Key comparisons CCQM-K92 and SIM.QM-K92

Key comparison CCQM-K92

MEASURAND : **Electrolytic conductivity of a KCl solution**
NOMINAL VALUE: **0.05 S/m**

x_i **:** **result of measurement carried out by laboratory** ***i***
u_i **:** **combined standard uncertainty of** x_i

Lab *i*	x_i / (S/m)	u_i / (S/m)
INRIM	0.049855	0.000035
INMETRO	0.049970	0.000048
INPL	0.049980	0.000038
CMI	0.049980	0.000049
MKEH	0.049988	0.000013
GUM	0.050000	0.000030
SMU	0.050018	0.000016
VNIIFTRI	0.050021	0.000012
DFM	0.050026	0.000019
NIST	0.050036	0.000024
NIM	0.050044	0.000014
PTB	0.050051	0.000012
CENAM	0.050100	0.000080
SP	0.050110	0.000075
SE "Ukrmetrteststandard"	0.050116	0.000016

Key comparisons CCQM-K92 and SIM.QM-K92

Key comparison SIM.QM-K92

MEASURAND : **Electrolytic conductivity of a KCl solution**
NOMINAL VALUE: **0.05 S/m**

x $_i$ **:** **result of measurement carried out by laboratory *i***
u $_i$ **:** **combined standard uncertainty of *x*** $_i$

Lab *i*	x_i / (S/m)	u_i / (S/m)
INMETRO	0.050095	0.000062
CENAM	0.049965	0.000081
INM (CO)	0.050016	0.000051
INDECOPI	0.050036	0.000060

Key comparisons CCQM-K92 and SIM.QM-K92

MEASURAND : **Electrolytic conductivity of a KCl solution**
NOMINAL VALUE: **0.05 S/m**

Key comparison CCQM-K92

The key comparison reference value, x_R, is calculated as the weighted mean of the participants' results excluding outliers, and its standard uncertainty u_R is calculated as explained on page 15 of the Final Report.
x_R = 0.0500304 S/m and u_R = 0.0000061 S/m

The degree of equivalence of laboratory *i* relative to the key comparison reference value is given by a pair of terms: $D_i = (x_i - x_R)$, and U_i, its expanded uncertainty ($k = 2$), given by $U_i = 2(u_i^2 + u_R^2)^{1/2}$, both expressed in S/m.

There are no pair-wise degrees of equivalence computed for this key comparison.

Linking SIM.QM-K92 results to those of CCQM-K92

INMETRO and CENAM provide the link between key comparisons CCQM-K92 and SIM.QM-K92 as described on page 8 of the SIM.QM-K92 Final Report.

The degree of equivalence of laboratory *i* participant in SIM.QM-K92 only relative to the CCQM-K92 key comparison reference value is given by a pair of terms: D_i and U_i, its expanded uncertainty ($k = 2$), both expressed in S/m and computed according to Equations 2 and 3 of the SIM.QM-K92 Final Report.

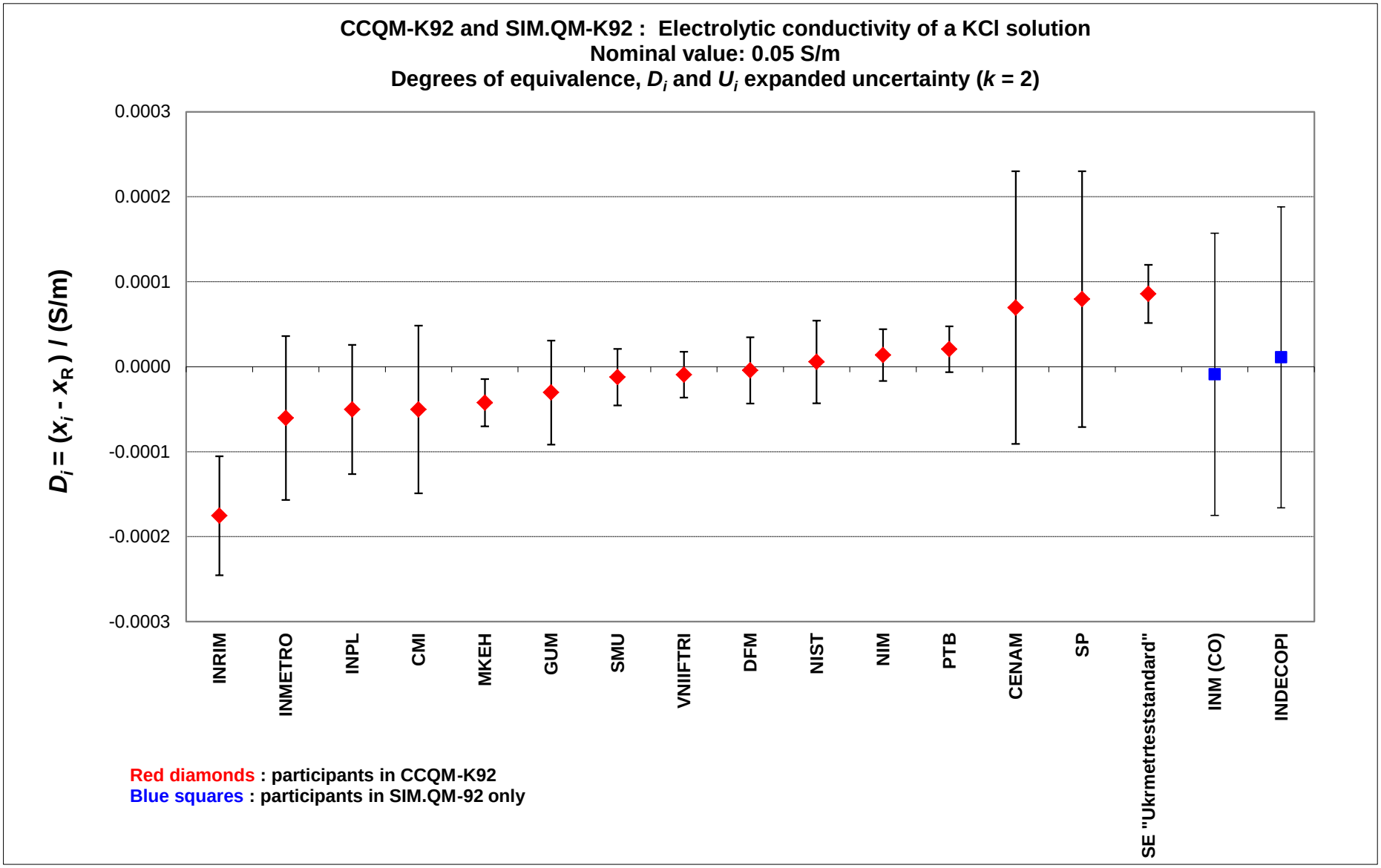
Key comparisons CCQM-K92 and SIM.QM-K92

MEASURAND : **Electrolytic conductivity of a KCl solution**
NOMINAL VALUE: **0.05 S/m**

Degrees of equivalence relative to the CCQM-K92 key comparison reference value

Lab *i* ⇩	D_i / (S/m)	U_i / (S/m)
INRIM	**-0.000175**	0.000070
INMETRO	**-0.000060**	0.000096
INPL	**-0.000050**	0.000076
CMI	**-0.000050**	0.000099
MKEH	**-0.000042**	0.000028
GUM	**-0.000030**	0.000061
SMU	**-0.000012**	0.000033
VNIIFTRI	**-0.000009**	0.000027
DFM	**-0.000004**	0.000039
NIST	**0.000006**	0.000049
NIM	**0.000014**	0.000031
PTB	**0.000021**	0.000027
CENAM	**0.000070**	0.000160
SP	**0.000080**	0.000150
SE "Ukrmetrteststandard"	**0.000086**	0.000034
INM (CO)	**-0.000009**	0.000166
INDECOPI	**0.000011**	0.000177

Red: participants in CCQM-K92
Blue: participants in SIM.QM-K92 only


CCQM-K92 and SIM.QM-K92 : Electrolytic conductivity of a KCl solution
Nominal value: 0.05 S/m
Degrees of equivalence, D_i and U_i expanded uncertainty (k = 2)
$D_i = (x_i - x_R)$ / (S/m)
0.0003
0.0002
0.0001
0.0000
-0.0001
-0.0002
-0.0003
INRIM
INMETRO
INPL
CMI
MKEH
GUM
SMU
VNIIFTRI
DFM
NIST
NIM
PTB
CENAM
SP
SE "Ukrmetrteststandard"
INM (CO)
INDECOPI
Red diamonds : participants in CCQM-K92
Blue squares : participants in SIM.QM-92 only

Key comparison CCQM-K92

MEASURAND : **Electrolytic conductivity of a KCl solution**
NOMINAL VALUE: **20 S/m**

x $_i$ **:** **result of measurement carried out by laboratory *i***
u $_i$ **:** **combined standard uncertainty of *x*** $_i$

Lab *i*	x_i / (S/m)	u_i / (S/m)
CENAM	20.123	0.025
GUM	20.279	0.011
INPL	20.280	0.014
DFM	20.283	0.007
VNIIM	20.290	0.007
NIM	20.300	0.006
MKEH	20.306	0.005
PTB	20.308	0.007
SE "Ukrmetrteststandard"	20.344	0.004
INMETRO	20.412	0.423

Key comparison CCQM-K92

MEASURAND : **Electrolytic conductivity of a KCl solution**
NOMINAL VALUE: **20 S/m**

The key comparison reference value, x_R, is calculated as the weighted mean of the participants' results excluding outliers, and its standard uncertainty u_R is calculated as explained on page 15 of the Final Report.

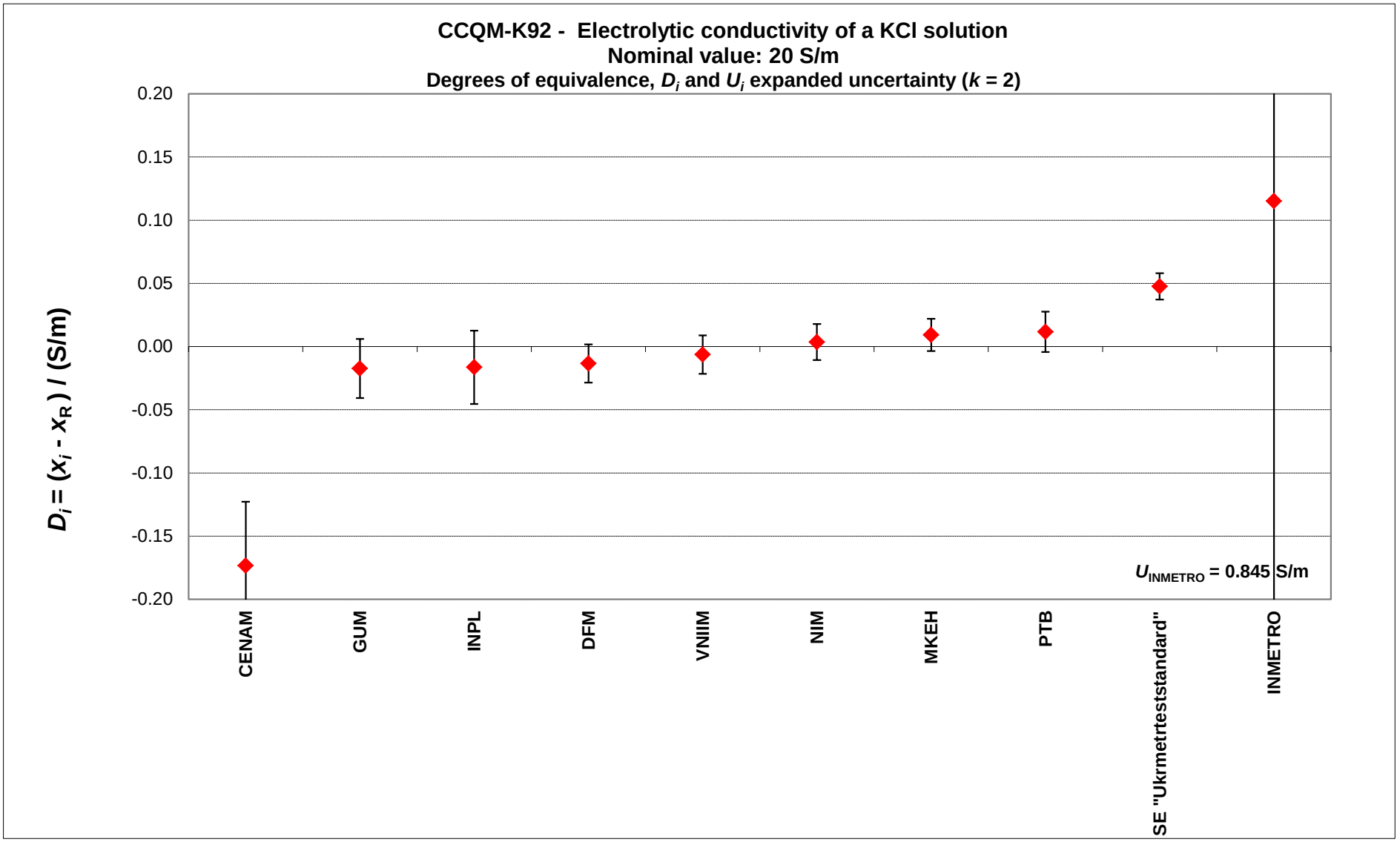
x_R = 20.2964 S/m and u_R = 0.0039 S/m

The degree of equivalence of laboratory *i* relative to the key comparison reference value is given by a pair of terms: $D_i = (x_i - x_R)$, and U_i, its expanded uncertainty (k = 2), given by $U_i = 2(u_i^2 + u_R^2)^{1/2}$, both expressed in S/m.

There are no pair-wise degrees of equivalence computed for this key comparison.

Lab *i*

⇩	D_i / (S/m)	U_i / (S/m)
CENAM	**-0.173**	0.051
GUM	**-0.017**	0.023
INPL	**-0.016**	0.029
DFM	**-0.013**	0.015
VNIIM	**-0.006**	0.015
NIM	**0.004**	0.014
MKEH	**0.009**	0.013
PTB	**0.012**	0.016
SE "Ukrmetrteststandard"	**0.048**	0.010
INMETRO	**0.115**	0.845


CCQM-K92 - Electrolytic conductivity of a KCl solution
Nominal value: 20 S/m
Degrees of equivalence, D_i and U_i expanded uncertainty (k = 2)
$D_i = (x_i - x_R) / (S/m)$
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
-0.20
$U_{INMETRO}$ = 0.845 S/m
CENAM
GUM
INPL
DFM
VNIIM
NIM
MKEH
PTB
SE "Ukrmetrteststandard"
INMETRO