



Length, Russian Federation

VNIIM (D.I. Mendeleyev Institute for Metrology, Rosstandart)

VNIIMS (Institute for Metrological Service, Rosstandart)

UNIIM (Ural Scientific and Research Institute for Metrology, Rosstandart)

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					NMI Internal Service Identifier	NMI Service Provider	Comments
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?			
Laser radiations	Frequency stabilized laser: absolute frequency	He-Ne/J2 laser	633	633	nm	Temperature	20 °C ± 5 °C	15	kHz	2	95%	No	1	VNIIM	
End standards	Gauge block: central length <i>L</i>	Interferometry, exact fractions	1	100	mm	Temperature, pressure and humidity	ISO 3650, OIML R30	Q[30, 0.15 <i>L</i>], <i>L</i> in mm	nm	2	95%	No	3	VNIIM	
						Material	steel								
End standards	Length bar, long gauge block: central length <i>L</i>	Interferometry, exact fractions	200	1000	mm	Temperature, pressure and humidity	ISO 3650, OIML R30	Q[30, 0.20 <i>L</i>], <i>L</i> in mm	nm	2	95%	No	4	VNIIM	Valid just for the integer multiples of 100 mm
Line standards	Line scale: line spacing <i>L</i>	Interferometry and video microscope	0.01	1000	mm	Temperature, pressure and humidity	normal conditions	Q[20, 0.3 <i>L</i>], <i>L</i> in mm	nm	2	95%	No	5	VNIIM	
1-D gratings	Pitch <i>L</i>	Laser interferometer, diffractometer, SPM	270	1000	nm	Temperature, pressure and humidity	normal conditions	Q[0.05, 0.001 <i>L</i>], <i>L</i> in nm	nm	2	95%	No	7	VNIIM	
Diameter standards	External cylinder (plug): diameter <i>L</i>	1-D laser interference comparator	5	200	mm	Environmental conditions	normal	Q[0.40, 0.091 <i>L</i>], <i>L</i> in mm	µm	2	95%	No	8	VNIIM	Modified on 28 December 2012
Diameter standards	External cylinder (pin or wire): diameter <i>L</i>	1-D laser interference comparator	0.1	5	mm	Environmental conditions	normal	Q[0.51, 0.01 <i>L</i>], <i>L</i> in mm	µm	2	95%	No	9	VNIIM	Modified on 28 December 2012
Diameter standards	Internal cylinder (ring): diameter <i>L</i>	1-D laser interference comparator	5	200	mm	Environmental conditions	normal	Q[0.10, 0.016 <i>L</i>], <i>L</i> in mm	µm	2	95%	No	10	VNIIM	Modified on 28 December 2012



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Angle by circle dividers	Optical polygon: face angle	Two autocollimators measuring system	0	360	°	Environmental conditions	normal	0.05	"	2	95%	No	11	VNIIM	
Angle by circle dividers	Rotary table	Autocollimators system	0	360	°	Environmental conditions	normal	0.5	"	2	95%	No	12	VNIIM	
Angle instruments	Autocollimator: error of indicated angle	Interferometric examiner	0	± 600	"	Environmental conditions	normal	0.02	"	2	95%	No	14	VNIIM	
Surface texture, step height	Step height standard. Step height L	Laser heterodyne and micro-interferometer, SPM	1	3000	nm	Temperature, pressure and humidity	normal conditions	$Q[1.6, 0.007L]$, L in nm	nm	2	95%	No	15	VNIIM	According ISO 5436
Screw standards	Thread plug, plain: pitch diameter L	CMM and gauge substitution, 2-D comparator	10	500	mm	Environmental conditions	normal	$Q[1, 8E-03L]$, L in mm	µm	2	95%	No	16	VNIIM	
Screw standards	Thread plug, tapered: pitch diameter L	CMM and gauge substitution, 2-D comparator	10	500	mm	Environmental conditions	normal	$Q[1, 8E-03L]$, L in mm	µm	2	95%	No	17	VNIIM	
Screw standards	Thread ring, plain: pitch diameter L	CMM and gauge substitution, 2-D comparator	10	500	mm	Environmental conditions	normal	$Q[1, 8E-03L]$, L in mm	µm	2	95%	No	18	VNIIM	
Screw standards	Thread ring, tapered: pitch diameter L	CMM and gauge substitution, 2-D comparator	10	500	mm	Environmental conditions	normal	$Q[1, 8E-03L]$, L in mm	µm	2	95%	No	19	VNIIM	



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CMM artefacts	Ball plate, 2D centre coordinates	CMM with laser interferometer and reversal technique	(20x20)	(960x960)	mm ²	Temperature	20 °C ± 0.3 °C	Q[0.9, 0.75L], L distance in m	µm	2	95%	No	20	VNIIMS	Modified on 16 December 2014
CMM artefacts	Ball bar, centre spacing L	CMM with laser interferometer	10	960	mm	Temperature	20 °C ± 0.3 °C	Q[0.9, 0.75L], L in m	µm	2	95%	No	21	VNIIMS	Modified on 16 December 2014
Complex geometry	CMM	Ball plate calibration sphere	(20x20x20)	(2000x2000x1000)	mm ³	Temperature	20 °C ± 0.3 °C	Q[1.35, 1.5L], L length in m	µm	2	95%	No	22	VNIIMS	Modified on 16 December 2014
Roundness standards	Magnification stanart (e. g. fkick standard): roundness	Stylus-on-spindle roundness instrument	0	300	µm	Diameter	1 mm to 300 mm	Q[28, 10R], R in mm	nm	2	95%	No	COO-VNIIMS-L-423/4	VNIIMS	Approved on 10 November 2016
Roundness standards	sphere, hemisphere: roundness	Stylus-on-spindle roundness instrument	0	2000	nm	Diameter	1 mm to 100 mm	2.80E+01	nm	2	95%	No	COO-VNIIMS-L-423/4	VNIIMS	Approved on 10 November 2016
Straightness standards	Straight edge: straightness deviation	Comparison with straight edge: electronics levels	0	50	µm	Length L	up to 4 m	0.2L, L in m	µm	2	95%	No		UNIIM	Approved on 17 November 2011
Film thickness	Film thickness gauge	X-ray fluorescence	4	100	µm			(0.1 µm + 0.007h), h thickness in µm	µm	2	95%	No	L.6.6.1	UNIIM	Approved on 24 December 2014