

**Amount of substance, High purity chemicals, Germany, BAM (Bundesanstalt für Materialforschung und -prüfung)**

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The expanded uncertainties correspond to  $k = 2$  (level of confidence 95%)

NMI Service Identifier	Measurement Service Sub-Category	Matrix	Measurand		Dissemination Range of Measurement Capability			Range of Expanded Uncertainties as Disseminated				Range of Certified Values in Reference Materials			Range of Expanded Uncertainties for Certified Value				Mechanism(s) for Measurement Service Delivery	Comments	Uncertainty convention
			Analyte or Component	Quantity	From	To	Unit	From	To	Unit	Is the expanded uncertainty a relative one?	From	To	Unit	From	To	Unit	Is the expanded uncertainty a relative one?			
HiPu-1	Metals	high purity copper	copper	Mass fraction	0.999	0.999999	kg/kg	0.0005	0.000001	kg/kg	No	0.999970	0.999970	kg/kg	0.000010	0.000010	kg/kg	No	CRM BAM-Y001 (solid primary CRM, available only to NMIs), reference measurement Approved on 06 December 2011	For additional information contact: info@bam.de Approved on 06 December 2011	Uncertainty convention 2
HiPu-2	Metals	high purity iron	iron	Mass fraction	0.999	0.999999	kg/kg	0.0005	0.000001	kg/kg	No	0.999862	0.999862	kg/kg	0.000044	0.000044	kg/kg	No	CRM BAM-Y002 (solid primary CRM, available only to NMIs), reference measurement Approved on 06 December 2011	For additional information contact: info@bam.de Approved on 06 December 2011	Uncertainty convention 2
HiPu-3	Metals	high purity lead	lead	Mass fraction	0.999	0.999999	kg/kg	0.0005	0.000001	kg/kg	No	0.99992	0.99992	kg/kg	0.00006	0.00006	kg/kg	No	CRM BAM-Y004 (solid primary CRM, available only to NMIs), reference measurement Approved on 06 December 2011	For additional information contact: info@bam.de Approved on 06 December 2011	Uncertainty convention 2
HiPu-4	Metals	high purity gallium	gallium	Mass fraction	0.999	0.999999	kg/kg	0.0005	0.000001	kg/kg	No	0.99992	0.99992	kg/kg	0.00007	0.00007	kg/kg	No	CRM BAM-Y008 (solid primary CRM, available only to NMIs), reference measurement Approved on 06 December 2011	For additional information contact: info@bam.de Approved on 06 December 2011	Uncertainty convention 2
HiPu-5	Metals	high purity silicon	silicon	Mass fraction	0.999	0.999999	kg/kg	0.0005	0.000001	kg/kg	No	0.99991	0.99991	kg/kg	0.00007	0.00007	kg/kg	No	CRM BAM-Y003 (solid primary CRM, available only to NMIs), reference measurement Approved on 06 December 2011	For additional information contact: info@bam.de Approved on 06 December 2011	Uncertainty convention 2

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			Analyte or Component	Quantity	From	To	Unit	From	To	Unit	Is the expanded uncertainty a relative one?	From	To	Unit	From	To	Unit	Is the expanded uncertainty a relative one?			
HiPu-6	Metals	high purity tin	tin	Mass fraction	0.999	0.999999	kg/kg	0.0005	0.000001	kg/kg	No	0.99991	0.99991	kg/kg	0.00006	0.00006	kg/kg	No	CRM BAM-Y005 (solid primary CRM, available only to NMIs), reference measurement Approved on 06 December 2011	For additional information contact: info@bam.de Approved on 06 December 2011	Uncertainty convention 2
HiPu-7	Metals	high purity tungsten	tungsten	Mass fraction	0.999	0.999999	kg/kg	0.0005	0.000001	kg/kg	No	0.99981	0.99981	kg/kg	0.00010	0.00010	kg/kg	No	CRM BAM-Y006 (solid primary CRM, available only to NMIs), reference measurement Approved on 06 December 2011	For additional information contact: info@bam.de Approved on 06 December 2011	Uncertainty convention 2
HiPu-8	Metals	high purity bismuth	bismuth	Mass fraction	0.999	0.999999	kg/kg	0.0005	0.000001	kg/kg	No	0.99990	0.99990	kg/kg	0.00007	0.00007	kg/kg	No	CRM BAM-Y007 (solid primary CRM, available only to NMIs), reference measurement Approved on 06 December 2011	For additional information contact: info@bam.de Approved on 06 December 2011	Uncertainty convention 2
HiPu-9	Inorganic compounds	sodium chloride	sodium expressed as sodium chloride	Mass fraction	0.99	0.999999	kg/kg	0.0005	0.000001	kg/kg	No	0.99984	0.99984	kg/kg	0.00009	0.00009	kg/kg	No	CRM BAM-Y009 (solid primary CRM, available only to NMIs), reference measurement Approved on 02 November 2006	For additional information contact: info@bam.de Approved on 02 November 2006	Uncertainty convention 2
HiPu-10	Inorganic compounds	potassium chloride	potassium expressed as potassium chloride	Mass fraction	0.99	0.999999	kg/kg	0.0005	0.000001	kg/kg	No	0.99983	0.99983	kg/kg	0.00010	0.00010	kg/kg	No	CRM BAM-Y010 (solid primary CRM, available only to NMIs), reference measurement Approved on 02 November 2006	For additional information contact: info@bam.de Approved on 02 November 2006	Uncertainty convention 2

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			Analyte or Component	Quantity	From	To	Unit	From	To	Unit	Is the expanded uncertainty a relative one?	From	To	Unit	From	To	Unit	Is the expanded uncertainty a relative one?			
HiPu-11	Isotopics	aqueous solution	boron	Isotope amount ratio $n(10B)/n(11B)$	0.05	20	mol/mol	0.14	0.14	%	Yes	0.28197	0.28197	mol/mol	0.00040	0.00040	mol/mol	No	ERM-AE101	For additional information contact: info@bam.de Approved on 08 December 2006	
HiPu-12	Isotopics	aqueous solution	boron	Isotope amount ratio $n(10B)/n(11B)$	0.05	20	mol/mol	0.14	0.14	%	Yes	0.42485	0.45966	mol/mol	0.00060	0.00062	mol/mol	No	ERM-AE102, ERM-AE104	For additional information contact: info@bam.de Approved on 08 December 2006	Uncertainty convention 2
HiPu-13	Isotopics	aqueous solution	boron	Isotope amount ratio $n(10B)/n(11B)$	0.05	20	mol/mol	0.14	0.14	%	Yes	0.9895	0.9895	mol/mol	0.0014	0.0014	mol/mol	No	ERM-AE103	For additional information contact: info@bam.de Approved on 08 December 2006	
HiPu-14	Organic compounds	theophylline	theophylline	Mass fraction	985	999	mg/g	6	2	mg/g	No								Value assignment to customer supplied samples	Approved on 30 July 2009	Uncertainty convention 2
HiPu-15	Metals	high purity aluminium	aluminium	Mass fraction	0.999	0.999999	kg/kg	0.0005	0.000001	kg/kg	No								Reference measurement	For additional information contact: info@bam.de Approved on 06 December 2011	Uncertainty convention 2
I.1-04-01	Inorganic compounds	silicium dioxide	silicium dioxide	Mass fraction	99.99	99.99	%	0.01	0.01	%	Yes	99.99	99.99	%	0.01	0.01	%	Yes	CRM- R1	Approved on 01 March 2005	
I.1-04-02	Inorganic compounds	aluminium oxide	aluminium oxide	Mass fraction	99	99.995	%	0.03	0.03	%	Yes	99.76	99.76	%	0.03	0.03	%	Yes	CRM-R2	Approved on 01 March 2005	

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			Analyte or Component	Quantity	From	To	Unit	From	To	Unit	Is the expanded uncertainty a relative one?	From	To	Unit	From	To	Unit	Is the expanded uncertainty a relative one?			
I.1-04-03	Inorganic compounds	calcium carbonate	calcium carbonate	Mass fraction	99	99.99	%	0.05	0.05	%	Yes	99.79	99.79	%	0.05	0.05	%	Yes	CRM-R3	Approved on 01 March 2005	
HiPu-16	Metals	high purity nickel	nickel	Mass fraction	99.9	99.995	%	0.003	0.003	%	Yes	99.995	99.995	%	0.003	0.003	%	Yes	CRM BAM-RS4	For additional information contact: info@bam.de Approved on 06 December 2011	
I.1-04-05	Inorganic compounds	nickel oxide	nickel	Mass fraction	78	79	%	0.08	0.08	%	Yes	78.57	78.57	%	0.08	0.08	%	Yes	CRM-R5	Approved on 01 March 2005	
I.1-04-06	Inorganic compounds	magnesium oxide	magnesium	Mass fraction	60	61	%	0.03	0.03	%	Yes	60.19	60.19	%	0.03	0.03	%	Yes	CRM-R6	Approved on 01 March 2005	
I.1-06-05	Inorganic compounds	K[Au(CN) <sub>2</sub> ]	gold	Mass fraction	0.67	0.69	kg/kg	0.02	0.02	kg/kg	No	0.683	0.683	kg/kg	0.025	0.025	kg/kg	No	CRM BAM 501	Approved on 01 March 2005	
I.2-01-11-1	Organic compounds	benzoic acid	benzoic acid	Mass fraction	95	100	%	1.5	3	%	Yes								Reference measurement	Approved on 17 November 2005	Uncertainty convention 1
I.2-01-11-2	Organic compounds	naphthalin	naphthalin	Mass fraction	95	100	%	1.5	3	%	Yes								Reference measurement	Approved on 17 November 2005	Uncertainty convention 1
I.2-01-11-3	Organic compounds	acetanalid	acetanalid	Mass fraction	95	100	%	1.5	3	%	Yes								Reference measurement	Approved on 17 November 2005	Uncertainty convention 1