Calibrati	Calibration or Measurement Services			rand Level or	Range	Measu Conditions/Inde	rement pendent variables			Expanded	Uncertainty			
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Comments	s NMI Service Identifier
Temperature	Mercury point	By comparison	234.3156	234.3156	к	Temperature controlled thermostat		0.7	mK	2	95%	No	Approved on 18 May 2004	1
Temperature	Gallium point	By comparison	29.7646	29.7646	°C	Temperature controlled thermostat		0.22	mK	2	95%	No	Approved on 18 May 2004	3
Temperature	Zinc point	By comparison	419.527	419.527	°C	Temperature controlled furnace		1.4	mK	2	95%	No	Approved on 18 May 2004	6
Temperature	Aluminium point	By comparison	660.323	660.323	°C	Temperature controlled furnace		2	mK	2	95%	No	Approved on 18 May 2004	7
Temperature	SPRT	Calibration at triple point of Mercury only	234.3156	234.3156	к	Ambient temperature	(23 ± 1) °C	0.7	mK	2	95%	No	Approved on 18 May 2004	8
Temperature	SPRT	Calibration at melting point of Gallium only	29.7646	29.7646	°C	Ambient temperature	(23 ± 1) °C	0.22	mK	2	95%	No	Approved on 18 May 2004	10
Temperature	SPRT	Calibration at freezing point of Zinc only	419.527	419.527	°C	Ambient temperature	(23 ± 1) °C	1.4	mK	2	95%	No	Approved on 18 May 2004	13
Temperature	SPRT	Calibration at freezing point of Aluminium only	660.323	660.323	°C	Ambient temperature	(23 ± 1) °C	2	mK	2	95%	No	Approved on 18 May 2004	14
Temperature	Photoelectric pyrometer	Calibrated by blackbody radiator of Gold	1064.18	1064.18	°C	Wavelength	650 nm	0.25	к	2	95%	No	Approved on 18 May 2004	21
Humidity	Dew-point hygrometer	Direct comparison	-60	-45	°C			0.3	°C	2	95%	No	Approved on 03 November 2009	2/h
Humidity	Dew-point hygrometer	Direct comparison	-45	20	°C			0.2	°C	2	95%	No	Approved on 03 November 2009	3/h
Temperature	Water triple point cell	Direct comparison	0.01	0.01	°C	Temperature controlled bath	stirred water bath	0.15	mK	2	95%	No	Approved on 20 January 2010	2
Temperature	Long stem SPRT	Calibration at triple point of water	0.01	0.01	°C	Temperature controlled bath	stirred water bath	0.15	mK	2	95%	No	Approved on 20 January 2010	9

Calibratio	Calibration or Measurement Services		Measu	rand Level or	Range	Measu Conditions/Inde	irement pendent variables			Expanded	Jncertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Com	nents	NMI Service Identifier
Temperature	IPRT	Comparison with reference thermometer	-39	10	℃	Temperature controlled bath	stirred alcohol bath	0.01	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Hysteresis uncertainty for each IPRT must be added to the combined uncertainty quoted in the calibration report	25
Temperature	IPRT	Comparison with reference thermometer	10	90	°C	Temperature controlled bath	stirred water bath	0.01	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Hysteresis uncertainty for each IPRT must be added to the combined uncertainty quoted in the calibration report	26
Temperature	IPRT	Comparison with reference thermometer	90	290	℃	Temperature controlled bath	stirred oil bath	0.025	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Hysteresis uncertainty for each IPRT must be added to the combined uncertainty quoted in the calibration report	27

Calibratio	Calibration or Measurement Services		Measu	rand Level or	Range	Measu Conditions/Inde	irement pendent variables			Expanded I	Uncertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Com	nents	NMI Service Identifier
Temperature	IPRT	Comparison with reference thermometer	200	500	°C	Temperature controlled furnace	three zone furnace	0.65	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Hysteresis uncertainty for each IPRT must be added to the combined uncertainty quoted in the calibration report	28
Temperature	Thermocouples type R, S	Calibration at TPW only	0.01	0.01	°C	Temperature controlled bath	stirred water bath	0.5	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	29
Temperature	Thermocouples type R, S	Calibration at freezing point of Sn only	231.928	231.928	°C	Temperature controlled furnace	three zone furnace	0.5	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	30
Temperature	Thermocouples type R, S	Calibration at freezing point of Zn only	419.527	419.527	°C	Temperature controlled furnace	three zone furnace	0.5	Ŷ	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	31

Calibratio	Calibration or Measurement Services		Measu	rand Level or	Range	Measu Conditions/Inde	irement pendent variables			Expanded l	Incertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Com	nents	NMI Service Identifier
Temperature	Thermocouples type B, R, S	Calibration at freezing point of Al only	660.323	660.323	ç	Temperature controlled furnace	three zone furnace	0.5	ç	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	32
Temperature	Thermocouples type B, R, S	Calibration at freezing point of Ag only	961.78	961.78	ç	Temperature controlled furnace	three zone furnace	0.8	ç	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	33
Temperature	Thermocouples type B, R, S	Calibration at freezing point of Cu only	1084.62	1084.62	ç	Temperature controlled furnace	three zone furnace	1.3	ç	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	34
Temperature	Thermocouples type B, R, S	Calibration at Pd point only (wire bridge method)	1553.5	1553.5	°C	Temperature controlled furnace	three zone furnace	2	ç	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	35
Temperature	Thermocouples type R, S	Comparison	0	660	°C	Temperature controlled bath and furnace	three zone furnace	0.7	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	36

Calibratio	Calibration or Measurement Services		Measu	rand Level or	Range	Measu Conditions/Inde	irement pendent variables			Expanded I	Uncertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Com	nents	NMI Service Identifier
Temperature	Thermocouples type B, R, S	Comparison	660	1100	ç	Temperature controlled furnace	three zone furnace	1.5	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	37
Temperature	Thermocouples type B, R, S	Comparison	1100	1550	ç	Temperature controlled furnace	three zone furnace	3	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	38
Temperature	Thermocouples type T, J, K, E, N	Comparison	0	660	ç	Temperature controlled bath and furnace	three zone furnace	1.5	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	39
Temperature	Thermocouples type K, N	Comparison	660	1100	ç	Temperature controlled furnace	three zone furnace	2.7	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point. Pre-determined value of inhomogeneity included in the CMC entry	40
Temperature	Liquid-in-glass thermometer	Comparison	-39	10	°C	Temperature controlled bath	stirred alcohol bath	0.02	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.01 °C, mercury- in-glass	41

Calibratio	Calibration or Measurement Services		Measu	rand Level or	Range	Measu Conditions/Inde	urement pendent variables			Expanded I	Jncertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Com	nents	NMI Service Identifier
Temperature	Liquid-in-glass thermometer	Comparison	10	90	°C	Temperature controlled bath	stirred water bath	0.02	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.01 °C, mercury- in-glass	72
Temperature	Liquid-in-glass thermometer	Comparison	90	290	°C	Temperature controlled bath	stirred oil bath	0.023	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.01 °C, mercury- in-glass	73
Temperature	Liquid-in-glass thermometer	Comparison	-39	10	°C	Temperature controlled bath	stirred alcohol bath	0.022	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.01 °C, mercury- in-glass	74
Temperature	Liquid-in-glass thermometer	Comparison	10	90	°C	Temperature controlled bath	stirred water bath	0.022	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.01 °C, mercury- in-glass	75
Temperature	Liquid-in-glass thermometer	Comparison	90	290	°C	Temperature controlled bath	stirred oil bath	0.025	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.01 °C, mercury- in-glass	76
Temperature	Liquid-in-glass thermometer	Comparison	-39	10	°C	Temperature controlled bath	stirred alcohol bath	0.04	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.1 °C, mercury-in- glass	77
Temperature	Liquid-in-glass thermometer	Comparison	10	90	°C	Temperature controlled bath	stirred water bath	0.04	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.1 °C, mercury-in- glass	78



Calibratic	Calibration or Measurement Services			rand Level or	Range	Measu Conditions/Inde	irement pendent variables			Expanded I	Jncertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Com	nents	NMI Service Identifier
Temperature	Liquid-in-glass thermometer	Comparison	90	290	ç	Temperature controlled bath	stirred oil bath	0.042	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.1 °C, mercury-in- glass	79
Temperature	Liquid-in-glass thermometer	Comparison	-39	10	ç	Temperature controlled bath	stirred alcohol bath	0.043	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.1 °C, mercury-in- glass	80
Temperature	Liquid-in-glass thermometer	Comparison	10	90	ç	Temperature controlled bath	stirred water bath	0.043	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.1 °C, mercury-in- glass	81
Temperature	Liquid-in-glass thermometer	Comparison	90	290	°C	Temperature controlled bath	stirred oil bath	0.05	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.1 °C, mercury-in- glass	82
Temperature	Liquid-in-glass thermometer	Comparison	-39	10	°C	Temperature controlled bath	stirred alcohol bath	0.1	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.2 °C, mercury-in- glass	83
Temperature	Liquid-in-glass thermometer	Comparison	10	90	°C	Temperature controlled bath	stirred water bath	0.1	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.2 °C, mercury-in- glass	84
Temperature	Liquid-in-glass thermometer	Comparison	90	290	°C	Temperature controlled bath	stirred oil bath	0.14	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.2 °C, mercury-in- glass	55



Calibratio	Calibration or Measurement Services			rand Level or	Range	Measu Conditions/Inde	irement pendent variables			Expanded I	Uncertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Com	ments	NMI Service Identifier
Temperature	Liquid-in-glass thermometer	Comparison	-39	10	ç	Temperature controlled bath	stirred alcohol bath	0.12	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.2 °C, mercury-in- glass	56
Temperature	Liquid-in-glass thermometer	Comparison	10	90	ç	Temperature controlled bath	stirred water bath	0.12	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.2 °C, mercury-in- glass	57
Temperature	Liquid-in-glass thermometer	Comparison	90	290	ç	Temperature controlled bath	stirred oil bath	0.15	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.2 °C, mercury-in- glass	58
Temperature	Liquid-in-glass thermometer	Comparison	-39	10	°C	Temperature controlled bath	stirred alcohol bath	0.2	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.5 °C, mercury-in- glass	59
Temperature	Liquid-in-glass thermometer	Comparison	10	90	°C	Temperature controlled bath	stirred water bath	0.2	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.5 °C, mercury-in- glass	60
Temperature	Liquid-in-glass thermometer	Comparison	90	290	°C	Temperature controlled bath	stirred oil bath	0.23	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 0.5 °C, mercury-in- glass	61
Temperature	Liquid-in-glass thermometer	Comparison	-39	10	°C	Temperature controlled bath	stirred alcohol bath	0.3	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.5 °C, mercury-in- glass	62



Calibratio	Calibration or Measurement Services			rand Level or	Range	Measu Conditions/Inde	irement pendent variables			Expanded I	Jncertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Com	nents	NMI Service Identifier
Temperature	Liquid-in-glass thermometer	Comparison	10	90	°C	Temperature controlled bath	stirred water bath	0.3	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.5 °C, mercury-in- glass	63
Temperature	Liquid-in-glass thermometer	Comparison	90	290	°C	Temperature controlled bath	stirred oil bath	0.33	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 0.5 °C, mercury-in- glass	64
Temperature	Liquid-in-glass thermometer	Comparison	-39	10	°C	Temperature controlled bath	stirred alcohol bath	0.4	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 1 °C, mercury-in- glass	65
Temperature	Liquid-in-glass thermometer	Comparison	10	90	°C	Temperature controlled bath	stirred water bath	0.4	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 1 °C, mercury-in- glass	66
Temperature	Liquid-in-glass thermometer	Comparison	90	290	°C	Temperature controlled bath	stirred oil bath	0.45	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 1 °C, mercury-in- glass	67
Temperature	Liquid-in-glass thermometer	Comparison	-39	10	°C	Temperature controlled bath	stirred alcohol bath	0.45	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 1 °C, mercury-in- glass	68
Temperature	Liquid-in-glass thermometer	Comparison	10	90	°C	Temperature controlled bath	stirred water bath	0.45	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 1 °C, mercury-in- glass	69
Temperature	Liquid-in-glass thermometer	Comparison	90	290	°C	Temperature controlled bath	stirred oil bath	0.50	°C	2	95%	No	Approved on 20 January 2010	Partial immersion, graduation of 1 °C, mercury-in- glass	70

Calibratio	Calibration or Measurement Services			rand Level or	Range	Measu Conditions/Inde	irement pendent variables			Expanded	Jncertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Com	nents	NMI Service Identifier
Temperature	Liquid-in-glass thermometer	Comparison	10	80	°C	Temperature controlled bath	stirred water bath	0.5	°C	2	95%	No	Approved on 20 January 2010	Total immersion, graduation of 1 °C, spirit-in-glass	71
Temperature	Sensors with indicator, thermocouple	Comparison	10	90	°C	Temperature controlled bath	stirred water bath	1	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point	43
Temperature	Sensors with indicator, thermocouple	Comparison	90	290	°C	Temperature controlled bath	stirred oil bath	1	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point	44
Temperature	Sensors with indicator, thermocouple	Comparison	200	660	°C	Temperature controlled furnace	three zone furnace	1.8	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point	45
Temperature	Sensors with indicator, IPRT	Comparison	-39	10	°C	Temperature controlled furnace	three zone furnace	0.05	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point	46
Temperature	Sensors with indicator, IPRT	Comparison	90	290	°C	Temperature controlled furnace	three zone furnace	0.06	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point	47
Temperature	Sensors with indicator, IPRT	Comparison	200	500	°C	Temperature controlled furnace	three zone furnace	0.1	°C	2	95%	No	Approved on 20 January 2010	Uncertainty at the calibration point	48
Temperature	Indium point cell	Comparison with reference fixed- point cell	156.5985	156.5985	°C	Temperature controlled furnace	three zone furnace	0.95	mK	2	95%	No	Approved on 20 May 2010		4
Temperature	Tin point cell	Comparison with reference fixed- point cell	231.928	231.928	°C	Temperature controlled furnace	three zone furnace	0.92	mK	2	95%	No	Approved on 20 May 2010		5
Temperature	Silver point cell	Comparison with reference fixed- point cell	961.78	961.78	°C	Temperature controlled furnace	three zone furnace	5	mK	2	95%	No	Approved on 20 May 2010		22
Temperature	Long stem SPRT	Calibration at In fixed point only	156.5985	156.5985	°C	Temperature controlled furnace	three zone furnace	0.95	mK	2	95%	No	Approved on 20 May 2010		11
Temperature	Long stem SPRT	Calibration at Sn fixed point only	231.928	231.928	°C	Temperature controlled furnace	three zone furnace	0.92	mK	2	95%	No	Approved on 20 May 2010		12



Calibration or Measurement Services			Measu	rand Level or	Range	Measu Conditions/Inde	urement pendent variables			Expanded U	Jncertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Comr	nents	NMI Service Identifier
Temperature	Long stem SPRT	Calibration at Ag point only	961.78	961.78	°C	Temperature controlled furnace	three zone furnace	6	mK	2	95%	No	Approved on 20 May 2010		15
Temperature	Long stem SPRT	Calibration at ITS- 90 subrange from Hg to Ga	-38.8344	29.7646	ů	Temperature controlled bath		0.8 to 0.25	mK	2	95%	No	Approved on 17 January 2013		16
Temperature	Long stem SPRT	Calibration at ITS- 90 subrange from TPW to Ga	0.01	29.7646	°C	Temperature controlled bath		0.15 to 0.25	mK	2	95%	No	Approved on 17 January 2013		17
Temperature	Long stem SPRT	Calibration at ITS- 90 subrange from TPW to In	0.01	156.5985	°C	Temperature controlled thermostat and furnace		0.15 to 1	mK	2	95%	No	Approved on 17 January 2013		18
Temperature	Long stem SPRT	Calibration at ITS- 90 subrange from TPW to Sn	0.01	231.928	ů	Temperature controlled bath and furnace		0.15 to 1	mK	2	95%	No	Approved on 17 January 2013		19
Temperature	Long stem SPRT	Calibration at ITS- 90 subrange from TPW to Zn	0.01	419.527	°C	Temperature controlled bath and furnace		0.15 to 1.5	mK	2	95%	No	Approved on 17 January 2013		20
Temperature	Long stem SPRT	Calibration at ITS- 90 subrange from TPW to Al	0.01	660.323	°C	Temperature controlled thermostat and furnace		0.15 to 2.2	mK	2	95%	No	Approved on 17 January 2013		23
Temperature	Long stem SPRT	Calibration at ITS- 90 subrange from TPW to Ag	0.01	961.78	°C	Temperature controlled bath and furnace		0.15 to 6.5	mK	2	95%	No	Approved on 17 January 2013		24
Temperature	Variable temperature blackbody radiation sources	Comparison	-20	20	°C	Wavelength	spectral band 8 µm to 14 µm	1	°C	2	95%	No	Approved on 06 January 2012		48
						Aperture diameter	< 15 mm								
Temperature	Variable temperature blackbody radiation sources	Comparison	20	200	°C	Wavelength	spectral band 8 µm to 14 µm	1.5	°C	2	95%	No	Approved on 06 January 2012		49
						Aperture diameter	< 15 mm								



Calibratio	on or Measurement S	ervices	Measu	rand Level or	⁻ Range	Measu Conditions/Inde	urement pendent variables			Expanded (Jncertainty				
Quantity	Instrument or artifact	Instrument Type or Method	Minimum value	Maximum value	units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	Comn	nents	NMI Service Identifier
Temperature	Variable temperature blackbody radiation sources	Spectral comparison	200	600	°C	Wavelength	spectral region from 0.9 μm to 1.6 μm	1.5 to 2.0	°C	2	95%	No	Approved on 06 January 2012		50
						Aperture diameter	< 5 mm								

