Length, Denmark, DFM (Danish Institute of Fundamental Metrology), DANIAmet-NGM (Primary Laboratory for Dimensional Metrology)

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty							
Class	**Instrument or Artifact: Measurand**	**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?**	**Service Provider**	**NMI Internal Service Identifier**	**Comments**
End standards	Gauge block: central length *L*	Interferometry, exact fractions	0.5	100	mm			Q[23, 0.36*L*], *L* in mm	nm	2	95%	No	DFM	4	
End standards	Gauge block: central length *L*	Mechanical comparison	0.5	100	mm			Q[0.06, 0.001*L*], *L* in mm	µm	2	95%	No	DANIAmet-NGM	6	
Roundness standards	Sphere or hemisphere: roundness, *R*	Stylus-on-spindle roundness instrument	0.01	1	µm			(9 + 50*R*), *R* in µm	nm	2	95%	No	DANIAmet-NGM	7	
Surface texture	Depth standard (ISO 5436-1 type A): depth *H*	Stylus instrument	0.25	10	µm			Q[23, 12*H*], *H* in µm	nm	2	95%	No	DANIAmet-NGM	8	
Surface texture	Roughness standard (ISO 5436-1 D), amplitude parameters	Stylus instrument	0.2	100	µm	*Ra*		25*Ra* , *Ra* in µm	nm	2	95%	No	DANIAmet-NGM	9	
						Rz		Q[10, 24*Rz*], *Rz* in µm	nm	2	95%	No	DANIAmet-NGM	9	
CMM artefacts	Ball/hole plate: centre coordinates	CMM and contacting probe, gauge substitution and reversal methods				Plate size	(700x700) mm^2	(0.8 + 1.1E-03*L*), *L* center distance in mm	µm	2	95%	No	DANIAmet-NGM	11	
CMMs	CMM: error of indicated coordinates	Ball plate				CMM size	(270x190x332) mm^3 to (910x830x332) mm^3	(1.3 + 1.0E-03*L*), *L* distance in mm	µm	2	95%	No	DANIAmet-NGM	13	
Line standards	2-D gratings: pitch	AFM	0.5	1	µm	Measurement area	70^2 $µm^2$	(0.1 + 1.6*p*), *p* in µm	nm	2	95%	No	DFM	14	Approved on 19 May 2007
Line standards	2-D gratings: pitch	AFM	1.001	12	µm	Measurement area	70^2 $µm^2$	(1.4 + 1.5*p*), *p* in µm	nm	2	95%	No	DFM	15	Approved on 19 May 2007

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Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty							
Class	**Instrument or Artifact: Measurand**	**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?**	**Service Provider**	**NMI Internal Service Identifier**	**Comments**
Surface texture	Groove or step height standard: step height *h*	AFM	0.020	3	µm	Width of groove or step height *w*	< 30 µm	Q[1, 2.6*h* , 0.002w^2], *h* and *w* in µm, values range from 1.0 nm to 8.1 nm	nm	2	95%	No	DFM	16	Approved on 19 May 2007