357	0.23
NRC	1872174	0.002 351 418	0.23
PTB	1842379	0.002 294 680	0.30

Key comparison CCT-K2.1

Lab i	CSPRT s/n	W_i	u_i / mK
NRC	1872174	0.002 351 718	0.59
VNIIFTRI	356	0.002 538 391	0.65

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Key comparison CCT-K2.3

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1820627	0.002 285 292	0.58
VSL	1820627	0.002 264 738	0.22
NRC	1599	0.002 443 054	0.58
VSL	1599	0.002 422 565	0.22

Key comparison CCT-K2.4

No data taken at this nominal temperature

Key comparison CCT-K2.5

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NMIJ	RS954-7	0.002 619 112	0.494
NMIJ	RS85A-6	0.002 349 788	0.494
NMIJ	1860951	0.002 329 254	0.494
NRC	RS954-7	0.002 618 025	0.58
NRC	RS85A-6	0.002 348 643	0.58

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance Ratio, W , at nominal temperature
 NOMINAL TEMPERATURE: Near 17.035 K, a defining fixed point
 on the International Temperature Scale of 1990 (ITS-90)

Degrees of equivalence relative to the CCT-K2 key comparison reference values

Lab i ↓

Group A	CSPRT s/n	D_i / mK	U_i / mK
NIST	1774095	-0.01	0.30
NPL	213865	0.06	0.50
NRC	1872174	0.05	0.46
VNIIFTRI	356	-0.30	1.84
VSL	1820627	-0.02	1.37
VSL	1599	-0.02	1.37
NMIJ	RS954-7	-0.25	1.63
NMIJ	RS85A-6	-0.12	1.63

Lab i ↓

Group B	CSPRT s/n	D_i / mK	U_i / mK
NIST	1774092	0.01	0.30
NPL	1728839	-0.09	0.46
NRC	1872174	0.18	0.46
PTB	1842379	0.21	0.60
VNIIFTRI	356	-0.19	1.84
VSL	1820627	0.09	1.37
VSL	1599	0.10	1.37
NMIJ	RS954-7	-0.14	1.63
NMIJ	RS85A-6	-0.01	1.63

VNIIFTRI participant in CCT-K2.1

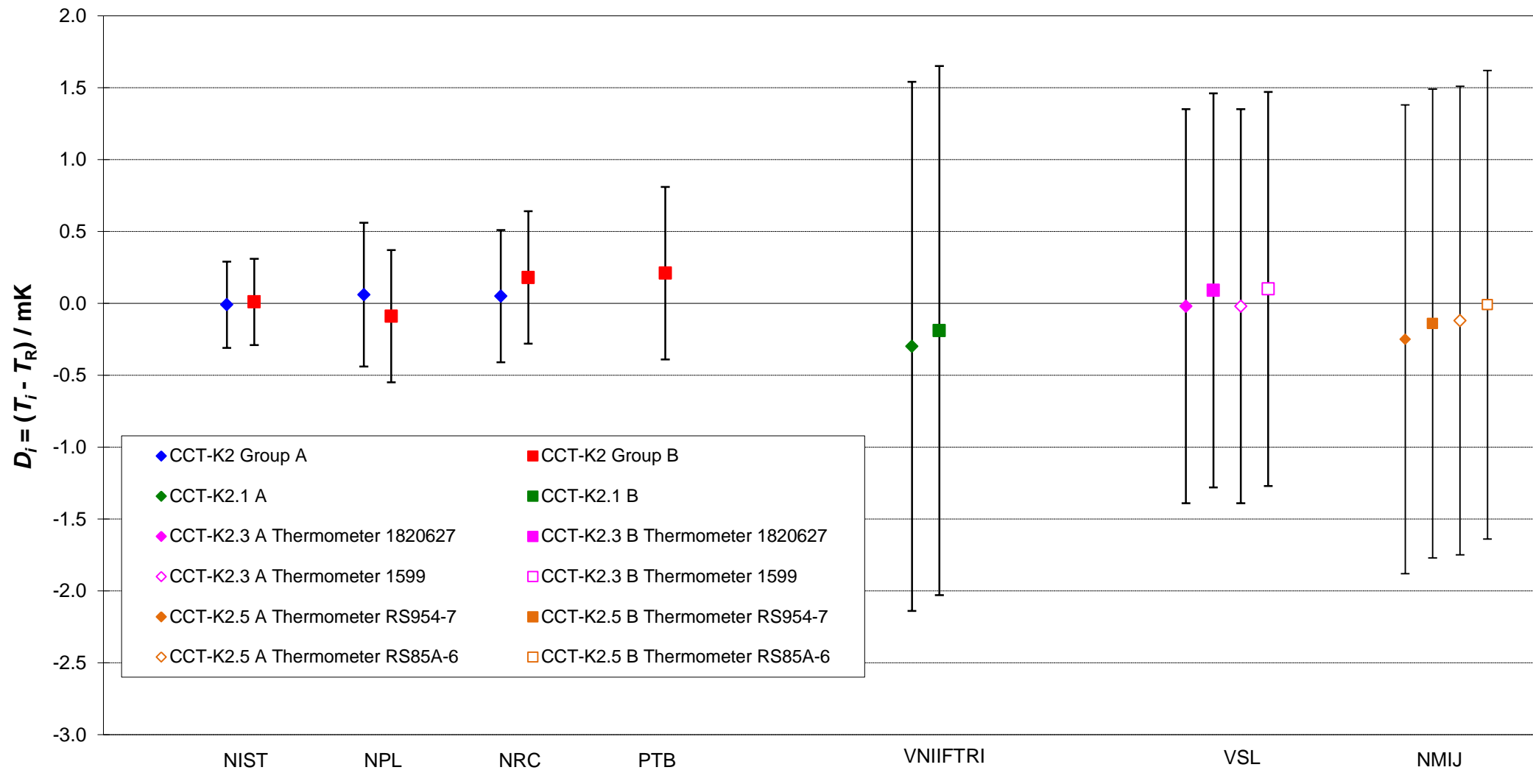
VSL participant in CCT-K2.3

NMIJ participant in CCT-K2.5

No data taken in CCT-K2.4 at this nominal temperature

Italics: values that are not, strictly speaking, traceable to CCT-K2 (see the relevant Final Reports)

CCT-K2, CCT-K2.1, CCT-K2.3 and CCT-K5 - CSPRT at nominal temperature near 17.035 K
 (a defining fixed point on ITS-90)
 Degrees of equivalence [D_i and U_i (expanded uncertainty at the 95% confidence level)]



In CCT-K2 Group A and Group B thermometers have been analyzed separately. Degrees of equivalence of linked key comparisons are expressed with respect to the CCT-K2 key comparison reference values for Groups A and B.

No data taken in CCT-K2.4 at this nominal temperature

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance ratio, W , at nominal temperature

NOMINAL TEMPERATURE: Near 20.271 K, a defining fixed point
on the International Temperature Scale of 1990 (ITS-90)

W_i : dimensionless resistance ratio of thermometer from laboratory i

s/n : serial number of thermometer from laboratory i

u_i : combined standard uncertainty of measurement made using thermometer from laboratory i

Key comparison CCT-K2 Measurements were performed in two separate groups: **Group A** and **Group B**

Lab i	CSPRT s/n	W_i	u_i / mK
Group A			
NIST	1774095	0.004 412 085	0.14
NPL	213865	0.004 290 209	0.25
NRC	1872174	0.004 295 846	0.23

Lab i	CSPRT s/n	W_i	u_i / mK
Group B			
NIST	1774092	0.004 214 789	0.14
NPL	1728839	0.004 419 156	0.23
NRC	1872174	0.004 295 849	0.23
PTB	1842379	0.004 236 895	0.30

Key comparison CCT-K2.1

Lab i	CSPRT s/n	W_i	u_i / mK
NRC	1872174	0.004 297 175	0.59
VNIIFTRI	356	0.004 493 374	0.56

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Key comparison CCT-K2.3

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1820627	0.004 228 150	0.58
VSL	1820627	0.004 236 683	0.22
NRC	1599	0.004 389 311	0.58
VSL	1599	0.004 398 058	0.22

Key comparison CCT-K2.4

No data taken at this nominal temperature

Key comparison CCT-K2.5

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NMIJ	RS954-7	0.004 571 906	0.495
NMIJ	RS85A-6	0.004 300 012	0.495
NMIJ	1860951	0.004 277 239	0.495
NRC	RS954-7	0.004 572 228	0.58
NRC	RS85A-6	0.004 300 228	0.58

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance Ratio, W , at nominal temperature
 NOMINAL TEMPERATURE: Near 20.271 K, a defining fixed point
 on the International Temperature Scale of 1990 (ITS-90)

Degrees of equivalence relative to the CCT-K2 key comparison reference values

Lab i ↓

Group A	CSPRT s/n	D_i / mK	U_i / mK
NIST	1774095	0.00	0.28
NPL	213865	-0.06	0.50
NRC	1872174	0.06	0.46
VNIIFTRI	356	-0.33	1.72
VSL	1820627	0.03	1.37
VSL	1599	0.03	1.37
NMIJ	RS954-7	-0.40	1.63
NMIJ	RS85A-6	-0.26	1.63

Lab i ↓

Group B	CSPRT s/n	D_i / mK	U_i / mK
NIST	1774092	-0.06	0.28
NPL	1728839	0.00	0.46
NRC	1872174	0.13	0.46
PTB	1842379	0.42	0.60
VNIIFTRI	356	-0.26	1.72
VSL	1820627	0.10	1.37
VSL	1599	0.10	1.37
NMIJ	RS954-7	-0.33	1.63
NMIJ	RS85A-6	-0.19	1.63

VNIIFTRI participant in CCT-K2.1

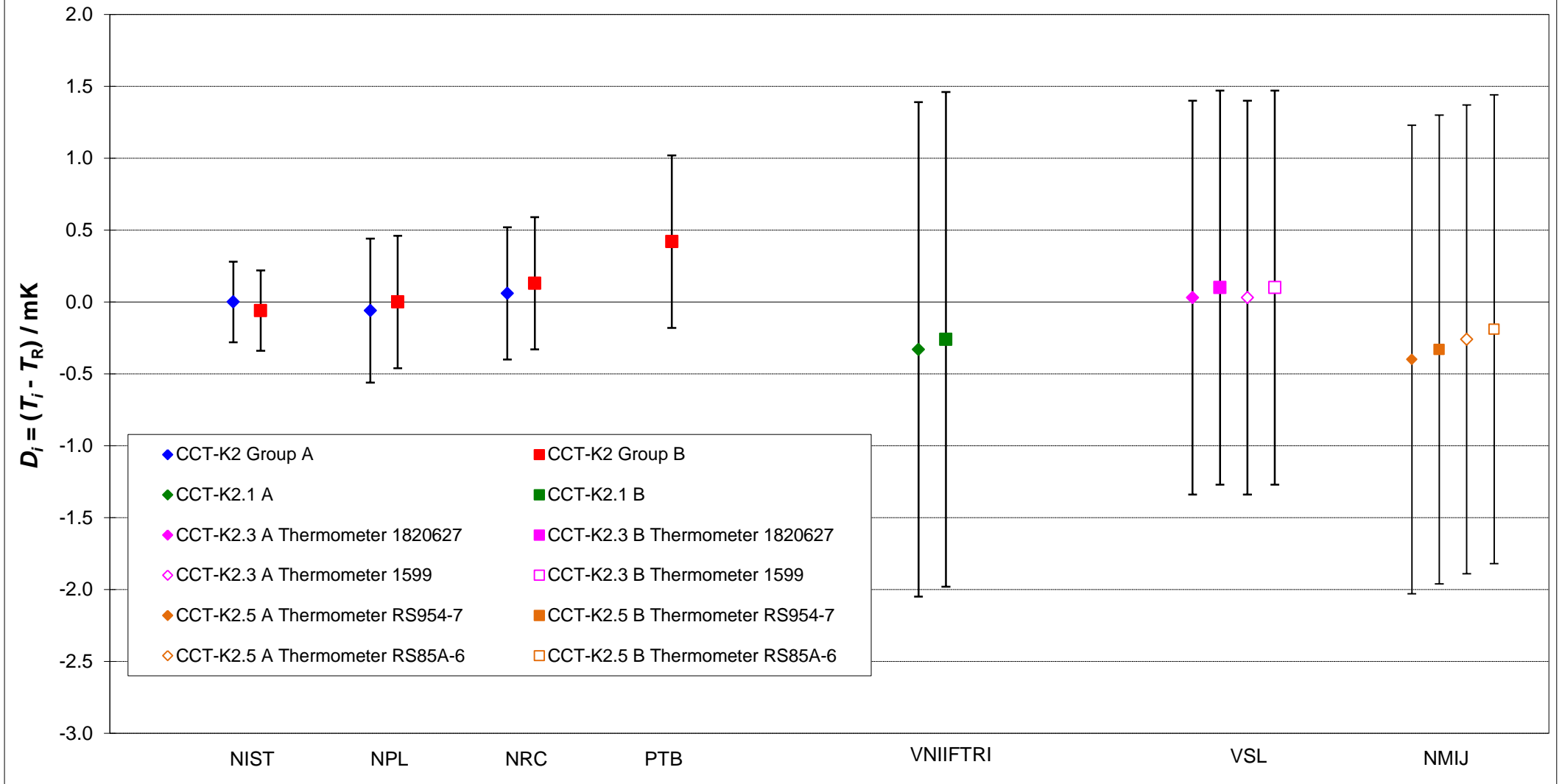
VSL participant in CCT-K2.3

NMIJ participant in CCT-K2.5

No data taken in CCT-K2.4 at this nominal temperature

Italics: values that are not, strictly speaking, traceable to CCT-K2 (see the relevant Final Reports)

CCT-K2, CCT-K2.1, CCT-K2.3 and CCT-K5 - CSPRT at nominal temperature near 20.271 K
 (a defining fixed point on ITS-90)
 Degrees of equivalence [D_i and U_i (expanded uncertainty at the 95% confidence level)]



In CCT-K2 Group A and Group B thermometers have been analyzed separately. Degrees of equivalence of linked key comparisons are expressed with respect to the CCT-K2 key comparison reference values for Groups A and B.
 No data taken in CCT-K2.4 at this nominal temperature

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance ratio, W , at nominal temperature

NOMINAL TEMPERATURE: Near 24.5561 K, the triple point of neon
on the International Temperature Scale of 1990 (ITS-90)

W_i : dimensionless resistance ratio of thermometer from laboratory i

s/n : serial number of thermometer from laboratory i

u_i : combined standard uncertainty of measurement made using thermometer from laboratory i

Key comparison CCT-K2 Measurements were performed in two separate groups: **Group A** and **Group B**

Lab i Group A	CSPRT s/n	W_i	u_i / mK
LNE-INM	1886904	0.008 581 302	0.54
INRIM	1857277	0.008 495 871	0.14
KRISS	1886906	0.008 523 028	0.20
NIST	1774095	0.008 633 474	0.16
NPL	213865	0.008 507 130	0.22
NRC	1872174	0.008 516 257	0.22

Lab i Group B	CSPRT s/n	W_i	u_i / mK
LNE-INM	1041	0.008 524 861	1.40
INRIM	1860951	0.008 500 855	0.14
KRISS	1043	0.008 511 365	0.20
NIST	1774092	0.008 430 085	0.16
NPL	1728839	0.008 452 413	0.19
NRC	1872174	0.008 513 109	0.22
PTB	1842379	0.008 452 413	0.20

Key comparison CCT-K2.1

Lab i	CSPRT s/n	W_i	u_i / mK
NRC	1872174	0.008 516 358	0.22
VNIFTRI	356	0.008 723 208	0.23

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Key comparison CCT-K2.3

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1820627	0.008 445 748	0.20
VSL	1820627	0.008 445 227	0.20
NRC	1599	0.008 607 987	0.20
VSL	1599	0.008 607 741	0.20

Key comparison CCT-K2.4

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1866334	0.008 513 452	0.20
INTiBS	1866334	0.008 513 43	0.20
LNE-INM	1866334	0.008 512 954	0.30

Key comparison CCT-K2.5

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NMIJ	RS954-7	0.008 799 967	0.142
NMIJ	RS85A-6	0.008 523 066	0.145
NMIJ	1860951	0.008 504 069	0.142
INRIM	1860951	0.008 503 849	0.055
NRC	RS954-7	0.008 800 181	0.20
NRC	RS85A-6	0.008 523 210	0.20

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance Ratio, W , at nominal temperature
 NOMINAL TEMPERATURE: Near 24.5561 K, the triple point of neon
 on the International Temperature Scale of 1990 (ITS-90)

Degrees of equivalence relative to the CCT-K2 key comparison reference values

Lab i ↓	CSPRT s/n	D_i / mK	U_i / mK
Group A			
LNE-INM	1886904	-0.02	1.08
INRIM	1857277	0.11	0.28
KRISS	1886906	0.01	0.40
NIST	1774095	-0.13	0.32
NPL	213865	-0.10	0.44
NRC	1872174	-0.06	0.44
VNIIFTRI	356	0.28	0.67
VSL	1820627	-0.65	0.66
VSL	1599	-0.43	0.66
INTiBS	1866334	-0.24	0.64
LNE-INM	1866334	-0.63	0.78
NMIJ	RS954-7	-0.40	0.60
NMIJ	RS85A-6	-0.34	0.61
INRIM	1860951	-0.52	0.68

Lab i ↓	CSPRT s/n	D_i / mK	U_i / mK
Group B			
LNE-INM	1041	-1.88	2.80
INRIM	1860951	0.11	0.28
KRISS	1043	-0.15	0.40
NIST	1774092	0.04	0.32
NPL	1728839	-0.19	0.38
NRC	1872174	-0.12	0.44
PTB	1842379	0.26	0.40
VNIIFTRI	356	0.22	0.67
VSL	1820627	-0.71	0.66
VSL	1599	-0.49	0.66
INTiBS	1866334	-0.30	0.64
LNE-INM	1866334	-0.69	0.78
NMIJ	RS954-7	-0.46	0.60
NMIJ	RS85A-6	-0.40	0.61
INRIM	1860951	-0.58	0.68

VNIIFTRI participant in CCT-K2.1

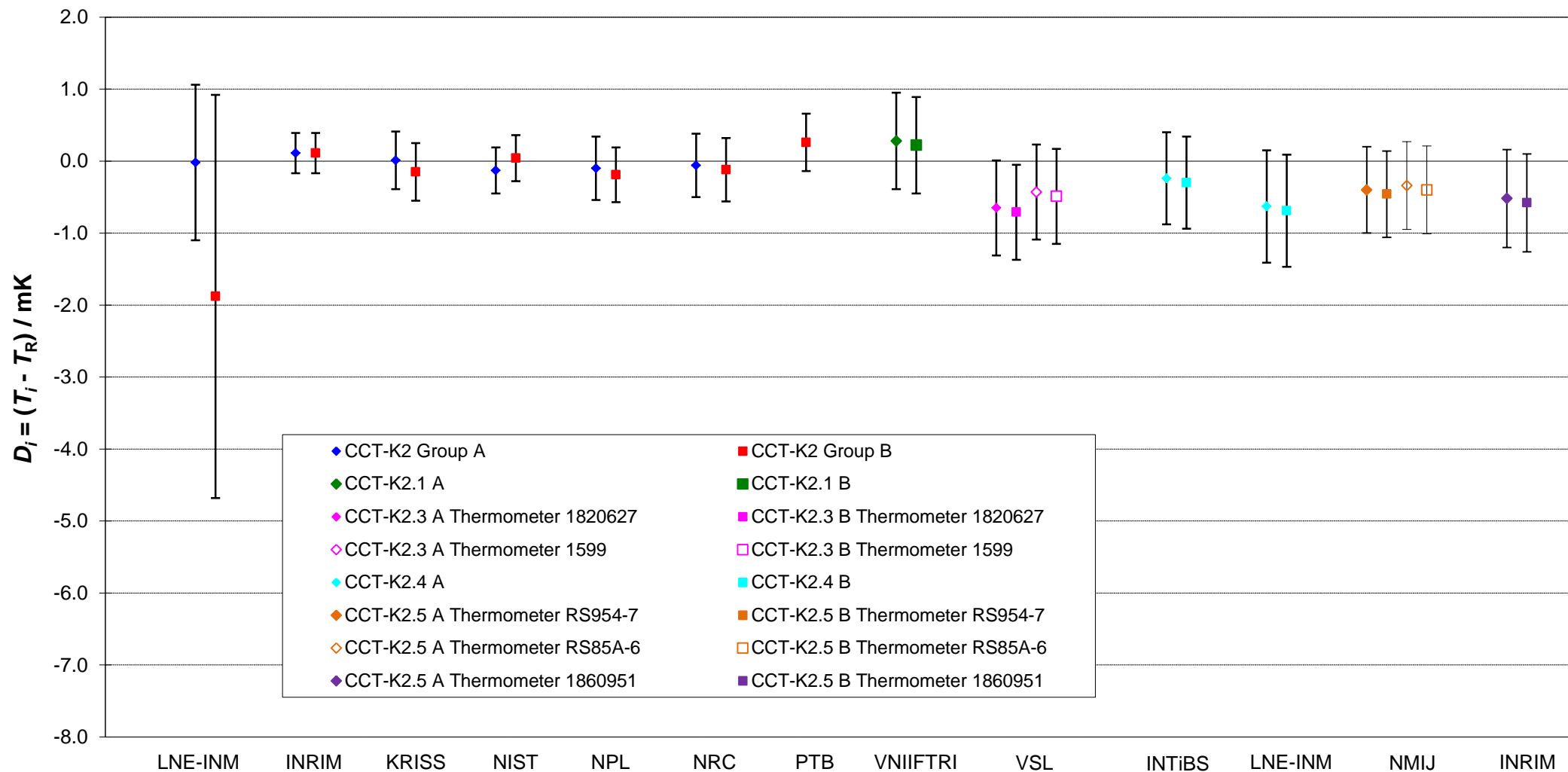
VSL participant in CCT-K2.3

INTiBS and LNE-INM participants in CCT-K2.4

NMIJ and INRIM participants in CCT-K2.5

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5 - CSPRT at nominal temperature near 24.5561 K (triple point of neon on ITS-90)

Degrees of equivalence [D_i and U_i (expanded uncertainty at the 95% confidence level)]



In CCT-K2 Group A and Group B thermometers have been analyzed separately. Degrees of equivalence of linked key comparisons are expressed with respect to the CCT-K2 key comparison reference values for Groups A and B.

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance ratio, W , at nominal temperature

NOMINAL TEMPERATURE: Near 54.3584 K, the triple point of oxygen
on the International Temperature Scale of 1990 (ITS-90)

W_i : dimensionless resistance ratio of thermometer from laboratory i

s/n : serial number of thermometer from laboratory i

u_i : combined standard uncertainty of measurement made using thermometer from laboratory i

Key comparison CCT-K2 Measurements were performed in two separate groups: **Group A** and **Group B**

Lab i Group A	CSPRT s/n	W_i	u_i / mK
LNE-INM	1886904	0.091 851 621	0.26
INRIM	1857277	0.091 842 149	0.12
KRISS	1886906	0.091 817 050	0.17
NIST	1774095	0.091 915 678	0.10
NPL	213865	0.091 777 789	0.18
NRC	1872174	0.091 805 325	0.22

Lab i Group B	CSPRT s/n	W_i	u_i / mK
LNE-INM	1041	0.091 816 645	0.25
INRIM	1860951	0.091 813 149	0.12
KRISS	1043	0.091 805 357	0.17
NIST	1774092	0.091 730 552	0.12
NPL	1728839	0.091 747 843	0.15
NRC	1872174	0.091 810 015	0.22
PTB	1842379	0.091 747 843	0.23

Key comparison CCT-K2.1

Lab i	CSPRT s/n	W_i	u_i / mK
NRC	1872174	0.091 803 886	0.22
VNIFTRI	356	0.092 032 136	0.23

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Key comparison CCT-K2.3

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1820627	0.091 729 674	0.20
VSL	1820627	0.091 730 333	0.16
NRC	1599	0.091 868 491	0.20
VSL	1599	0.091 869 167	0.16

Key comparison CCT-K2.4

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1866334	0.091 833 725	0.20
INTiBS	1866334	0.091 833 87	0.23
LNE-INM	1866334	0.091 833 911	0.23

Key comparison CCT-K2.5

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NMIJ	RS954-7	0.092 072 640	0.069
NMIJ	RS85A-6	0.091 790 375	0.069
NMIJ	1860951	0.091 810 606	0.071
INRIM	1860951	0.091 810 533	0.033
NRC	RS954-7	0.092 071 860	0.20
NRC	RS85A-6	0.091 789 499	0.20

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance Ratio, W , at nominal temperature
 NOMINAL TEMPERATURE: Near 54.3584 K, the triple point of oxygen
 on the International Temperature Scale of 1990 (ITS-90)

Degrees of equivalence relative to the CCT-K2 key comparison reference values

Lab i ↓	CSPRT s/n	D_i / mK	U_i / mK
Group A			
LNE-INM	1886904	-0.07	0.52
INRIM	1857277	-0.20	0.24
KRISS	1886906	0.09	0.34
NIST	1774095	0.07	0.20
NPL	213865	0.02	0.36
NRC	1872174	0.18	0.44
VNIIFTRI	356	-0.16	0.67
VSL	1820627	0.45	0.62
VSL	1599	0.45	0.62
INTiBS	1866334	0.32	0.68
LNE-INM	1866334	0.33	0.68
NMIJ	RS954-7	0.48	0.54
NMIJ	RS85A-6	0.50	0.54
INRIM	1860951	0.46	0.57

Lab i ↓	CSPRT s/n	D_i / mK	U_i / mK
Group B			
LNE-INM	1041	0.01	0.50
INRIM	1860951	-0.16	0.24
KRISS	1043	0.10	0.34
NIST	1774092	-0.05	0.24
NPL	1728839	0.06	0.30
NRC	1872174	0.24	0.44
PTB	1842379	0.18	0.46
VNIIFTRI	356	-0.10	0.67
VSL	1820627	0.51	0.62
VSL	1599	0.51	0.62
INTiBS	1866334	0.38	0.68
LNE-INM	1866334	0.39	0.68
NMIJ	RS954-7	0.54	0.54
NMIJ	RS85A-6	0.56	0.54
INRIM	1860951	0.52	0.57

VNIIFTRI participant in CCT-K2.1

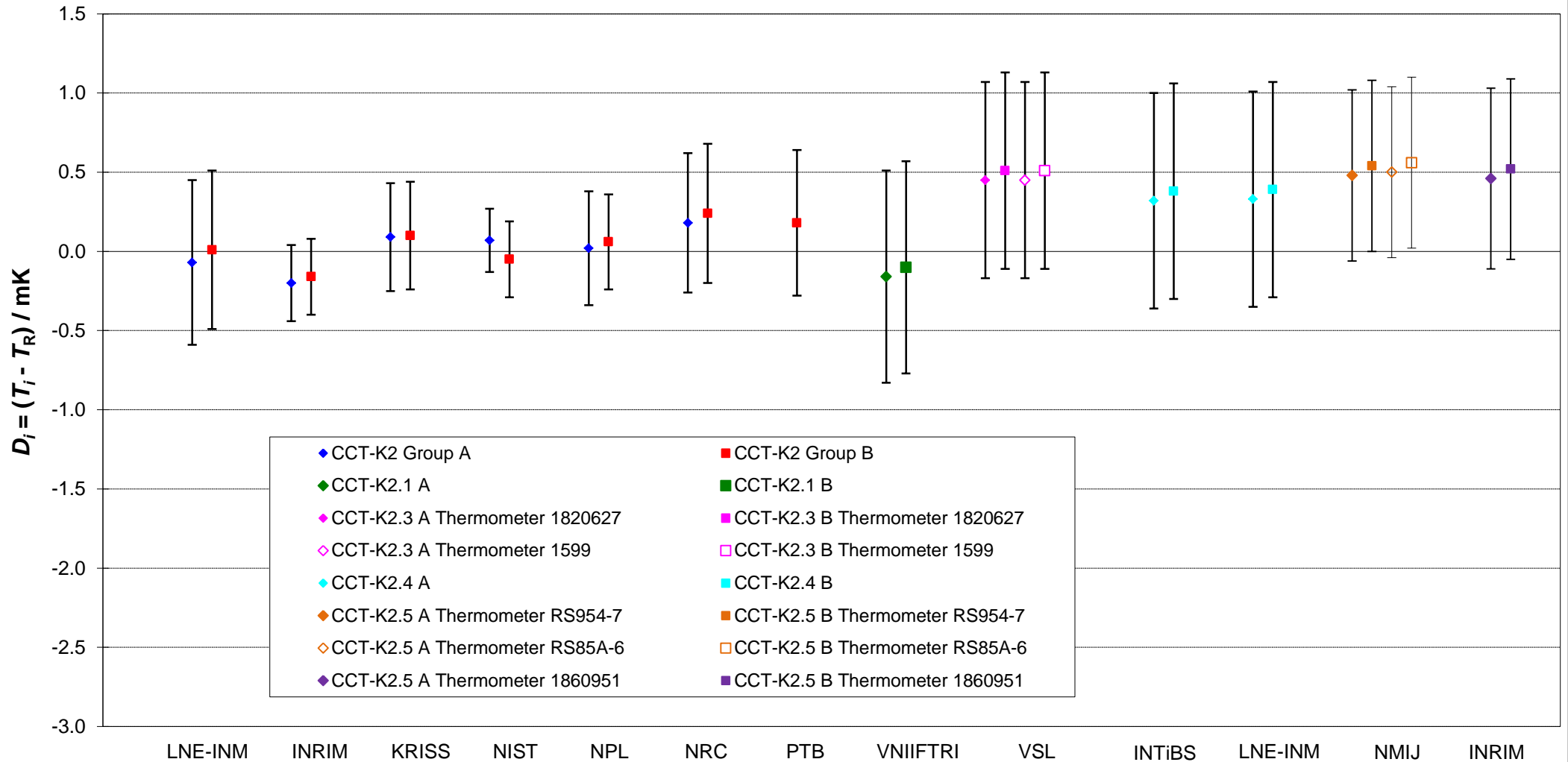
VSL participant in CCT-K2.3

INTiBS and LNE-INM participants in CCT-K2.4

NMIJ and INRIM participants in CCT-K2.5

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5 - CSPRT at nominal temperature near 54.3584 K, (the triple point of oxygen)

Degrees of equivalence [D_i and U_i (expanded uncertainty at the 95% confidence level)]



In CCT-K2 Group A and Group B thermometers have been analyzed separately. Degrees of equivalence of linked key comparisons are expressed with respect to the CCT-K2 key comparison reference values for Groups A and B.

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance ratio, W , at nominal temperature

NOMINAL TEMPERATURE: Near 83.8058 K, the triple point of argon
on the International Temperature Scale of 1990 (ITS-90)

W_i : dimensionless resistance ratio of thermometer from laboratory i

s/n : serial number of thermometer from laboratory i

u_i : combined standard uncertainty of measurement made using thermometer from laboratory i

Key comparison CCT-K2 Measurements were performed in two separate groups: **Group A** and **Group B**

Lab i Group A	CSPRT s/n	W_i	u_i / mK
LNE-INM	1886904	0.215 972 101	0.20
INRIM	1857277	0.215 981 409	0.10
KRISS	1886906	0.215 949 212	0.17
NIST	1774095	0.216 038 028	0.10
NPL	213865	0.215 911 188	0.17
NRC	1872174	0.215 941 946	0.22

Lab i Group B	CSPRT s/n	W_i	u_i / mK
LNE-INM	1041	0.215 944 081	0.22
INRIM	1860951	0.215 944 525	0.10
KRISS	1043	0.215 937 371	0.17
NIST	1774092	0.215 876 593	0.11
NPL	1728839	0.215 886 386	0.13
NRC	1872174	0.215 944 613	0.22
PTB	1842379	0.215 886 386	0.21

Key comparison CCT-K2.1

Lab i	CSPRT s/n	W_i	u_i / mK
NRC	1872174	0.215 943 937	0.22
VNIIFTRI	356	0.216 148 969	0.19

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Key comparison CCT-K2.3

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1820627	0.215 873 205	0.20
VSL	1820627	0.215 874 217	0.09
NRC	1599	0.215 986 696	0.20
VSL	1599	0.215 987 896	0.09

Key comparison CCT-K2.4

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1866334	0.215 965 358	0.20
INTiBS	1866334	0.215 967 07	0.20
LNE-INM	1866334	0.215 967 357	0.20

Key comparison CCT-K2.5

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NMIJ	RS954-7	0.216 167 373	0.099
NMIJ	RS85A-6	0.215 919 495	0.100
NMIJ	1860951	0.215 945 418	0.100
INRIM	1860951	0.215 945 226	0.076
NRC	RS954-7	0.216 166 646	0.20
NRC	RS85A-6	0.215 918 929	0.20

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance Ratio, W , at nominal temperature
 NOMINAL TEMPERATURE: Near 83.8058 K, the triple point of argon
 on the International Temperature Scale of 1990 (ITS-90)

Degrees of equivalence relative to the CCT-K2 key comparison reference values

Lab i ↓	CSPRT s/n	D_i / mK	U_i / mK
Group A			
LNE-INM	1886904	0.07	0.40
INRIM	1857277	-0.20	0.20
KRISS	1886906	0.55	0.34
NIST	1774095	0.00	0.20
NPL	213865	-0.03	0.34
NRC	1872174	0.18	0.44
VNIIFTRI	356	0.27	0.63
VSL	1820627	0.29	0.55
VSL	1599	0.34	0.55
INTiBS	1866334	0.45	0.64
LNE-INM	1866334	0.52	0.64
NMIJ	RS954-7	0.23	0.56
NMIJ	RS85A-6	0.19	0.56
INRIM	1860951	0.14	0.62

Lab i ↓	CSPRT s/n	D_i / mK	U_i / mK
Group B			
LNE-INM	1041	0.11	0.44
INRIM	1860951	-0.09	0.20
KRISS	1043	0.01	0.34
NIST	1774092	0.04	0.22
NPL	1728839	-0.04	0.26
NRC	1872174	0.24	0.44
PTB	1842379	0.22	0.42
VNIIFTRI	356	0.33	0.63
VSL	1820627	0.35	0.55
VSL	1599	0.40	0.55
INTiBS	1866334	0.51	0.64
LNE-INM	1866334	0.58	0.64
NMIJ	RS954-7	0.29	0.56
NMIJ	RS85A-6	0.25	0.56
INRIM	1860951	0.20	0.62

VNIIFTRI participant in CCT-K2.1

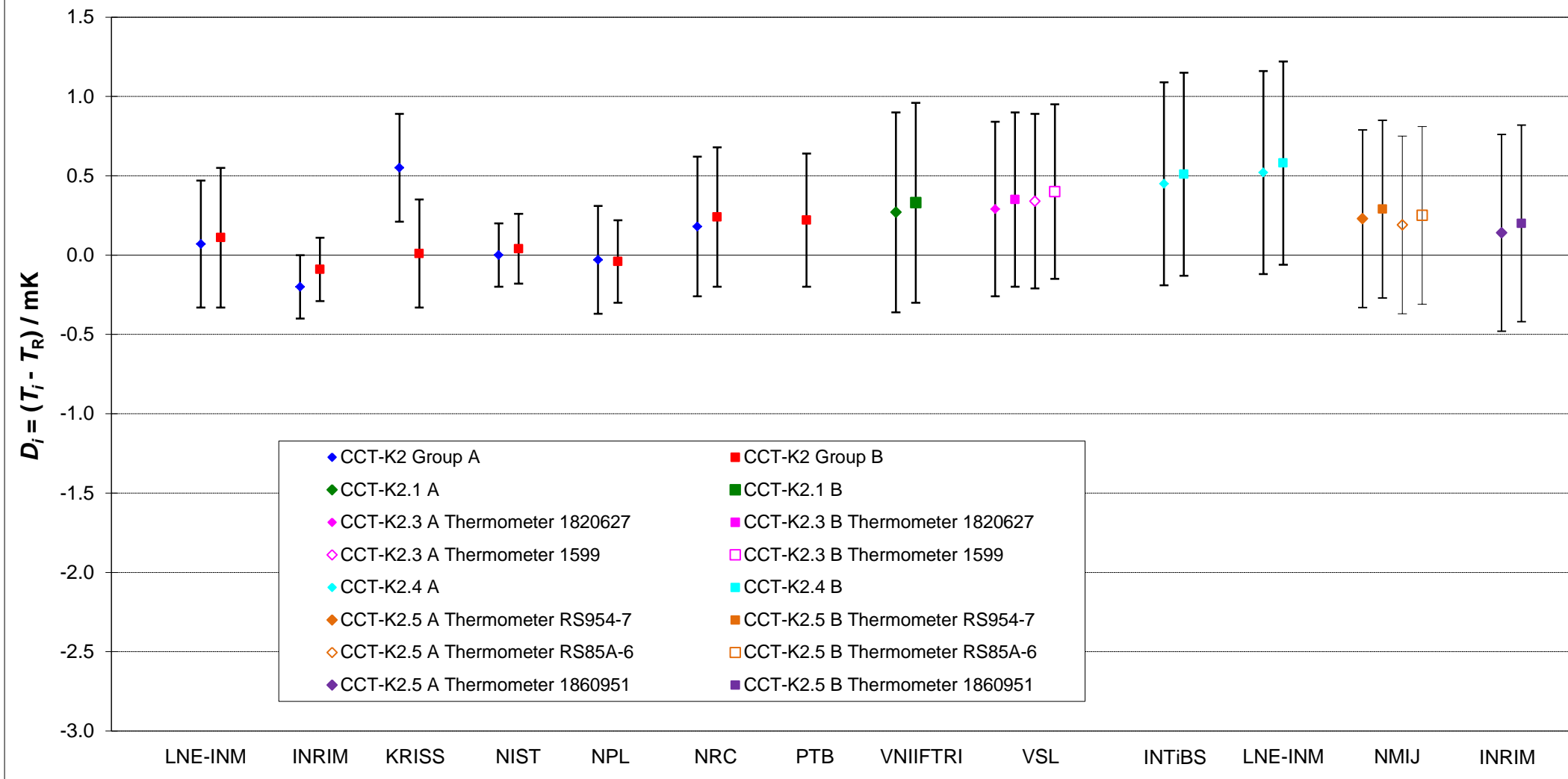
VSL participant in CCT-K2.3

INTiBS and LNE-INM participants in CCT-K2.4

NMIJ and INRIM participants in CCT-K2.5

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5 - CSPRT at nominal temperature near 83.8058 K (triple point of argon on ITS-90)

Degrees of equivalence [D_i and U_i (expanded uncertainty at the 95% confidence level)]



In CCT-K2 Group A and Group B thermometers have been analyzed separately. Degrees of equivalence of linked key comparisons are expressed with respect to the CCT-K2 key comparison reference values for Groups A and B.

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance ratio, W , at nominal temperature

NOMINAL TEMPERATURE: Near 234.3156 K, the triple point of mercury on the International Temperature Scale of 1990 (ITS-90)

W_i : dimensionless resistance ratio of thermometer from laboratory i

s/n : serial number of thermometer from laboratory i

u_i : combined standard uncertainty of measurement made using thermometer from laboratory i

Key comparison CCT-K2 Measurements were performed in two separate groups: **Group A** and **Group B**

Lab i Group A	CSPRT s/n	W_i	u_i / mK
LNE-INM	1886904	0.844 163 638	0.28
INRIM	1857277	0.844 167 763	0.10
KRISS	1886906	0.844 159 979	0.26
NIST	1774095	0.844 180 202	0.14
NPL	213865	0.844 152 407	0.19
NRC	1872174	0.844 160 883	0.22

Lab i Group B	CSPRT s/n	W_i	u_i / mK
LNE-INM	1041	0.844 157 926	0.28
INRIM	1860951	0.844 158 353	0.10
KRISS	1043	0.844 157 290	0.26
NIST	1774092	0.844 146 607	0.12
NPL	1728839	0.844 146 812	0.17
NRC	1872174	0.844 160 907	0.22
PTB	1842379	0.844 146 812	0.19

Key comparison CCT-K2.1

Lab i	CSPRT s/n	W_i	u_i / mK
NRC	1872174	0.844 161 420	0.22
VNIIFTRI	356	0.844 200 155	0.36

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Key comparison CCT-K2.3

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1820627	0.844 145 551	0.20
VSL	1820627	0.844 144 155	0.14
NRC	1599	0.844 166 839	0.20
VSL	1599	0.844 166 266	0.14

Key comparison CCT-K2.4

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NRC	1866334	0.844 164 875	0.20
INTiBS	1866334	0.844 163 64	0.23
LNE-INM	1866334	0.844 170 518	0.27

Key comparison CCT-K2.5

Lab <i>i</i>	CSPRT s/n	W_i	u_i / mK
NMIJ	RS954-7	0.844 205 549	0.160
NMIJ	RS85A-6	0.844 152 947	0.163
NMIJ	1860951	0.844 159 782	0.161
INRIM	1860951	0.844 159 364	0.063
NRC	RS954-7	0.844 205 460	0.20
NRC	RS85A-6	0.844 153 600	0.20

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5

Comparison of Capsule-type Standard Platinum Resistance Thermometers (CSPRT)

MEASURAND: Resistance Ratio, W , at nominal temperature
 NOMINAL TEMPERATURE: Near 234.3156 K, the triple point of mercury
 on the International Temperature Scale of 1990 (ITS-90)

Degrees of equivalence relative to the CCT-K2 key comparison reference values

Lab i ↓	CSPRT s/n	D_i / mK	U_i / mK
Group A			
LNE-INM	1886904	-0.23	0.56
INRIM	1857277	-0.06	0.20
KRISS	1886906	-0.12	0.52
NIST	1774095	0.12	0.28
NPL	213865	0.11	0.38
NRC	1872174	-0.14	0.44
VNIIFTRI	356	-0.26	0.88
VSL	1820627	-0.49	0.59
VSL	1599	-0.28	0.59
INTiBS	1866334	-0.45	0.64
LNE-INM	1866334	1.26	0.73
NMIJ	RS954-7	-0.12	0.62
NMIJ	RS85A-6	-0.30	0.62
INRIM	1860951	-0.43	0.71

Lab i ↓	CSPRT s/n	D_i / mK	U_i / mK
Group B			
LNE-INM	1041	-0.87	0.56
INRIM	1860951	-0.07	0.20
KRISS	1043	0.23	0.52
NIST	1774092	0.09	0.24
NPL	1728839	-0.02	0.34
NRC	1872174	-0.14	0.44
PTB	1842379	0.06	0.38
VNIIFTRI	356	-0.26	0.88
VSL	1820627	-0.49	0.59
VSL	1599	-0.28	0.59
INTiBS	1866334	-0.45	0.64
LNE-INM	1866334	1.26	0.73
NMIJ	RS954-7	-0.12	0.62
NMIJ	RS85A-6	-0.30	0.62
INRIM	1860951	-0.43	0.71

VNIIFTRI participant in CCT-K2.1

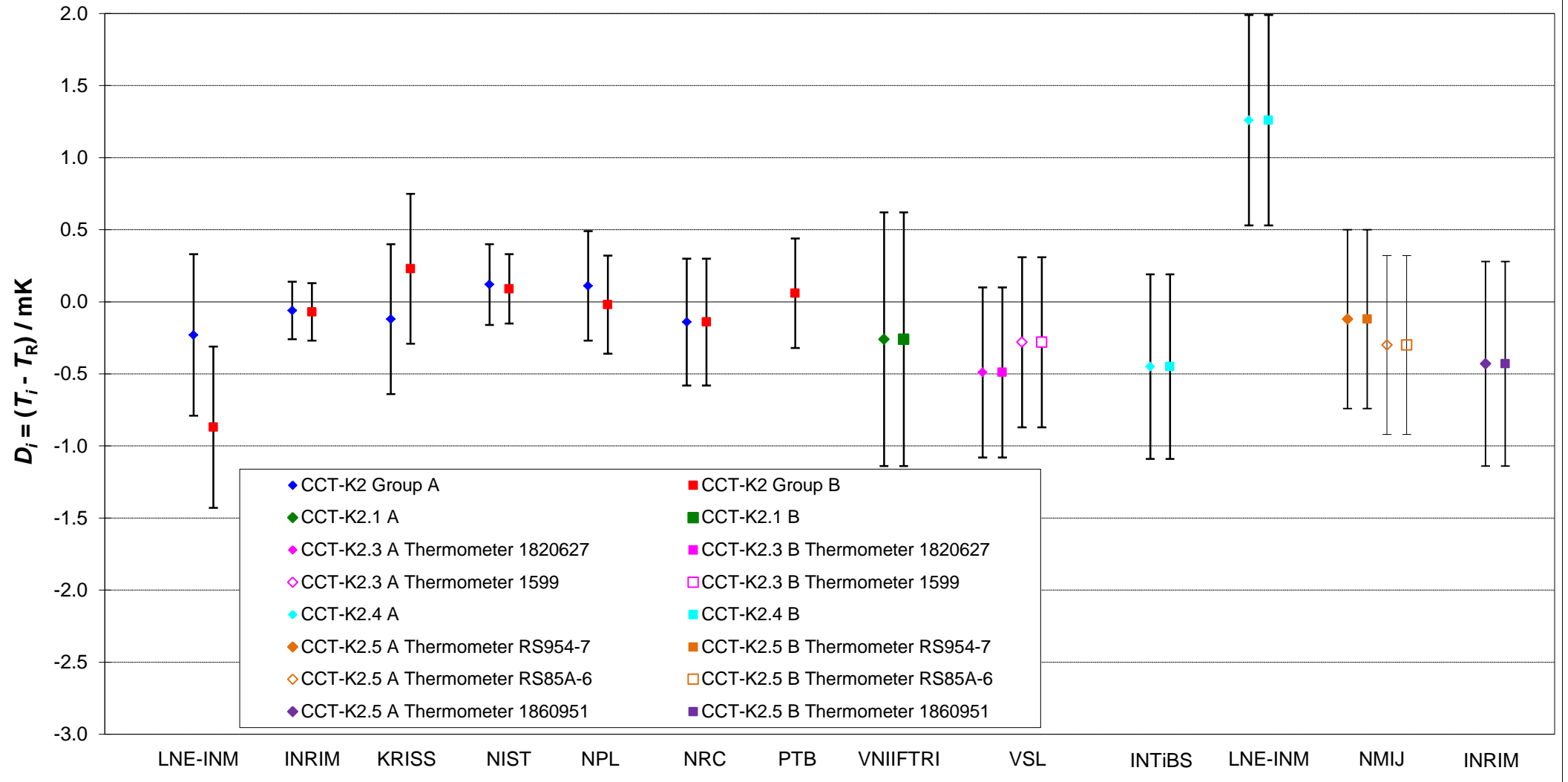
VSL participant in CCT-K2.3

INTiBS and LNE-INM participants in CCT-K2.4

NMIJ and INRIM participants in CCT-K2.5

CCT-K2, CCT-K2.1, CCT-K2.3, CCT-K2.4 and CCT-K2.5 - CSPRT at nominal temperature near 234.3156 K (triple point of mercury on ITS-90)

Degrees of equivalence [D_i and U_i (expanded uncertainty at the 95% confidence level)]



In CCT-K2 Group A and Group B thermometers have been analyzed separately. Degrees of equivalence of linked key comparisons are expressed with respect to the CCT-K2 key comparison reference values for Groups A and B.