

**Key comparison BIPM.RI(II)-K1.I-123**

**MEASURAND :**                    **Equivalent activity of  $^{123}\text{I}$**

$x_i$ :                    **result of measurement carried out in the SIR for the sample submitted by laboratory  $i$**

$u_i$ :                    **combined standard uncertainty of  $x_i$**

<b>Lab <math>i</math></b>	<b><math>x_i</math> / kBq</b>	<b><math>u_i</math> / kBq</b>	<b>Date of measurement</b>
<b>IRMM</b>	120120	730	83-05-31
<b>LNE-LNHB</b>	120020	470	83-05-31
<b>IRA</b>	119450	570	85-06-27
<b>PTB</b>	121400	1300	85-10-25

**Key comparison EUROMET.RI(II)-K2.I-123**

**MEASURAND :**                    **Equivalent activity of  $^{123}\text{I}$**

$x_i$ :                    **result of measurement carried out at laboratory  $i$   
converted to the equivalent activity through the LNE-LNHB and the IRMM**

$u_i$ :                    **combined standard uncertainty of  $x_i$**

<b>Lab <math>i</math></b>	<b><math>x_i</math> / kBq</b>	<b><math>u_i</math> / kBq</b>	<b>Measurement report date</b>
<b>NPL</b>	120480	440	1983

## Key comparison BIPM.RI(II)-K1.I-123

MEASURAND :                      Equivalent activity of  $^{123}\text{I}$

**Key comparison reference value: the SIR reference value for this radionuclide  $x_R$  is 120.25 MBq, with a standard uncertainty  $u_R$  of 0.41 MBq (see section 4.1 of the Final Report).**

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of terms:  $D_i = (x_i - x_R)$  and  $U_i$ , its expanded uncertainty ( $k = 2$ ), both expressed in MBq, with  $n$  the number of laboratories,  $U_i = 2[(1 - 2/n)u_i^2 + (1/n^2)\sum u_i^2]^{1/2}$  when each laboratory has contributed to the computation of  $x_R$  (see [Metrologia](#), 42, 140-144).

The degree of equivalence between two laboratories is given by a pair of terms:

$D_{ij} = D_i - D_j = (x_i - x_j)$  and  $U_{ij}$ , its expanded uncertainty ( $k = 2$ ), both expressed in MBq.

The approximation  $U_{ij} \sim 2(u_i^2 + u_j^2)^{1/2}$  is used in the computation of the pair-wise degrees of equivalence.

Linking EUROMET.RI(II)-K2.I-123 (1976) to BIPM.RI(II)-K1.I-123

**The value  $x_i$  is the equivalent activity for laboratory  $i$  participant in EUROMET.RI(II)-K2.I-123 having been normalized to the value of the LNE-LNHB and IRMM as the linking laboratories (see Final Report).**

The degree of equivalence of laboratory  $i$  participant in EUROMET.RI(II)-K2.I-123 with respect 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 ( $k = 2$ ), both expressed in MBq. The approximation  $U_i = 2(u_i^2 + u_R^2)^{1/2}$  is used in the Matrix of equivalence.

The degree of equivalence between two laboratories  $i$  and  $j$ , one participant in BIPM.RI(II)-K1.I-123 and one in EUROMET.RI(II)-K2.I-123 or both participants in EUROMET.RI(II)-K2.I-123, is given by a pair of terms expressed in MBq:

$D_{ij} = D_i - D_j$  and  $U_{ij}$ , its expanded uncertainty ( $k = 2$ ), approximated by  $U_{ij} = 2(u_i^2 + u_j^2 - 2fu_iu_j)^{1/2}$  with  $f$  being the linking laboratory when each laboratory is from the EUROMET and  $f$  is the correlation coefficient.

These statements make it possible to extend the BIPM.RI(II)-K1.I-123 matrix of equivalence to all participants in EUROMET.RI(II)-K2.I-123

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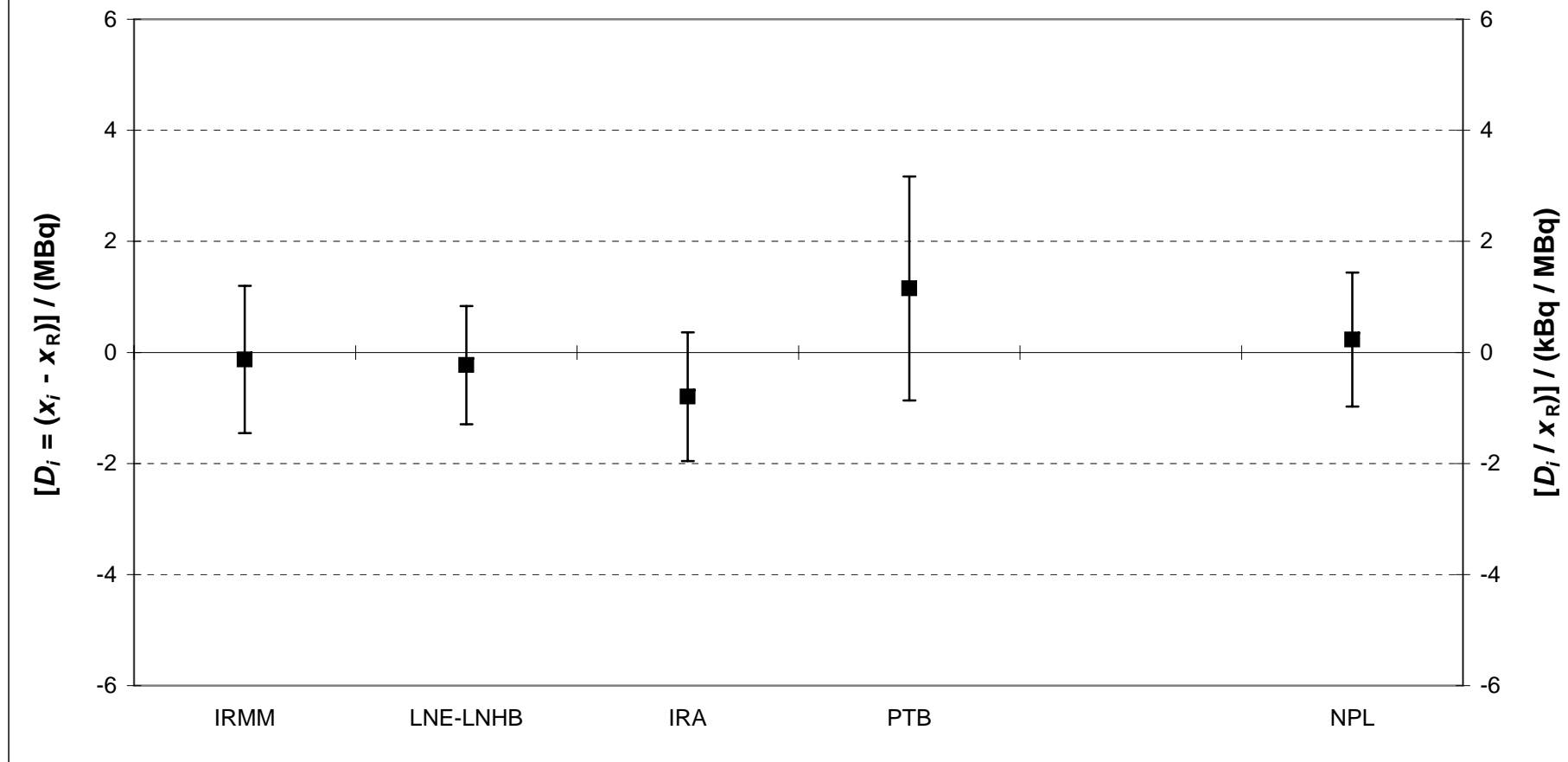
Matrix of equivalence

Lab *j*       $\Rightarrow$

Lab *i*       $\Downarrow$

	<i>D<sub>i</sub> U<sub>i</sub></i> / MBq		IRMM		LNE-LNHB		IRA		PTB		NPL	
	<i>D<sub>ij</sub></i>	<i>U<sub>ij</sub></i>	<i>D<sub>ij</sub></i>	<i>U<sub>ij</sub></i>	<i>D<sub>ij</sub></i>	<i>U<sub>ij</sub></i>	<i>D<sub>ij</sub></i>	<i>U<sub>ij</sub></i>	<i>D<sub>ij</sub></i>	<i>U<sub>ij</sub></i>	<i>D<sub>ij</sub></i>	<i>U<sub>ij</sub></i>
	/ MBq		/ MBq		/ MBq		/ MBq		/ MBq		/ MBq	
IRMM	-0.1	1.3			0.1	1.7	0.7	1.9	-1.3	3.0	-0.4	1.4
LNE-LNHB	-0.2	1.1	-0.1	1.7			0.6	1.5	-1.4	2.8	-0.5	0.9
IRA	-0.8	1.2	-0.7	1.9	-0.6	1.5			-2.0	2.8	-1.0	1.4
PTB	1.2	2.0	1.3	3.0	1.4	2.8	2.0	2.8			0.9	2.7
NPL	0.2	1.2	0.4	1.4	0.5	0.9	1.0	1.4	-0.9	2.7		

**BIPM.RI(II)-K1.I-123 and 1983 EUROMET.RI(II)-K2.I-123  
Degrees of equivalence for equivalent activity of <sup>123</sup>I**



**Left part of the graph:** participants in BIPM.RI(II)-K1.I-123

**Right part of the graph:** participant in EUROMET.RI(II)-K2.I-123

**Black squares:** participants' results prior to 1985

Note: The right-hand axis shows approximate relative values only