

**Mass and Related Quantities, Russian Federation,****VNIIM (D.I. Mendeleev Institute for Metrology, Rostekhnregulirovaniye of Russia),****VNIIMS (Institute for Metrological Service, Rostekhnregulirovaniye of Russia),****VNIIFTRI (Institute for Physical-Technical and Radiotechnical Measurements, Rostekhnregulirovaniye of Russia) and****SNIIM (Siberian Scientific and Research Institute for Metrology, Rostekhnregulirovaniye of Russia).**

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Comments	Service provider	NMI internal identifier
Class	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?			
Mass	Mass standards	Subdivision method	1	100	mg			0.6 to 1.2	µg	2	95%	No	The volume of the mass standards is known	VNIIM	2
Mass	Mass standards	Subdivision method	0.1	1	g			1.2 to 2.0	µg	2	95%	No	The volume of the mass standards is known	VNIIM	3
Mass	Mass standards	Subdivision method	1	10	g			2 to 5	µg	2	95%	No	The volume of the mass standards is known	VNIIM	4
Mass	Mass standards	Subdivision method	10	100	g			5 to 10	µg	2	95%	No	The volume of the mass standards is known	VNIIM	5
Mass	Mass standards	Subdivision method	0.1	1	kg			10 to 50	µg	2	95%	No	The volume of the mass standards is known	VNIIM	6
Mass	Mass standards	Direct comparison	1	1	kg			50	µg	2	95%	No	The volume of the mass standards is known	VNIIM	1
Mass	Mass standards	Multiplication method	1	20	kg			0.05 to 3.0	mg	2	95%	No	The volume of the mass standards is known	VNIIM	7

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Class	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?			
Mass	Mass standards	Calibration method	500	500	kg			5.0	g	2	95%	No	Temperature and humidity measured	SNIIM	8
Force: tension and compression	Force transducers	Direct loading, deadweight	10	1000	kN			0.002	%	2	95%	Yes		VNIIM	01
Force: tension and compression	Force transducers	Direct loading, deadweight	2	100	kN			0.002	%	2	95%	Yes		VNIIM	02
Force: tension and compression	Force transducers	Direct loading, deadweight	0.1	5	kN			0.002	%	2	95%	Yes		VNIIM	03
Force: tension and compression	Force transducers	Direct loading, deadweight	10	200	N			0.002	%	2	95%	Yes		VNIIM	04
Force: tension	Force measuring device	Reference force transducers	5	50	kN			0.01	%	2	95%	Yes		VNIIM	11
Force: tension	Force measuring device	Reference force transducers	10	100	kN			0.01	%	2	95%	Yes		VNIIM	12
Force: tension	Force measuring device	Reference force transducers	20	200	kN			0.01	%	2	95%	Yes		VNIIM	13
Force: tension	Force measuring device	Reference force transducers	50	500	kN			0.01	%	2	95%	Yes		VNIIM	14
Force: tension	Force measuring device	Reference force transducers	100	1000	kN			0.01	%	2	95%	Yes		VNIIM	15
Force: compression	Force measuring device	Reference force transducers	10	100	kN			0.01	%	2	95%	Yes		VNIIM	21
Force: compression	Force measuring device	Reference force transducers	20	200	kN			0.01	%	2	95%	Yes		VNIIM	22

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Class	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?			
Force: compression	Force measuring device	Reference force transducers	50	500	kN			0.01	%	2	95%	Yes		VNIIM	23
Force: compression	Force measuring device	Reference force transducers	100	1000	kN			0.01	%	2	95%	Yes		VNIIM	24
Force: compression	Force measuring device	Reference force transducers	200	2000	kN			0.05	%	2	95%	Yes		VNIIM	25
Force: compression	Force measuring device	Reference force transducers	300	3000	kN			0.05	%	2	95%	Yes		VNIIM	26
Force: compression	Force measuring device	Reference force transducers	400	4000	kN			0.05	%	2	95%	Yes		VNIIM	27
Force: compression	Force measuring device	Reference force transducers	500	5000	kN			0.05	%	2	95%	Yes		VNIIM	28
Force: tension and compression	Force transducers	Lever-type amplification	40	2000	kN			0.05	%	2	95%	Yes		VNIIM	31
Viscosity	Capillary viscometers	Flow due to gravity	0.001	0.003	mm <sup>2</sup> /s <sup>2</sup>	Temperature	20 °C	0.1	%	2	95%	Yes		VNIIM	1
Viscosity	Capillary viscometers	Flow due to gravity	0.01	0.3	mm <sup>2</sup> /s <sup>2</sup>	Temperature	20 °C	0.2	%	2	95%	Yes		VNIIM	2
Viscosity	Capillary viscometers	Flow due to gravity	1	100	mm <sup>2</sup> /s <sup>2</sup>	Temperature	20 °C	0.3	%	2	95%	Yes		VNIIM	3
Viscosity	Newtonian liquids	Reference liquids	1.2	6.0	mm <sup>2</sup> /s	Temperature	20 °C	0.2	%	2	95%	Yes		VNIIM	4
Viscosity	Newtonian liquids	Reference liquids	10	600	mm <sup>2</sup> /s	Temperature	20 °C	0.25	%	2	95%	Yes		VNIIM	5
Viscosity	Newtonian liquids	Reference liquids	1000	10000	mm <sup>2</sup> /s	Temperature	20 °C	0.4	%	2	95%	Yes		VNIIM	6
Viscosity	Newtonian liquids	Reference liquids	20000	100000	mm <sup>2</sup> /s	Temperature	20 °C	0.5	%	2	95%	Yes		VNIIM	7

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Class	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?			
Viscosity	Newtonian liquids	Reference liquids	0.9	4.8	mPa s	Temperature	20 °C	0.2	%	2	95%	Yes		VNIIM	8
Viscosity	Newtonian liquids	Reference liquids	8	480	mPa s	Temperature	20 °C	0.25	%	2	95%	Yes		VNIIM	9
Viscosity	Newtonian liquids	Reference liquids	800	7900	mPa s	Temperature	20 °C	0.4	%	2	95%	Yes		VNIIM	10
Viscosity	Newtonian liquids	Reference liquids	16000	90000	mPa s	Temperature	20 °C	0.5	%	2	95%	Yes		VNIIM	11
Gauge pressure: liquid medium	Pressure measuring device, standard pressure generator	Direct comparison with standard, crossfloat	5E+04	1E+07	Pa			8E-06 to 2E-05		2	95%	Yes	Working fluid: aviation kerosene	VNIIM	1
Gauge pressure: liquid medium	Pressure measuring device, standard pressure generator	Direct comparison with standard, crossfloat	1E+07	6E+07	Pa			5E-05		2	95%	Yes	Working fluid: oil	VNIIM	2
Gauge pressure: liquid medium	Pressure measuring device, standard pressure generator	Direct comparison with standard, crossfloat	6E+07	2.5E+08	Pa			5E-04		2	95%	Yes	Working fluid: oil	VNIIM	3
Negative gauge pressure: gas medium	Pressure measuring device, standard pressure generator	Direct comparison with standard, crossfloat	-9.5E+04	4E+04	Pa			20	Pa	2	95%	No		VNIIM	4
Gauge pressure: gas medium	Pressure measuring device, standard pressure generator	Direct comparison with standard, crossfloat	4E+04	6.3E+05	Pa			2E-04		2	95%	Yes		VNIIMS	5

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Comments	Service provider	NMI internal identifier
Class	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?			
Gauge pressure: liquid medium	Pressure measuring device, standard pressure generator	Direct comparison with standard, crossfloat	2.5E+08	1.6E+09	Pa			3E-04		2	95%	Yes	Working fluid: oil	VNIIFTRI	6
Absolute pressure: gas medium	Pressure measuring device, standard pressure generator	Direct comparison with standard, crossfloat	2.7E+02	1.3E+05	Pa			6.7	Pa	2	95%	No		VNIIM	7
Absolute pressure: gas medium	Pressure measuring device, standard pressure generator	Direct comparison with standard, crossfloat	1.3E+05	7.2E+05	Pa			5 to 36	Pa	2	95%	No		VNIIM	8
Differential pressure: liquid medium	Pressure measuring device, standard pressure generator	Direct comparison with standard	0.1	100	Pa	Line pressure, $p_{line}$	1E+05 Pa	0.1	Pa	2	95%	No	Working fluid: ethanol	VNIIM	9
Differential pressure: liquid medium	Pressure measuring device, standard pressure generator	Direct comparison with standard	100	5E+03	Pa	Line pressure, $p_{line}$	1E+05 Pa	0.34	Pa	2	95%	No	Working fluid: water	VNIIM	10
Differential pressure: gas medium	Pressure measuring device, standard pressure generator	Direct comparison with standard, crossfloat	5E+03	4E+04	Pa	Line pressure, $p_{line}$	1E+05 Pa	1.1	Pa	2	95%	No		VNIIM	11

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Comments	Service provider	NMI internal identifier
Class	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?			
Absolute pressure: gas medium	Pressure measuring device, standard pressure generator	Direct comparison with standard	1E-03	1E+03	Pa			1E-04 to 6.6	Pa	2	95%	No		VNIIM	12
Absolute pressure: gas medium	Vacuum gauge	Direct comparison with standard	1E-07	1E-03	Pa			7E-09 to 4E-05	Pa	2	95%	No		VNIIM	13
Hardness	Primary hardness reference block	Rockwell A, C (with diamond indenter) according to ISO 6508:3 and GOST 9013	According to ISO 6508:1 and GOST 9013	According to ISO 6508:1 and GOST 9013	HR	Preliminary test force	98.07 N	3.0E-01	HRC	2	95%	No	Approved on 30 May 2005	VNIIFTRI	VNIIFTRI-01
						Total test force	588.4 N to 1471 N								
Hardness	Primary hardness reference block	Rockwell N (with diamond indenter) according to ISO 6508:3 and GOST 22975	According to ISO 6508:1 and GOST 22975	According to ISO 6508:1 and GOST 22975	HRN	Preliminary test force	29.4 N	5.0E-01	HRN	2	95%	No	Approved on 30 May 2005	VNIIFTRI	VNIIFTRI-02
						Total test force	147.1 N to 441.3 N								
Hardness	Primary hardness reference block	Rockwell B (with ball indenter) according to ISO 6508:3 and GOST 9013	According to ISO 6508:1 and GOST 9013	According to ISO 6508:1 and GOST 9013 According to ISO 6508:1 and GOST 22975	HRB	Preliminary test force	98.07 N	4.0E-01	HRB	2	95%	No	Approved on 30 May 2005	VNIIFTRI	VNIIFTRI-03
						Total test force	980.7 N								

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Hardness	Primary hardness reference block	Rockwell T (with ball indenter) according to ISO 6508:3 and GOST 22975	According to ISO 6508:1 and GOST 22975	According to ISO 6508:1 and GOST 9013 According to ISO 6508:1 and GOST 22975	HRT	Preliminary test force	29.4 N	6.0E-01	HRT	2	95%	No	Approved on 30 May 2005	VNIIFTRI	VNIIFTRI-04
						Total test force	147.1 N to 441.3 N								
Hardness	Primary hardness reference block	Vickers (HV1 to HV3) according to ISO 6507:3 and GOST 2999	According to ISO 6507:1 and GOST 2999	According to ISO 6507:1 and GOST 2999	HV	Total force	9.81 N to 29.42 N	12.0E-01	%	2	95%	Yes	Approved on 30 May 2005	VNIIFTRI	VNIIFTRI-05
Hardness	Primary hardness reference block	Vickers (HV5 to HV100) according to ISO 6507:3 and GOST 2999	According to ISO 6507:1 and GOST 2999	According to ISO 6507:1 and GOST 2999	HV	Total force	49.03 N to 980.7 N	10.0E-01	%	2	95%	Yes	Approved on 30 May 2005	VNIIFTRI	VNIIFTRI-06
Hardness	Primary hardness reference block	Brinell (HB 2.5/187.5) according to ISO 6506:3 and GOST 9012	According to ISO 6506:1 and GOST 9012	According to ISO 6506:1 and GOST 9012	HB	Total force	1839 N	10.0E-01	%	2	95%	Yes	Approved on 30 May 2005	VNIIFTRI	VNIIFTRI-07
Hardness	Primary hardness reference block	Brinell (HB5/750 - HB 10/3000) according to ISO 6506:3 and GOST 9012	According to ISO 6506:1 and GOST 9012	According to ISO 6506:1 and GOST 9012	HB	Total force	7355 N to 29420 N	8.0E-01	%	2	95%	Yes	Approved on 30 May 2005	VNIIFTRI	VNIIFTRI-08



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Class	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?			
Hardness	Primary hardness reference block	Shore D (with diamond-tipped impact body) according to GOST 23273	According to GOST 8.426	According to GOST 8.426	HSD	Height of fall of the impact body	19.0 mm	12.0E-01	HSD	2	95%	No	Approved on 30 May 2005	VNIIFTRI	VNIIFTRI-09