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19, Moskovsky Ave., 190005 St. Petersburg
2, Fedyuninsky Str., Lomonosov 2198412, St. Petersburg
19 Chaynoye Ozero Str., Toksovo, 188664 Vsevolozhsk, St. Petersburg
Sosnovka Park, Vyborgsky District, 194354 St. Petersburg
29/5 B Kozhevennaya Line, Vasilyevsky Island, 199106 St. Petersburg
2, Upper Podstepnovka, Volzhsky district, 443004 Samara region
167, Volchanskaya Str., 308009 Belgorod
3–7 Zh, 24th Line, Vasilyevsky Island, 199106 St. Petersburg

addresses of business locations

Calibration of measuring instruments

IM

calibration stamp code

No. n/n	Measurements, type (group) of measuring instruments	Metrological requirements		Notes
		measurement range	uncertainty (error, class)	
1	**2**	**3**	**4**	**5**
19, Moskovsky Ave., St. Petersburg 190005				
GEOMETRIC MEASUREMENTS				
1	**Length measuring instruments**			
1.1	Spectral lamps	(0.2 – 50) μm	$U_{0.95} = 5 \cdot 10^{-6}$ nm	SK 03–251–44/20–T
1.2	Laser wavelength meters	λ = (0.4 – 11) μm	$U^{o}_{0.95} = 10^{-10}$	Method of direct measurements using frequency–stabilized lasers
1.3	Frequency stabilized, tunable and continuous gas lasers	λ = (0.4 – 11) μm	$U_{0.95}$ = 0.02 fm	SK 03–251–02/20–T Method of direct measurements using GET 2
1.4	Laser displacement meters	$(10^{-9} – 10^{-2)}$ m	$U_{0.95}$ = (0.2 – 20) nm	Comparisons with GET 2
1.5	Benches for verification of line gauges	(0.001 – 1000) mm	$U_{0.95}$ = (0.02 – 0.10) μm	SK 03–251–12/20–C Comparisons using transfer standards
1.6	Line gauges	(0.001 – 2000) mm	$U_{0.95} = Q^{1)}$ [0.02; 0.30L] μm, where L – length, m	SK 03–251–03/14–T Method of direct measurements using GET 2
1.7	Object–micrometers	(0 – 1) mm	$U_{0.95} = Q^{1)}$ [19.2; 0.102L] nm, where L – length, mm	SK 03–251–03/14–T Method of direct measurements using GET 2

1	2	3	4	5
1.8	Measuring tapes and roulettes	(0.001 – 100) m	$U_{0.95} = Q^1[16.8; 7.6L]$ µm, where L – length, m	SK 03–251–13/19–T Direct interference measurements
1.9	Step height gauges block type A1 according to ISO 5436–1	(1 – 3000) nm	$U_{0.95} = Q^{1)}[1,6; 0.007\ L]$ nm, where L is the length, nm	SK 03–251–06/15–T
1.10	Geodesic wands	to 4 m	$U_{0.95} = Q^{1)}[0.02; 0.30L]$ µm, where L – length, m	SK 03–251–03/14–T Direct interference measurements
1.11	Benches for verification of end gauges	(0.1 – 1000) mm	$U_{0.95}$ = (0.01 – 0.06) µm	SK 03–251–13/20–C Comparisons using transfer standards
1.12	Plane–parallel end gauges	(100 – 1000) mm	$U_{0.95} = Q^{1)}[30; 0.20L]$ nm, where L – length, mm	SK 03–251–07/15–T
1.13	Plane–parallel end gauges	(0.1 – 100) mm	$U_{0.95} = Q\ ^{1)}[30; 0.15L]$ nm, where L – length, mm	SK 03–251–08/14–T
1.14	Benches for verification of measuring tapes, measuring tapes	(0.001 – 50) m	$U_{0.95}$ = (0.5 – 25) µm	Direct interference measurements, comparisons using transfer standards
1.15	Measuring rulers	(0 – 3000) mm	$U_{0.95}$ = (0.03 – 0.23) mm	SK 03–251–25/19–T
1.16	Digital rulers	(0 – 3000) mm	$U_{0.95}$ = (0.006 – 0.15) mm	SK 03–251–26/19–T
1.17	Installations for verification of level gauges	(0 – 50) m	$U_{0.95}$ = (0.05 – 12) mm	Direct comparisons with laser measuring system
1.18	Laser level meters (ultrasonic, radio wave, electronic, microwave, radar, capacitive, waveguide, float)	(0 – 30) m	$U_{0.95}$ = (0.1 – 2) mm	Direct comparisons with measuring tape
1.19	Measuring heads and indicators (lever–gear, digital, multi–turn, clock type, microcators, micators, opticators, minicators)	(0 – 150) mm	$U_{0.95}$ = (0.01 – 3) µm	MK 41–233–2016 Method of direct measurements using plane–parallel end gauges
1.20	Instruments for verification of measuring heads, indicators and indicating calipers	(0 – 100) mm	$U_{0.95}$ = (0.01 – 2.5) µm	SK 03–251–45/20–T Method of direct measurements using plane–parallel length gauges
1.21	Instruments for verification of extensometers	(0 – 100) mm	$U_{0.95}$ = (0.1 – 20) µm	SK 03–251–19/19–T Direct comparisons with laser measuring system
1.22	Thickness gauges and indicator wall meters	(0 – 200) mm	$U_{0.95}$ = (1 – 70) µm	SK 03–251–24/19–T Method of direct measurements using plane –parallel end gauges

1	2	3	4	5
1.23	Instruments measuring relative position of surfaces	± 40 mm	$U_{0.95}$ = (0.005 – 1) mm in the measuring range from 0 to 40 mm, $U_{0.95}$ = (1 – 0.005) mm in the measuring range from minus 40 to 0 mm	SK 03–251–21/19–T
1.24	Micrometers	(0 – 3000) mm	$U_{0.95}$ = (0.5 – 20) μm	SK 03–251–24/19–T Method of direct measurements using plane parallel end gauges
1.25	Caliper tool	(0 – 4000) mm	$U_{0.95}$ = (0.003 – 0.15) mm	SK 03–251–18/19–T Method of direct measurements using plane parallel end gauges
1.26	Micrometric and indicator depth gauges	(0 – 300) mm	$U_{0.95}$ = (1 – 8) μm	SK 03–251–18/19–T Method of direct measurements using plane parallel end gauges
1.27	Staples	(0 – 2000) mm	$U_{0.95}$ = (0.3 – 12) μm	SK 03–251–24/19–T Method of direct measurements using plane parallel end gauges
1.28	Horizontal and vertical length gauges (altimeters)	(0 – 1000) mm (1000 – 5000) mm	$U_{0.95}$ = $= Q^{1)}[0.020; 0.34{\cdot}10^{-3}L]$ μm $U_{0.95}$ = $= Q^{1)}[0.007; 0.65{\cdot}10^{-3}L]$ μm, where L – length, mm	SK 03–251–45/20–T Method of direct measurements using plane parallel end gauges Direct comparisons with the laser measuring system
1.29	Coordinate measuring machines	X – 15000 mm Y – 5000 mm Z – 5000 mm	$U_{0.95}$ = $= Q^{1)}[0.56; 2.31{\cdot}10^{-3}L]$ μm, where L – length, mm	SK 03–251–32/19–T Method of direct measurements using plane parallel end gauges Direct comparisons with laser measuring system
1.30	Probes	(0.02 – 2) mm	$U_{0.95}$ = 0.7 μm	Method of direct measurements using measuring head
1.31	Radius templates	R (1 – 70) mm	$U_{0.95}$ = 10 μm	Method of direct measurements using two–coordinate measuring instrument
1.32	Laboratory sieves	(0.02 – 125) mm	$U_{0.95}$ = 1 μm	Method of direct measurements using two–coordinate measuring instrument

1	2	3	4	5
1.33	Screw ocular micrometers	15x (0 – 8) mm	$U_{0.95}$ = 5 µm	Method of direct measurements using two–coordinate measuring instrument
1.34	Threaded templates	(0.4 – 6.0) mm 28 – 4 threads per 1"	$U_{0.95}$ = 5 µm	Method of direct measurements using two–coordinate measuring instrument
1.35	Calibration squares	(60 – 1600) mm	$U_{0.95}$ = (1 – 36) µm	Method of direct measurements using measuring head
1.36	Special and universal templates	(0 – 220) mm	$U_{0.95}$ = 10 µm	Method of direct measurements using two–coordinate measuring instruments
1.37	Calipers, templates, stands and railway devices (track measuring)	(0 – 3000) mm	$U_{0.95}$ = (0.0005 – 0.5) mm	M OKT/DCM3.10.002 Method of direct measurements using end gauges
1.38	Measuring rods (road, water meter, etc.)	(0 – 8000) mm	$U_{0.95}$ = (0.0005 – 0.5) mm	Direct comparisons with measuring tape
1.39	Linear displacement transducers, extensometers	(0 – 7000) mm	$U_{0.95}$ = (0.02 – 6) µm	SK 03–251–33/19–T Method of direct measurements using plane parallel end gauges Direct comparisons with laser measuring system
1.40	Coordinate measuring instruments, incl. projecting and measuring microscopes	(0 – 200) mm (200 – 1000) mm	$U_{0.95}$ = = $Q^{1)}[0.6; 1\cdot10^{-3}L]$ µm $U_{0.95}$ = = $Q^{1)}[0.5; 2.5\cdot10^{-3}L]$ µm, where L – length, mm	SK 03–251–41/20–T Method of direct measurements using plane–parallel end gauges and line gauges
1.41	Calibration rulers	(50 – 500) mm	$U_{0.95}$ = (0.2 – 1) µm	Method of direct measurements using measuring head
1.42	Control bars	(150 – 500) mm	$U_{0.95}$ = (0.1 – 0.5) µm	Direct comparisons with flat glass plate
1.43	Systems and complexes for nuclear and gas industry	(0.0001 – 100) m	$U_{0.95}$ = (0.03 – 100) mm	ITCYA.463439.118D2 Method of direct measurements using end plane–parallel length measures, measuring tapes, measuring rings
1.44	Laser measuring systems, coordinate measuring systems (including trackers and scanners)	(0 – 200) m	$U_{0.95}$ = = $Q^{1)}[0.003; 0.07L]$ µm, where L – length, m	SK 03–251–33/19–T Direct comparisons with GET 2, tacheometer
1.45	Optical and digital levels	(0.1 – 5000) m	$U_{0.95}$ = 0.1 mm	Direct comparisons with tacheometer

1	2	3	4	5
1.46	Laser levels, including laser plane builders	(0 – 700) m	$U_{0.95}$ = 0.05 mm	Direct comparisons with tacheometer
1.47	Leveling Measuring rods	(0 – 8000) mm	$U_{0.95}$ = (0.05 – 0.5) mm	Direct comparisons with measuring tape
1.48	Gauging rods	(0 – 8000) mm	$U_{0.95}$ = (0.1 – 1.5) mm	Direct comparisons with measuring tape
1.49	Measuring waymarks	(0 – 12) m	$U_{0.95}$ = (1 – 3) mm	Direct comparisons with measuring tape
1.50	Material length gauges	(0.1 – 99999.9) m	$U_{0.95}$ = (0,05 + 0,004 L) m, where L – length, m	Method of direct measurements using measuring tape
1.51	Tacheometers	to 10000 m	$U_{0.95} = Q^{1)}[0.3; (0.2 + 0.6 \cdot 10^{-6} L)]$ mm where L – length, mm	SK 03–251–40/20–T
1.52	Distance meters	(0 – 30) m (30 – 3500) m	$U_{0.95}$ = 0.1 mm $U_{0.95} = Q^{1)}$ $[0.3; (0.2 + 0.6 \cdot 10^{-6} L)]$ mm, where L – length, mm	SK 03–251–40/20–T
1.53	Geodesic bases	to 3500 m	$U_{0.95} = Q^{1)}[0.9; (0.2 + 0.6 \cdot 10^{-6} L)]$ mm, where L – length, mm	Method of direct measurements with tacheometer
1.54	Internal diameter gauges (rings)	(0.5 – 200) mm (200 – 500) mm	$U_{0.95} = Q^{1)}[0.05; 0.59 \cdot 10^{-3} L]$ µm, $U_{0.95} = Q^{1})$ $[0.05; 0.77 \cdot 10^{-3} L]$ µm, where L – length, mm	SK 03–251–05/14–T Method of direct measurements using horizontal length gauge
1.55	Cylindrical gauges external dimensions – smooth gauges (plugs), wires and rollers	(0.5 – 500) mm	$U_{0.95} = Q^{1})$ $[0.06; 0.7 \cdot 10^{-3} L]$ µm, where L – length, mm	SK 03–251–04/14–T Direct measurement method using horizontal length gauge
1.56	Nutromery	(0.3 – 4000) mm	$U_{0.95} = Q^{1)}[0.6; 5.6 \cdot 10^{-3} L]$ µm, where L – length, mm	SK 03–251–36/19–T SK 03–251–29/19–T Method of direct measurements using measuring rings, horizontal length gauge , plane– parallel end gauges
1.57	Threaded gauges: – metric, – pipe cylindrical, – pipe conical, – locking	 (1 – 350) mm (1/8 – 20)" (1/8 – $3^1/_2$)" ($3^1/_2$ – 20)" Z 65 – Z 203	 $U_{0.95}$ = 0.5 µm $U_{0.95}$ = 0.5 µm $U_{0.95}$ = 1.2 µm $U_{0.95}$ = 1.6 µm $U_{0.95}$ = 1.6 µm	SK 03–251–09/14–T Method of direct measurements using horizontal length gauge, two –coordinate measuring instrument
1.58	Instruments measuring hole diameters	(1 – 300) mm	$U_{0.95} = Q^{1)}$ $[0.08;0.25 \cdot 10^{-3} L]$ µm where L – length, mm	SK 03–251–12/20–C Method of direct measurements using measuring rings, line gauges

1	2	3	4	5
1.59	Systems measuring smooth and threaded gauges and parts of complex shape, instrument for measuring thread parameters	(0 –350) mm	$U_{0.95}$ = (0.5 – 3) μm	Method of direct measurements using measuring rings, plane–parallel end gauges, thread gauges
1.60	Coating thickness gauges	(0 – 20) mm	$U_{0.95}$ = 0.08 μm	SK 03–251–14/15 Method of direct measurements using horizontal length gauge
1.61	Thickness gauges	(0.01 – 500) mm	$U_{0.95}$ = = $Q^{1)}$ [0.09;0.7 · 10^{-3} L] μm where L – length, mm	SK 03–251–14/15 Method of direct measurements using horizontal length gauge
1.62	Thickness gauges (ultrasonic, eddy current , magnetic)	(0 – 500) mm	$U_{0.95}$ = (0.0003 – 5) mm	ISO 2178:2016 ISO 2360:2017 Method of direct measurements using thickness gauges
1.63	Sensitivity standards	(0.1 – 5) mm	$U_{0.95}$ = (5 – 100) μm	Method of direct measurements using two–coordinate measuring instrument
1.64	Gauges (references) for non–destructive testing	(0.1 –100) mm (100 – 300) mm (300 – 1000) mm R_a (0.01 – 150) μm R_z R_{max} (0.01 – 320) μm	$U_{0.95}$ = 5 μm $U_{0.95}$ = 0.04 mm $U_{0.95}$ = 0.2 mm $U^{o}_{0.95}$ = (6 – 1)%	SK 03–251–28/19–T Method of direct measurements using measuring microscope, caliper, measuring ruler, instruments measuring roughness
1.65	Short length standards (targets, photomasks, samples for microscope calibration, etc.)	(0.7 – 1000) μm	$U_{0.95}$ = = $Q^{1)}$ [19.2; 0.102 L] nm, where L – length, mm	SK 03–251–03/14–T Method of direct measurements using GET 2
1.66	Flaw detectors (ultrasonic, eddy current, magnetic)	Minimum defect size: 0.1 mm Defect depth: (10 – 100) % of wall thickness	$U^{\circ}_{0.95}$ = 1 % $U^{\circ}_{0.95}$ = (0,05 – 7) %	Method of direct measurements using measures for flaw detection
1.67	Radiographic and X–ray television complexes	(0.01 – 1000) mm	$U_{0.95}$ = (0.1 – 0.7) μm	Method of direct measurements using plane parallel end gauges
1.68	Systems, complexes, installations, devices and modules measuring length	(0 – 100) m	$U_{0.95}$ = (0,2·0^{-9}– 5·10^{-6}) m	Direct comparisons with GET 2. Method of direct measurements using plane–parallel end gauges, measuring tapes

1	2	3	4	5
2	**Instruments measuring angles**			
2.1	Interference examiners	(0 – 6)'	$U_{0.95}$ = 0.02"	Direct comparisons with GET 22
2.2	Angle setting installations, systems and devices measuring angle	(0 – 360)º	$U_{0.95}$ = 0.03"	SK 03–251–12/15–T Direct comparisons with GET 22
2.3	Multifaceted prisms	(0 – 360)º	$U_{0.95}$ = 0.05"	SK 03–251–11/15–T
2.4	Angular measures	(0 – 360)º	$U_{0.95}$ = 0.2"	Method of direct measurements using GET 22
2.5	Autocollimators	±15" ±600" ±1000" ±300'	$U_{0.95}$ = 0.01" $U_{0.95}$ = 0.02" $U_{0.95}$ = 0.05" $U_{0.95}$ = 0.2"	SK 03–251–10/15–T Direct comparisons with GET 22
2.6	Angular displacement transducers (encoders)	(0 – 360)º	$U_{0.95}$ = 0.1"	Direct comparisons with GET 22
2.7	Dividing angular measuring instruments, optical dividing heads	(0 – 360)º	$U_{0.95}$ = 0.5"	Direct comparisons with multifaceted prism and autocollimator
2.8	Theodolites	(0 – 360)º	$U_{0.95}$ = 0.3"	SK 03–251–40/20–T
2.9	Goniometers	(0 – 360)º	$U_{0.95}$ = 0.05"	Direct comparisons with GET 22
2.10	Examiners	(0 – 360)'	$U_{0.95}$ = 0.08"	Method of direct measurements using plane parallel end gauges
2.11	Optical quadrants	(0 – 360)º	$U_{0.95}$ = 2.5"	Direct comparisons with multifaceted prism and autocollimator
2.12	Level meters: – with micrometric supply of ampoule; – frame and bar; – electronic	± 30" ± 30 mm/m 250 mm ± 5 mm/m ± 45º ± 90º	$U_{0.95}$ = 0.2" $U_{0.95}$ = 0.01 mm/m $U_{0.95}$ = 0.002 mm/m $U_{0.95}$ = 0.001 mm/m $U_{0.95}$ = 5" $U_{0.95}$ = 0.1º	SK 03–251–20/19–T Direct comparisons with the examiner, optical dividing head
2.13	Goniometers	(0 – 360)º	$U_{0.95}$ = 1'	Method of direct measurements using angle gauges
2.14	Special and universal templates	(0 – 160)°	$U_{0.95}$ = 1'	Method of direct measurements using two–coordinate measuring instrument
2.15	Calipers, templates, stands and railway devices (track measuring)	(0 – 360)°	$U_{0.95}$ = 1'	Method of direct measurements using two–coordinate measuring instrument

1	2	3	4	5
2.16	Measuring rods (road, water meter, etc.)	(0 – 360)°	$U_{0.95}$ = 1'	Direct measurement method using quadrant
2.17	Coordinate measuring instruments, incl. projection	(0 – 360)º	$U_{0.95}$ = 10"	SK 03–251–41/20–T Method of direct measurements using angle gouges
2.18	Sinus rulers	(100 – 500) mm	$U_{0.95}$ = 2"	Direct comparisons with angles gauges and autocollimator
2.19	Systems and complexes for nuclear and gas industry	(0 – 360)º	$U_{0.95}$ = 20"	ITCYA.463439.118D2 Direct comparisons with quadrant, theodolite
2.20	Coordinate measuring systems (including trackers and scanners)	(0 – 360)º	$U_{0.95}$ = 0.3"	Direct comparisons with GET 22
2.21	Tacheometers	(0 – 360)º	$U_{0.95}$ = 0.3"	SK 03–251–40/20–T
2.22	Laser measuring systems	± 10º	$U_{0.95}$ = 0.2"	SK 03–251–34/19–T
2.23	Distance meters	(0 – 360)º	$U_{0.95}$ = 0.1º	SK 03–251–20/19–T Direct comparisons with dividing optical head
2.24	Measures (references) for flaw detection	(0 – 360)º	$U_{0.95}$ = 1'	Method of direct measurements using two–coordinate measuring instrument
2.25	Tilt sensors	(0 – 360)º	$U_{0.95}$ = 0.1º	Direct comparisons with dividing optical head
2.26	Systems, complexes, installations, instruments and modules measuring angles	(0 – 360)º	$U_{0.95}$ = 0.1"	Direct comparisons with GET 22
3	**Instruments measuring roughness parameters**			
3.1	Roughness measures	R_a (0.01 – 150) µm R_z R_{max} (0.01 – – 250) µm	$U^o_{0.95}$ = (6 – 1) %	Method of direct measurements with roughness measuring instrument
3.2	Surface roughness samples (comparisons)	R_a (0.01 – 150) µm R_z R_{max} (0.01 – – 320) µm	$U^o_{0.95}$ = (20 – 3) %	Method of direct measurements with a roughness measuring instrument
3.3	Instruments measuring roughness parameters	R_a (0.001 – 400) µm R_z R_{max} (0.001 – – 3000) µm	$U^o_{0.95}$ = (10 – 1) %	GOST R 8.651–2009 Method of direct measurements using roughness standards

1	2	3	4	5
MECHANICAL MEASUREMENTS				
4	**Mass measuring instruments**			
4.1	Secondary standards – copies of mass unit standard	1 kg	$U_{0.95} = 2.4 \cdot 10^{-2}$ mg	Comparison with GET 3 using vacuum comparator
4.2	Secondary (working) standards of mass unit standard	1 mg; 2 mg; 5 mg; 10 mg 20 mg; 50 mg; 100 mg 200 mg 500 mg; 1 g; 2 g 5 g 10 g 20 g 50 g; 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg	$U_{0.95} = 6 \cdot 10^{-4}$ mg $U_{0.95} = 6 \cdot 10^{-4}$ mg $U_{0.95} = 9 \cdot 10^{-4}$ mg $U_{0.95} = 1.6 \cdot 10^{-3}$ mg $U_{0.95} = 1.9 \cdot 10^{-3}$ mg $U_{0.95} = 2.6 \cdot 10^{-3}$ mg $U_{0.95} = 4.4 \cdot 10^{-3}$ mg $U_{0.95} = 8.4 \cdot 10^{-3}$ mg $U_{0.95} = 1.3 \cdot 10^{-2}$ mg $U_{0.95} = 1.8 \cdot 10^{-2}$ mg $U_{0.95} = 5.0 \cdot 10^{-2}$ mg $U_{0.95} = 2.6 \cdot 10^{-1}$ mg $U_{0.95} = 5.0 \cdot 10^{-1}$ mg $U_{0.95} = 9.0 \cdot 10^{-1}$ mg $U_{0.95} = 3$ mg	Method of cumulative measurements using comparator
4.3	Measures of mass (weights)	1 mg; 2 mg; 5 mg; 10 mg 20 mg; 50 mg; 100 mg 200 mg 500 mg; 1 g; 2 g 5 g 10 g 20 g 50 g; 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg	$U_{0.95} = 6 \cdot 10^{-4}$ mg $U_{0.95} = 6 \cdot 10^{-4}$ mg $U_{0.95} = 9 \cdot 10^{-4}$ mg $U_{0.95} = 1.6 \cdot 10^{-3}$ mg $U_{0.95} = 1.9 \cdot 10^{-3}$ mg $U_{0.95} = 2.6 \cdot 10^{-3}$ mg $U_{0.95} = 4.4 \cdot 10^{-3}$ mg $U_{0.95} = 8.4 \cdot 10^{-3}$ mg $U_{0.95} = 1.3 \cdot 10^{-2}$ mg $U_{0.95} = 1.8 \cdot 10^{-2}$ mg $U_{0.95} = 5.0 \cdot 10^{-2}$ mg $U_{0.95} = 2.6 \cdot 10^{-1}$ mg $U_{0.95} = 5.0 \cdot 10^{-1}$ mg $U_{0.95} = 9.0 \cdot 10^{-1}$ mg $U_{0.95} = 3$ mg	Comparison with a comparator

1	2	3	4	5
4.4	Measures of mass (loads)	1 mg; 2 mg; 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg	$U_{0.95}$ =3 · 10^{-3} mg $U_{0.95}$ =2.7 · 10^{-3} mg $U_{0.95}$ =3.3 · 10^{-3} mg $U_{0.95}$ =4.0 · 10^{-3} mg $U_{0.95}$ =5.3 · 10^{-3} mg $U_{0.95}$ =6.7·10^{-3} mg $U_{0.95}$ =8.3 · 10^{-3} mg $U_{0.95}$ =1 · 10^{-2} mg $U_{0.95}$ =1.3 · 10^{-2} mg $U_{0.95}$ =1.7 · 10^{-2} mg $U_{0.95}$ =2.0 · 10^{-2} mg $U_{0.95}$ =2.7 · 10^{-2} mg $U_{0.95}$ =3.3 · 10^{-2} mg $U_{0.95}$ =5.3 · 10^{-2} mg $U_{0.95}$ =1.0 · 10^{-1} mg $U_{0.95}$ =2.7 · 10^{-1} mg $U_{0.95}$ =5.3 · 10^{-1} mg $U_{0.95}$ =1.0 mg $U_{0.95}$ =2.7 mg $U_{0.95}$ =5.3 mg $U_{0.95}$ =10 mg	Comparison with a set of standard weights using comparator. Nominal masses of loads are given. The conditional mass of goods may differ from the nominal. Intermediate values are calculated according to MK.
4.5	Mass standards (baskets)	10 kg 20 kg 40 kg 60 kg	$U_{0.95}$ =5.3 mg $U_{0.95}$ =10 mg $U_{0.95}$ =20 mg $U_{0.95}$ =100 mg	Comparison with a set of standard weights using comparator. Intermediate values are calculated according to MK
4.6	Mass standards (weights)	200 kg 500 kg 1 t	$U_{0.95}$ = 0.3 g $U_{0.95}$ = 0.8 g $U_{0.95}$ = 1.6 g	Comparison with a set of standard weights using comparator. Intermediate values are calculated according to MK
4.7	Non–automatic scales	from 1 · 10^{-5} to 6 g from 1 · 10^{-4} to 50 g from 1 · 10^{-3} to 200 g from 1 · 10^{-2} to 500 g from 1 · 10^{-4} to 5 kg from 1 · 10^{-3} to 15 kg from 5 · 10^{-3} to 70 kg from 5 · 10^{-2} to 100 kg from 5 · 10^{-1} to 200 kg from 5 to 500 kg from 50 to 1000 kg from 2·10^{-3} to 2·10^{5} kg from 2·10^{-2} to 2·10^{5} kg	$U_{0.95}$ =3.5·10^{-3} mg $U_{0.95}$ =8.7·10^{-3} mg $U_{0.95}$ =2.5·10^{-2} mg $U_{0.95}$ =2.2·10^{-1} mg $U_{0.95}$ =2.2 mg $U_{0.95}$ =22 mg $U_{0.95}$ =220 mg $U_{0.95}$ =2 g $U_{0.95}$ =4.3 g $U_{0.95}$ =10.8 g $U_{0.95}$ =21.6 g $U_{0.95}$ = 0.03 % $U_{0.95}$ = 0.03 %	Method of direct measurements. $U_{0.95}$ is given for the maximum load of the range at the lowest possible d for the "ideal tool", where d is the actual division value. Intermediate values are calculated according to MK. Calibration over 1000 kg is carried out only for "crane" scales.
4.8	Mass comparators	to 1 g to 10 g to 100 g to 1kg to 10 kg to 20 kg	3.1 · 10^{-4} mg 3.1 · 10^{-3} mg 3.1 · 10^{-3} mg 3.1 · 10^{-3} mg 3.1 · 10^{-1} mg 1.6 mg	Method of multiple measurements. Intermediate values are calculated according to MK

1	2	3	4	5
		to 20 kg to 50 kg to 500 kg to 1000 kg	3.1 mg 16 mg 160 mg 310 mg	
4.9	Liter grain testers of the 1st and 2nd class according to GOST 16464	(720 – 820) g	$U_{0.95}$ = 0.7 g	SK 03–2301–6–MK – 13–2020–T
4.10	Thermogravimetric moisture meters	to 250 g to 100 %	$U_{0.95}$ = 5.0 mg $U_{0.95}$ = 0.01 %	Method of direct measurements. Intermediate values are calculated according to MK.
5	**Force measuring instruments**			
5.1	Dynamometers and force–measuring sensors	$(10 – 10^6)$ N $(10^6 – 2 \cdot 10^6)$ H $(2\ 10^6 – 5 \cdot 10^6)$ H	$U^o_{0.95}$ = 0.01 % $U^o_{0.95}$ = 0.06 % $U^o_{0.95}$ = 0.12 %	Direct measurement method
5.2	Load cells	$(1 – 5 \cdot 10^5)$ kg	$U^o_{0.95}$ = 0.01 %	Direct measurement method
5.3	Power generating machines	$(10 – 10^6)$ N $(10^6 – 3 \cdot 10^6)$ H $(3\ 10^6 – 9 \cdot 10^6)$ N	$U^o_{0.95}$ = 0.01 % $U^o_{0.95}$ = 0.02 % $U^o_{0.95}$ = 0.04 %	Comparison method with GET 32
5.4	Test machines	$(10 — 10^6)$ N $(10^6 – 5 \cdot 10^6)$ H	$U^o_{0.95}$ = 0.2 % $U^o_{0.95}$ = 0.4 %	Direct measurement method
MEASUREMENTS OF FLOW, FLOW RATE, LEVEL, VOLUME OF SUBSTANCES				
6	**Instruments measuring gas volume flow**			
6.1	Sampling devices, dust collection devices, gas flow meters and regulators	from 0.002 to 400 dm^3/min	$U_{0.95}$ = 0.1 % (rel.)	Method of indirect measurements
6.2	Sampling devices, dust collection devices, gas flow meters and regulators	from 0.002 to 50 dm^3 /min	$U_{0.95}$ = 0.2 % (rel.)	Direct comparison
7	**Instruments measuring volume of gas**			
7.1	Sampling devices, dust collection devices, gas flow meters and regulators	from 0.1 to 60000 dm^3	$U_{0.95}$= 0.1 % (rel.)	Direct comparison
8	**Instruments measuring volume, capacity**			
8.1	Dispensers, pipettes, syringes, microsyringes, glass, plastic capacity gauges	from 0.1 to 0.5 μl incl.	$U^o_{0.95}$ = 6 %	Gravimetric method using distilled water
		from 0.5 to 1.0 μl incl.	$U^o_{0.95}$ = 1 %	
		from 1.0 to 10 μl incl.	$U^o_{0.95}$ = 0.3 %	
		from 10 to 100 μl incl.	$U^o_{0.95}$ = 0.2 %	
		from 0.1 to 50 ml incl.	$U^o_{0.95}$ = 0.1 %	
		from 0.05 to 10 l incl.	$U^o_{0.95}$ = 0.01 %	

1	2	3	4	5
PWSSSUWS MEASUREMENTS, VACUUM MEASUREMENTS				
9	**Instruments measuring overpressure**			
9.1	Piston pressure gauges	from minus 0.1 to 1 MPa from 1 to 3 MPa from 3 to 100 MPa from 100 to 250 MPa	$U^{o}_{0.95} = 1.77 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa $U^{o}_{0.95} = 1.77 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa $U^{o}_{0.95} = 1.80 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa $U^{o}_{0.95} = 1.81 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa	Direct comparison with GET 23, Standard–copy
9.2	Pressure calibrators (generators, controllers); converters, pressure sensors; digital pressure gauges	from minus 0.1 to 1 MPa	$U^{o}_{0.95} = 1.77 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa	Direct comparison with GET 23, Standard–copy, working standard
		from 1 to 3 MPa	$U^{o}_{0.95} = 1.77 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa	
		from 3 to 10 MPa from 10 to 100 MPa from 100 to 250 MPa	$U^{o}_{0.95} = 1.80 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa $U^{o}_{0.95} = 1.81 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa $U^{o}_{0.95} = 1.86 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa	
9.3	Deformation manometers	from minus 0.1 to 0 MPa	$U^{o}_{0.95} =$ $= 2 \cdot Q^{1)}[8.9 \cdot 10^{-6} \cdot p;$ $1.2 \cdot 10^{-1} \cdot c]$, where p is the measured pressure, Pa; s is the division value of pressure gauge scale, Pa	Direct Comparison with Standard–copy, working standard
		from 0 to 60 MPa from 60 to 250 MPa	$U^{o}_{0.95} =$ $= 2 \cdot Q^{1)}[8.9 \cdot 10^{-6} \cdot p;$ $1.2 \cdot 10^{-1} \cdot c]$, where p is the measured pressure, Pa; s is the division value of pressure gauge scale, Pa $U^{o}_{0.95} =$ $= 2 \cdot Q^{1)}[9.3 \cdot 10^{-6} \cdot p;$ $1.2 \cdot 10^{-1} \cdot c]$, where p – measured pressure, Pa; s is the price of division of the pressure gauge scale, Pa	

1	2	3	4	5
9.4	Pressure measuring instruments, measuring channels and others	from minus 0.1 to 1 MPa	$U^{o}_{0.95} = 1.77 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa	Direct comparison direct comparison with GET 23, copy standard, working standard
		from 1 to 3 MPa	$U^{o}_{0.95} = 1.77 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa	
		from 3 to 10 MPa	$U^{o}_{0.95} = 1.80 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa	
		from 10 to 100 MPa	$U^{o}_{0.95} = 1.81 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa	
		from 100 to 250 MPa	$U^{o}_{0.95} = 1.86 \cdot 10^{-5} \cdot p$, where p is the measured pressure, Pa	
9.5	Measuring pressure transducers, pressure sensors	from minus 0.1 to 0 MPa	$U_{0.95} = 2 \cdot Q^{1)}[8.9 \cdot 10^{-6} \cdot p; X]$	Direct comparison with copy standard, working standard
		from 0 to 60 MPa	$U_{0.95} = 2 \cdot Q^{1)}[9.2 \cdot 10^{-6} \cdot p; X]$	
		from 60 to 250 MPa	$U_{0.95} = 2 \cdot Q^{1)}[9.3 \cdot 10^{-6} \cdot p; X]$ where p is the measured pressure, Pa; X – calculated value for the range of the output signal	
		limits of outstanding change of output signals from 0 to 0.1 V from 0 to 1 V from 0 to 10 V	$X = 6.93 \cdot 10^{-7} \cdot p/(U_H - U_L)$ $X = 3.0 \cdot 10^{-6} \cdot p/(U_H - U_L)$ $X = 2.19 \cdot 10^{-5} \cdot p/(U_H - U_L)$ U_L, U_H – lower and upper limit values of the output signal, V	
		from 0 to 10 mA from 0 to 20 mA	$X = 1.73 \cdot 10^{-4} \cdot p/(I_H - I_L)$ $X = 6.93 \cdot 10^{-4} \cdot p/(I_H - I_L)$ I_L, I_H – lower and upper limit values of the output signal, mA	
10	**Instruments measuring differential pressure**			
10.1	Pressure calibrators (generators, controllers); converters, pressure sensors; digital pressure gauges	from $5 \cdot 10^{-2}$ to $1 \cdot 10^{2}$ Pa	$U_{0.95} = 0.06$ Pa	Direct comparison with GET 95
		from $1 \cdot 10^{2}$ to $5 \cdot 10^{3}$ Pa	$U_{0.95} = 0.14$ Pa	
		from $5 \cdot 10^{3}$ to $1 \cdot 10^{5}$ Pa	$U_{0.95} = 0.62$ Pa	
10.2	Micromanometers	from $5 \cdot 10^{-2}$ to $1 \cdot 10^{2}$ Pa	$U_{0.95} = 0.09$ Pa	Direct comparison with GET 95
		from $1 \cdot 10^{2}$ to $5 \cdot 10^{3}$ Pa	$U_{0.95} = 0.17$ Pa	
		from $5 \cdot 10^{3}$ to $1 \cdot 10^{5}$ Pa	$U_{0.95} = 0.65$ Pa	
10.3	Pressure transmitters (calibrators)	from $5 \cdot 10^{-2}$ to $1 \cdot 10^{2}$ Pa	$U_{0.95} = 0.2$ Pa	Direct comparison with GET 95
		from $1 \cdot 10^{2}$ to $5 \cdot 10^{3}$ Pa	$U_{0.95} = 0.51$ Pa	
		from $5 \cdot 10^{3}$ to $1 \cdot 10^{5}$ Pa	$U_{0.95} = 2.2$ Pa	

1	2	3	4	5
10.4	Deformation manometers	from $5 \cdot 10^{-2}$ to $1 \cdot 10^{2}$ Pa	$U_{0.95}$ = $2 \cdot Q$ 1) [0.03 Pa; 0.12·*s*], where *s* is the division value of the manometer scale, Pa	Direct comparison with GET 95
		from $1 \cdot 10^{2}$ to $5 \cdot 10^{3}$ Pa	$U_{0.95}$ = $2 \cdot Q$ 1) [0.07 Pa; 0.12·*s*], where *s* is the division value of the manometer scale, Pa	
		from $5 \cdot 10^{3}$ to $1 \cdot 10^{5}$ Pa	$U_{0.95}$ = $2 \cdot Q$ 1) [0.31 Pa; 0.12·*s*], where *s* is the division value of the manometer scale, Pa	
11	**Instruments measuring absolute pressure**			
11.1	Piston pressure gauges	from $7 \cdot 10^{3}$ to $1 \cdot 10^{6}$ Pa	$U_{0.95}$ = 0.9 Pa + $2.1 \cdot 10^{-5} \cdot p$, where *p* – measured pressure, Pa	Direct comparison with GET 101
11.2	Calibrators (setters, generators, controllers) pressure; converters, pressure sensors; digital pressure gauges	from $1 \cdot 10^{-1}$ to $1 \cdot 10^{3}$ Pa	$U_{0.95}$ = $7.2 \cdot 10^{-3}$ Pa + + $1.0 \cdot 10^{-4} \cdot p$, where *p* – measured pressure, Pa	Direct comparison with GET 101
		from $1 \cdot 10^{3}$ to $1.3 \cdot 10^{5}$ Pa	$U_{0.95}$ = $1.0 \cdot 10^{-1}$ Pa + + $1.0 \cdot 10^{-5} \cdot r$, where *p* – measured pressure, Pa	
		from $7 \cdot 10^{3}$ to $1 \cdot 10^{6}$ Pa	$U_{0.95}$ = $7.2 \cdot 10^{-3}$ Pa + + $1.0 \cdot 10^{-4} \cdot p$, where *p* – measured pressure, Pa	
11.3	Pressure transducers	from $1 \cdot 10^{-1}$ to $1 \cdot 10^{3}$ Pa	$U_{0.95}$ = 2 Q 1)[*A*; *X*] *A* = $3.6 \cdot 10^{-3}$ Pa+$5.0 \cdot 10^{-5} \cdot p$, where *p* – measured pressure, Pa	Direct comparison with GET 101
		from $1 \cdot 10^{3}$ to $1.3 \cdot 10^{5}$ Pa	*A* = $5.2 \cdot 10^{-2}$ Pa +$4.9 \cdot 10^{-6} \cdot p$, where *p* – measured pressure, Pa	
		from $7 \cdot 10^{3}$ to $1 \cdot 10^{6}$ Pa	*A* = 0.45 Pa +$1.0 \cdot 10^{-5} \cdot p$, where *p* is the measured pressure, Pa; *X* – calculated value for the range of the output signal	

1	2	3	4	5
		limits of outstanding change of output signals: from 0 to 0.1 V from 0 to 1 V from 0 to 10 V from 0 to 10 mA from 0 to 20 mA	$X = 6.93\cdot10^{-7}\cdot p/(U_H - U_L)$ $X = 3.0\cdot10^{-6}\cdot p/(U_H - U_L)$ $X = 2.19\cdot10^{-5}\cdot p/(U_H - U_L)$ U_L, U_H – lower and upper limit values of the output signal, V $X = 1.73\cdot10^{-4}\cdot p/(I_H - I_L)$ $X = 6.93\cdot10^{-4}\cdot p/(I_H - I_L)$ I_L, I_H – lower and upper limit values of the output signal, mA	
11.4	Barometers	from $5\cdot10^2$ to $7\cdot10^3$ from $7\cdot10^3$ to $1\cdot10^6$ Pa	$U_{0.95} = 1.0\cdot10^{-1}$ Pa+ $+1.0\cdot10^{-5}\cdot p$, where p – measured pressure, Pa $U_{0.95} = 2.1\cdot10^{-5}\cdot p+0.9$ Pa, where p – measured pressure, Pa	Direct comparison with GET 101
11.5	Vacuum gauges, pressure transducers, pressure sensors	from $6.6\cdot10^{-8}$ to $1\cdot10^{-6}$ from $1\cdot10^{-6}$ to $1\cdot10^{-2}$ Pa incl. ab. $1\cdot10^{-2}$ to $1\cdot10^{0}$ Pa from $1\cdot10^{0}$ to $1\cdot10^{3}$ Pa from $1\cdot10^{3}$ to $1.3\cdot10^{5}$ Pa	$U^{o}_{0.95} = 5.0$ % $U^{o}_{0.95} = 4.8$ % $U^{o}_{0.95} = 1.4$ % $U_{0.95} = 7.2\cdot10^{-3}$ Pa + $+ 1.0\cdot10^{-4}\cdot p$, where p – measured pressure, Pa $U_{0.95} = 1.0\cdot10^{-1}$ Pa+ $+ 1.0\cdot10^{-5}\cdot r$, where p – measured pressure, Pa	Direct comparison with GET 101, GET 49, or with working standard
11.6	Vacuum gauge units	from $1\cdot10^{-7}$ to $1\cdot10^{-6}$ from $1\cdot10^{-6}$ to $1\cdot10^{-2}$ Pa incl. ab. $1\cdot10^{-2}$ to $1\cdot10^{3}$ Pa	$U^{o}_{0.95} = 5.0$ % $U^{o}_{0.95} = 4.8$ % $U^{o}_{0.95} = 1.4$ %	Direct comparison with GET 49, with working standard
11.7	Instruments measuring gas flow in vacuum: measures (helium leaks), flow meters, leak detectors	from 10^{-13} to 10^{-9} m^3 Pa/s from 10^{-9} to 1 m^3 Pa/s	$U^{o}_{0.95} = (30 - 3)$ % $U^{o}_{0.95} = 3$ %	Direct comparison with working standard of gas flow in vacuum and helium leaks implemented in the standard
11.8	Vapor pressure analyzers	from 8 to 19 kPa incl. ab. 19 to 115 kPa	$U_{0.95} = 1.6$ kPa $U_{0.95} = 1.0$ kPa	Direct comparison with CRM
11.9	Vapor pressure standards	from 8 to 19 kPa incl. ab. 19 to 115 kPa	$U_{0.95} = 0.8$ kPa $U_{0.95} = 0.5$ kPa	Direct comparison with working standard, Direct comparison
MEASUREMENTS OF THE PHYMICO–CHEMICAL COMPOMITION AND PROPERTIES OF SUBSTANCES				
12	**Instruments measuring molar (volume) fraction of components in gaseous media**			
12.1	Analytical and gas mixing plants, instruments measuring content of components in gaseous media (inert gases,	from 0 to $1.5\cdot10^{-8}$ % from $1.5\cdot10^{-8}$ to $1.0\cdot10^{-5}$ % from $1.0\cdot10^{-5}$ to $1.0\cdot10^{-4}$ %	$U_{0.95} = 0.15\ 10^{-8}$ %(abs.) $U_{0.95} = 10$ % (rel.) $U_{0.95} = 2.5$ % (rel.) $U_{0.95} = 1.0$ % (rel.) $U_{0.95} = 0.5$ % (rel.)	Direct measurement method

1	2	3	4	5
	permanent gases, reactive gases, hydrocarbon components, including vapors of petroleum products, freons, etc.), including: gas analyzers, signaling devices, gas analytical converters, measuring systems and measuring channels of measuring systems, gas analytical stations and atmospheric pollution control posts, indicator tubes, medical gas analyzers	from $1.0 \cdot 10^{-4}$ to $1.0 \cdot 10^{-2}$ % from $1.0 \cdot 10^{-2}$ to 0.1 % from 0.1 to 1.0 % 1.0 to 50 % from 50 to 100 %	$U_{0.95}$ = 0.25 % (rel.) $U_{0.95}$ = 0.2 % (rel.) $U_{0.95}$ = 0.15 % (rel.)	
12.2	Industrial gas chromatographs for determining component composition and impurities in natural, associated, liquefied gases, unstable gas condensate, etc.	from 0.001 to 0.01 % from 0.01 to 0.1 % from 0.1 to 1 % from 1 to 10 % from 10 to 20 % from 20 to 50 % from 50 to 99.97 %	$U_{0.95} = (4.2 - 215 \cdot C)$ % (rel.) $U_{0.95} = (2.2 - 10 \cdot C)$ % (rel.) $U_{0.95} = (1.24 - 0.7 \cdot C)$ % (rel.) $U_{0.95} = (0.56 - 0.014 \cdot C)$ % (rel.) $U_{0.95} = (0.53 - 0.01 \cdot C)$ % (rel.) $U_{0.95} = (0.38 - 0.003 \cdot C)$ % (rel.) $U_{0.95}$ = 0.2 % (rel.) where C is the molar (volume) fraction, % (abs.)	Direct measurement method
12.3	Gas chromatographs	from 0 to 99.97 %	$U_{0.95} = (1 \cdot 10^{-7} + 0.01 \cdot C)$ % (abs.), where C is the molar (volume) fraction, % (abs.)	Direct measurement method
12.4	Chromatography–mass spectrometers, mass selective detectors	from 0 to 1.0 %	$U_{0.95} = (1 \cdot 10^{-7} + 0.01 \cdot C)$ % (abs.), where C is the molar (volume) fraction, % (abs.)	Direct measurement method
12.5	Dilution type gas mixture generators	from $1.0 \cdot 10^{-6}$ to $1.0 \cdot 10^{-4}$ % from $1.0 \cdot 10^{-4}$ to $1.0 \cdot 10^{-2}$ % from $1.0 \cdot 10^{-2}$ to 99.9 %	$U_{0.95}$ = 2.0 % (rel.) $U_{0.95}$ = 1.0 % (rel.) $U_{0.95}$ = 0.5 % (rel.)	Direct measurement method
12.6	Zero air generators	from $1.5 \cdot 10^{-8}$ to $1.0 \cdot 10^{-3}$ %	$U_{0.95}$= 10 % (rel.)	Direct measurement method
12.7	Ozone generators	From $3 \cdot 10^{-7}$ to $1 \cdot 10^{-6}$ % from $1 \cdot 10^{-6}$ to $2.5 \cdot 10^{-5}$ % from $2.5 \cdot 10^{-5}$ to $1 \cdot 10^{-3}$ %	$U_{0.95}$ = 4.8 % (rel.) $U_{0.95}$ = 2.7 % (rel.) $U_{0.95}$ = 2.4 % (rel.)	Direct measurement method

1	2	3	4	5
13	**Instruments measuring mass concentration of components in gaseous media**			
13.1	Analytical and gas mixing plants, instrument measuring content of components in gaseous media (inert gases, permanent gases, reactive gases, hydrocarbon components, including vapors of petroleum products, freons, etc.), including: gas analyzers, signaling devices, gas analytical converters, measuring systems and measuring channels of measuring systems, gas analytical stations and air pollution control posts, indicator tubes, medical gas analyzers	from 0 to $1.5\cdot10^{-4}$ mg/m^3	$U_{0.95}$ = $0.15\cdot10^{-4}$ mg/m^3 (abs.)	Direct measurement method
		from $1.5\cdot10^{-4}$ to $1.0\cdot10^{-1}$ mg/m^3	$U_{0.95}$ = 10 % (rel.)	
		from $1.0\cdot10^{-1}$ to 1.0 mg/m^3	$U_{0.95}$ = 2.5 % (rel.)	
		from 1.0 to $1.0\cdot10^{2}$ mg/m^3	$U_{0.95}$ = 1.0 % (rel.)	
		from $1.0\cdot10^{2}$ to $1.0\cdot10^{3}$ mg/m^3	$U_{0.95}$ = 0.5 % (rel.)	
		from $1.0\cdot10^{3}$ to $1.0\cdot10^{4}$ mg/m^3	$U_{0.95}$ = 0.25 % (rel.)	
		from $1.0\cdot10^{4}$ to $5\cdot10^{5}$ mg/m^3	$U_{0.95}$ = 0.2 % (rel.)	
		from $5\cdot10^{5}$ to $1.0\cdot10^{6}$ mg/m^3	$U_{0.95}$ = 0.15 % (rel.)	
13.2	Flammable liquid vapor generators	from $1.5\cdot10^{3}$ to $2.0\cdot10^{5}$ mg/m^3	$U_{0.95}$ = 2 % (rel.)	Direct measurement method
13.3	Ozone generators	from $6\cdot10^{-3}$ to $2\cdot10^{-2}$ mg/m^3 from $2\cdot10^{-2}$ to 0.5 mg/m^3 from 0.5 to 20 mg/m^3	$U_{0.95}$ = 4.8 % (rel.) $U_{0.95}$ = 2.7 % (rel.) $U_{0.95}$ = 2.4 % (rel.)	Direct measurement method
13.4	Zero air generators	from $1.5\cdot10^{-4}$ to 10 mg/m^3	$U_{0.95}$ = 10 % (rel.)	Direct measurement method
13.5	Thermodiffusion and electrochemical generators, generators based on saturation method	from $1.0\cdot10^{-6}$ to $2.0\cdot10^{-2}$ mg/m^3 from $2.0\cdot10^{-2}$ to 1.0 mg/m^3 from 1.0 to 1500 mg/m^3	$U_{0.95}$ = 2 % (rel.)	Direct measurement method
13.6	Sources of gas and vapor microflows	from $1.0\cdot10^{-5}$ to $1.0\cdot10^{-4}$ µg/min	$U_{0.95}$ = 3 % (rel.)	Direct measurement method
		from $1.0\cdot10^{-4}$ to 0.10 µg/min	$U_{0.95}$ = 2 % (rel.)	
		from 0.10 to 1.0 µg/min	$U_{0.95}$ = 1 % (rel.)	
		from 1.0 to 50 µg/min	$U_{0.95}$ = 0.7 % (rel.)	
13.7	Vapor–phase sources of gas mixtures	from 0.5 to 5 mg/m^3 from 5 to 1000 mg/m^3	$U_{0.95}$ = 3.5 % (rel.) $U_{0.95}$ = 2.5 % (rel.)	Direct measurement method
13.8	Generators of gas mixtures of ethanol vapor in air	from 20 to 2000 mg/m^3	$U_{0.95}$ = 0.5 % (rel.)	Direct measurement method
13.9	Ethanol vapor analyzers and detectors in exhaled air	from 0 to 2.00 mg/l	$U_{0.95}$ = (0.001 + + 0.015 C) mg/l, where C is mass concentration, mg/l	Direct measurement method

1	2	3	4	5
13.10	Gas chromatographs	from 0 to $99.97 \cdot 10^4$ mg/m^3	$U_{0.95} = (1 \cdot 10^{-3} + 0.01 \cdot C)$ mg/m^3, where C – mass concentration, mg/m^3	Direct measurement method
13.11	Chromatography mass-spectrometers, mass selective detectors	from 0 to $1.0 \cdot 10^4$ mg/m^3	$U_{0.95} = (1 \cdot 10^{-3} + 0.01 \cdot C)$ mg/m^3, where C – mass concentration, mg/m^3	Direct measurement method
14	**Instruments measuring pre–explosive concentrations of components in gaseous media**			
14.1	Gas analyzers, signaling devices, gas analytical converters, measuring systems and measuring channels of measuring systems	from 0 to 1 % LEL from 1 to 50 % LEL from 50 to 100 % LEL	$U_{0.95}$ = 0.025 % LEL $U_{0.95}$ = 1.5 % (rel.) $U_{0.95}$ = 0.6 % (rel.)	Direct measurement method
14.2	Flammable liquid vapor generators	from 5 to 50 % LEL	$U_{0.95}$ = 2 % (rel.)	Direct measurement method
15	**Instruments measuring integral concentration of components in gaseous media**			
15.1	Gas analyzers, signaling devices, gas analytical converters, measuring systems and measuring channels of measuring systems	from 0 to 1 % LEL· m	$U_{0.95}$ = 0.025 % LEL·m	Direct measurement method
		ab. 1 to 10 % LEL· m	$U_{0.95}$ = 1 % (rel.)	
		from 0 to 0.5 ppm· m	U0.95 = 0.025 ppm · m	
		ab. 0.5 to 3 000 000 ppm· m	U0.95 = 2.5% (rel.)	
16	**Instruments measuring mass fraction of components in liquid media**			
16.1	Liquid chromatographs, gas chromatographs, mass spectrometers, mass selective detectors	from 0 to 0.1 %	$U_{0.95} = (1 \cdot 10^{-7} + 0.01 \cdot C)$% (abs.), where C is mass fraction,% (abs.)	Direct measurement method
17	**Instruments measuring mass concentration of components in liquid media**			
17.1	Liquid chromatographs, gas chromatographs, mass spectrometers, mass selective detectors	from 0 to $1 \cdot 10^6$ mg/m^3	$U_{0.95} = (1 + 0.01 \cdot C)$ mg/m^3, where C is the mass concentration, mg/m^3	Direct measurement method
17.2	Flame photometric analyzers	from 0 to 0.01 mg/dm^3 from 0.01 to 5.0 mg /dm^3 from 5.0 to 1000 mg/dm^3	$U_{0.95}$ = 0.002 mg/dm $U_{0.95}$ = 2.0 % (rel.) $U_{0.95}$ =1.6 % (rel.)	Direct measurement method
18	**Instruments measuring counting concentration of aerosol particles**			
18.1	Aerosol particle counters (air dust control devices)	from $1 \cdot 10^2$ to $1 \cdot 10^9$ particles/m^3	$U_{0.95}$ = 5 %	Direct comparison
		from $1 \cdot 10^9$ to $1 \cdot 10^{14}$ particles/m^3	$U_{0.95}$ = 10 %	
19	**Instruments measuring mass concentration of aerosol particles**			
19.1	Aerosol photometers (filter breakthrough coefficient from 0 to 100%)	from 0.02 to 1500 mg/m^3	$U_{0.95}$ = 5 %	Direct comparison
19.2	Mass concentration meters of suspended	from 0.02 to 1500 mg/m^3	$U_{0.95}$ = 5 %	Direct comparison

1	2	3	4	5
	particles in air (aerosol (dust) analyzers, aerosol (dust) mass concentration meters, dust meters)	from 1500 to 15000 mg/m^3	$U_{0.95}$ = 6 %	
19.3	Fractional composition meters for mass concentration of suspended particles, including RM10, RM2.5, RM1 (analyzers (meters) of fractional composition of aerosol (dust), analyzers (meters) of the dispersed composition of aerosol (dust), impactors, cyclones, measuring transducers of dispersed composition, aerodynamic converters of the dispersed composition of aerosol particles)	from 0.02 to 1500 mg/m^3 from 1500 to 15000 mg/m^3	$U_{0.95}$ = 5 % $U_{0.95}$ = 6 %	Direct comparison
20	**Instruments measuring aerodynamic diameter of aerosol particles**			
20.1	Fractional composition meters for the mass concentration of suspended particles, including RM10, RM2.5, RM1 (analyzers (meters) of fractional composition of aerosol (dust), analyzers (meters) of the dispersed composition of aerosol (dust), impactor , cyclones, measuring transducers of dispersed composition, aerodynamic converters of the dispersed composition of aerosol particles)	from 0.5 to 20 µm	$U_{0.95}$ = 10 %	Direct comparison
21	**Instruments measuring particle size**			
21.1	Particle size analyzers for liquid media and powder materials (dispersion parameters meters, suspension analyzers)	from 0.01 to 3500 µm	$U_{0.95}$ = 5 %	Direct measurement method
21.2	Particle size analyzers for liquid media and powder materials (dispersion parameters meters, suspension analyzers)	from 1000 to 10000 µm	$U_{0.95}$ = 10 µm	Direct comparison
22	**Instruments measuring counting concentration of particles in liquids**			
22.1	Liquid particle counters (particle count meters, liq-	from $1\cdot10^2$ to $1\cdot10^{14}$ particles/cm^3	$U_{0.95}$ = 8 %	Direct comparison

1	2	3	4	5
	uid purity analyzers, liquid purity control devices)			
23	**Instruments measuring counting concentration of light air ions**			
23.1	Light ion aspiration counters	from $1\cdot10^2$ to $1\cdot10^6$ particles/cm^3	$U_{0.95}$ = 20 %	Direct comparison
24	**Instruments measuring turbidity**			
24.1	Turbidity analyzers (turbidimeters , turbidimeters)	from 0.1 to 1 FMU from 1 to 4000 FMU	$U_{0.95}$ = 3 % $U_{0.95}$ = 2.5 %	Direct measurement method
25	**Instruments measuring mass fraction of substances**			
25.1	Ash content analyzers	(0 – 90) %	$U_{0.95}$ = 3 % (rel.)	SK 03–2414–10–2021–T Method of direct measurements using CRM
25.2	Analyzers for composition and physico–chemical properties of oil and oil products	0 to $1\cdot10^{-4}$ % $1\cdot10^{-4}$ to 10 %	$U_{0.95}$ = $5\cdot10^{-6}$ % (abs.) $U_{0.95}$ = 3 % (rel.)	Direct measurement method
25.3	Analyzers of water in liquid, solid and bulk substances and materials (hygrometers)	0.1 to 2.5 % from 2.5 to 100 %	$U_{0.95}$ = 3 % (rel.) $U_{0.95}$ = 1.5 % (rel.)	Direct measurement method
25.4	Titrators	from 0.0001 to 0.015 % from 0.015 to 0.1 % from 1 to 100 %	$U_{0.95}$ = 4 % (rel.) $U_{0.95}$ = 2 % (rel.) $U_{0.95}$ = 1 % (rel.)	Direct measurement method
26	**Instruments measuring volume fraction of substances**			
26.1	Analyzers for composition and physico–chemical properties of oil and oil products	from 0.1 to 10 % from 10 to 60 %	$U_{0.95}$ = 3 % (rel.) $U_{0.95}$ = 1.5 % (rel.)	Direct measurement method
26.2	Analyzers of water in liquid, solid and bulk substances and materials (hygrometers)	from 0 to 100 %	$U_{0.95}$ = $(0.01+0.05\cdot C)$ % (abs.), where C is the volume fraction, % (abs.)	Direct measurement method
26.3	Titrators	from 0.0001 to 0.015 % from 0.015 to 0.1 % from 1 to 100 %	$U_{0.95}$ = 4 % (rel.) $U_{0.95}$ = 2 % (rel.) $U_{0.95}$ = 1 % (rel.)	Direct measurement method
27	**Instruments measuring mass of substances in analyzed sample**			
27.1	Titrators	from $1\cdot10^{-4}$ to 200 mg	$U_{0.95}$ = 1.5 % (rel.)	Direct measurement method
28	**Instruments measuring pH of liquid media**			
28.1	Titrators	from 0 to 14 pH	$U_{0.95}$ = 0.02 pH	Direct measurement method
29	**Instruments measuring flash point of combustible liquids**			
29.1	Open crucible flash point temperature analyzers	from 60 to 130 ºC 130 to 300 ºC	$U_{0.95}$ = 2.6 ºC $U_{0.95}$ = 5.6 ºC	Direct measurement method
29.2	Closed crucible flash point temperature	from minus 70 to minus 10 ºC	$U_{0.95}$ = 4 ºC	Direct measurement method

1	2	3	4	5
	analyzers	from minus 10 to 30 ºC	$U_{0.95}$ = 2 ºC	
		from 30 to 104 ºC	$U_{0.95}$ = 1.2 ºC	
		from 104 to 300 ºC	$U_{0.95}$ = 2.4 ºC	
30	**Instruments measuring turbidity/solidification/flow loss/crystallization/filterability limit temperatures of petroleum products and chemical products**			
30.1	Turbidity/solidification/loss of yield/crystallization/ filterability limit temperature analyzers	from minus 70 before minus 45 ºC from minus 45 to 10 ºC	$U_{0.95}$ = 1.4 ºC $U_{0.95}$ = 0.6 ºC	Direct measurement method
31	**Instruments measuring mass concentration of oil products in liquid media**			
31.1	Analyzers of petroleum products in liquid media	from 0 to 0.5 mg/dm^3 from 0.5 to 1000 mg/dm^3	$U_{0.95}$ = 0.11 mg/dm^3 $U_{0.95}$ = (0.20 + + 0.05·C) mg/dm^3 where C – mass concentration, mg/dm^3	Direct measurement method
32	**Instruments measuring volume fraction of gases dissolved in transformer oil**			
32.1	Analyzers of gases dissolved in transformer oil: – methane (CH_4), ethylene (C_2H_4), ethane (C_2H_6) – carbon monoxide (CO), carbon dioxide (CO_2), hydrogen (H_2), acetylene (C_2H_2)	from 1 to 10 ppm from 10 to 50 ppm from 50 to 10000 ppm from 5 to 50 ppm from 50 to 10000 ppm	$U_{0.95}$ = 30 % (rel.) $U_{0.95}$ = (36 – 0.6·C) % (rel.) $U_{0.95}$ = 6 % (rel.) $U_{0.95}$ = 30 % (rel.) $U_{0.95}$ = (30 – 0.0024·C) % (rel.), where C is the volume fraction, ppm	Direct measurement method
33	**Instruments measuring mass fraction of elements in metals**			
33.1	Emission spectrometers	from 0.0006% to 0.010% ab. 0.010% to 0.10% ab. 0.10% to 1.0% ab. 1.0% to 89%	$U_{0.95}$ = 30 % (rel.) $U_{0.95}$ = 10 % (rel.) $U_{0.95}$ = 5 % (rel.) $U_{0.95}$ = 3 % (rel.)	Direct measurement method
34	**Instruments measuring redox potential**			
34.1	pH/pX meters and converters for laboratory and industrial use, ionometers, redox meters	from minus 200 to 1500 mV at 25 °C	$U_{0.95}$ = 6 mV	Method of direct measurements using buffer solutions – discharge working standards SK 03–209–6.1.2.2/01
35	**Instruments measuring Mass concentration**			
35.1	Liquid analyzers: conductometric, salt meters, total salt content meters, signaling devices and conductometric type concentrators	from 0.001 to 150 g/dm^3	$U^{o}_{0.95}$ = 5 %	Method of indirect measurements with conductometers – working standards of the 2nd class, with measures of electrical resistance, SK 03–2450–001–T
35.2	Analyzers of dissolved gases in liquids (O_2, O_3, Cl_2, H_2, CO_2 etc.)	from 0 to 2000 µg/dm^3 from 2000 to 20000 µg/dm^3	$U_{0.95}$ = 40 µg/dm^3 $U^{o}_{0.95}$ = 2 %	Method of indirect measurements using standard samples MK SK 03–2450–004–T

1	2	3	4	5
36	**Instruments measuring ion activity**			
36.1	pH/pX meters and converters for laboratory and industrial use, ionometers, redox meters	pH at temperature 25 °C: 1.65; 4.01; 6.86; 9.18 pX at temperature 25 °C: to 7	$U_{0.95}$ = 0.1 $U_{0.95}$ = 0.2	Direct measurement method using buffer solutions with discharge working standards SK 03–209–6.1.2.2/01
37	**Instruments measuring specific electrical conductivity**			
37.1	Liquid analyzers: conductometric, salt meters, total salt content meters, signaling devices and conductometric type concentrators	from $1\cdot10^{-6}$ to 1 10^{-4} incl. cm/m at 25 °C ab. $1\cdot10^{-4}$ to 35 S/m at 25 °C	$U^{0}_{0,95}$ = 2 % $U^{0}_{0,95}$ = 0,1 %	Method of indirect measurements with conductometers – working standards of the 2nd class, with measures of electrical resistance SK 03–2450–001–T
37.2	Installations for conductometric testing	ab. $1\cdot10^{-4}$ to 35 S/m at 25 °C	$U^{o}_{0,95}$ = 0,1 %	Direct comparison with GET 132, SK 03–2450–001–T
38	**Instruments measuring specific electrical conductivity (SEC), relative electrical conductivity, sea water salinity**			
38.1	SEC measuring channels as part of hydrophysical probes (stationary, ship, cable, lost, drifting and autonomous) for measuring SEC, GEP and sea water salinity	0.1 to 7 S/m at 25 °C from 0.1 to 2 relative units at 25 °C and pressure 101.1 kPa from 2 to 43 P.E.S. at 25 °C and pressure 101.1 kPa	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.3 % $U_{0.95}$ = 0.02 P.E.S.	Direct comparison with working standards of the 2nd class SK 03–2450–002–T
39	**Instruments measuring viscosity of liquids**			
39.1	Standard (reference) glass capillary viscometers	from $1.6\cdot10^{-9}$ to $5.5\cdot10^{-5}$ m^2/s^2	$U_{0.95}$ = (0,0109 ln(C) + + 0,2714) %, where C – nominal value of the viscometer constant, m^2/s^2	Comparison with reference viscometers from GET 17 using comparator (calibration liquid)
39.2	Reference complexes designed for storage and transmission of the unit of kinematic viscosity of liquid (working standards of the unit of kinematic viscosity of liquid of the 1st class)	to $3.4\cdot10^{-6}$ m^2/s	$U_{0.95}$ = 0.10 %	Comparison with GET 17 using comparator (calibration liquid)
		from $1\cdot10^{-6}$ to $1\cdot10^{-5}$ m^2/s	$U_{0.95}$ = 0.11 %	
		from $3.4\cdot10^{-6}$ to $3.4\cdot10^{-5}$ m^2/s	$U_{0.95}$ = 0.12 %	
		from $8\cdot10^{-6}$ to $8\cdot10^{-5}$ m^2/s	$U_{0.95}$ = 0.13 %	
		from $1\cdot10^{-5}$ to $1\cdot10^{-4}$ m^2/s	$U_{0.95}$ = 0.14 %	
		from $1.6\cdot10^{-5}$ to $1.6\cdot10^{-4}$ m^2/s	$U_{0.95}$ = 0.14 %	

1	2	3	4	5
		from $3.4 \cdot 10^{-5}$ to $3.4 \cdot 10^{-4}$ m²/s	$U_{0.95}$ = 0.15 %	
		from $5.4 \cdot 10^{-5}$ to 5.4 10^{-4} m²/s	$U_{0.95}$ = 0.16 %	
		from $1 \cdot 10^{-4}$ to $1 \cdot 10^{-3}$ m²/s	$U_{0.95}$ = 0.17 %	
		from $2.4 \cdot 10^{-4}$ to 2.4 10^{-3} m²/s	$U_{0.95}$ = 0.17 %	
		from $3.4 \cdot 10^{-4}$ to $3.4 \cdot 10^{-3}$ m²/s	$U_{0.95}$ = 0.18 %	
		from $1 \cdot 10^{-3}$ to $1 \cdot 10^{-2}$ m²/s	$U_{0.95}$ = 0.18 %	
		from $3.4 \cdot 10^{-3}$ to $3.4 \cdot 10^{-2}$ m²/s	$U_{0.95}$ = 0.19%	
		from $1 \cdot 10^{-2}$ to $1 \cdot 10^{-1}$ m²/s	$U_{0.95}$ = 0.20%	
39.3	Liquid viscosity standards (calibration fluids)	to $2 \cdot 10^{-6}$ m²/s	$U_{0.95}$ = 0.05%	Method of direct measurements on GET 17
		from $0.6 \cdot 10^{-7}$ to $1 \cdot 10^{-5}$ m²/s	$U_{0.95}$ = 0.05%	
		from $2 \cdot 10^{-6}$ to $2 \cdot 10^{-5}$ m²/s	$U_{0.95}$ = 0.06%	
		from $1 \cdot 10^{-5}$ to $1 \cdot 10^{-4}$ m²/s	$U_{0.95}$ = 0.07%	
		from $2 \cdot 10^{-5}$ to $2 \cdot 10^{-4}$ m²/s	$U_{0.95}$ = 0.09%	
		from 1 10 $^{-4}$ to 1 10 $^{-3}$ m²/s	$U_{0.95}$ = 0.10%	
		from $2 \cdot 10^{-4}$ to $2 \cdot 10^{-3}$ m²/s	$U_{0.95}$ = 0.11%	
		from 1 10^{-3} to 1 10 $^{-2}$ m $^{2/s}$	$U_{0.95}$ = 0.12%	
		from $2 \cdot 10^{-3}$ to $2 \cdot 10^{-2}$ m²/s	$U_{0.95}$ = 0.14%	
		from $1 \cdot 10^{-2}$ to $1 \cdot 10^{-1}$ m²/s	$U_{0.95}$ = 0.15%	
39.4	Glass capillary viscometers	from $7 \cdot 10^{-10}$ to $3 \cdot 10^{-4}$ m²/s	$U_{0.95}$ = 0.2 %	Comparison with working standard of the 1st class using comparator (calibration liquid)
39.5	Glass capillary viscometers, automatic viscometers	to $1 \cdot 10^{-1}$ m²/s	$U_{0.95}$ = 0.2%	Comparison with working standard of the 1st class using comparator (calibration liquid)
36.6	Rotational viscometers, rheometers	from $1 \cdot 10^{-3}$ to 100 Pa·s	$U_{0.95}$ = 0.2%	Method of direct measurements using standard samples of fluid viscosity (calibration liquids)
39.7	Viscometers of conventional viscosity (VU and VZ) type, cup viscometers	from 5 to 600 s	$U_{0.95}$ = 1.0%	Method of direct measurements using standard samples of fluid viscosity (calibration fluids)

1	2	3	4	5
39.8	Ball viscometers	from 0.008 to 35.0 $MPa \cdot cm^{-3}$ g^{-1} from $0.5 \cdot 10^{-3}$ to 100 $Pa \cdot s$	$U_{0.95}$ = 0.5%	Method of direct measurements using standard samples of viscosity of liquids(calibration liquids)
39.9	Converters for viscosity of liquids (working standards of the 1st class)	to 1.10 $^{-2}$ $Pa \cdot s$ ab. $1 \cdot 10^{-2}$ to 10 $Pa \cdot s$	$U_{0.95} = 6.5 \cdot 10^{-5}$ $Pa \cdot s$ U= 0.5 %	Method of direct comparison with GET 17
39.10	In–line viscometers, viscosity converters	from $5 \cdot 10^{-4}$ to $1 \cdot 10^{-2}$ $Pa \cdot s$ ab. $1 \cdot 10^{-2}$ to 100 $Pa \cdot s$	$U_{0.95} = 2 \cdot 10^{-5}$ $Pa \cdot s$ $U_{0.95}$ = 1 %	Method of direct comparison with working standard of the 1st class Method of direct measurements of density on DMA 5000M
39.11	Stabinger viscometers	to 40 $Pa \cdot s$ to $4 \cdot 10^{-2}$ m^2/s from 650 to 3000 kg/m^3	$U_{0.95}$ = 0.2 % $U_{0.95}$ = 0.2 % $U_{0.95}$ = 0.5 kg/m^3	Comparison with working standard of the 1st class using comparator (calibration liquid) Method of direct measurements of density on DMA 5000M. Method of direct measurements using CRMs of liquid viscosity (calibration liquids) and CRMs of liquid density (calibration liquids)
39.12	Falling number analyzers	from 1 to 1000 s	$U_{0.95}$ = 0.5 %	Method of direct measurements using electronic stopwatch
40	**Instruments measuring density**			
40.1	Secondary standards of the unit of density Hydrostatic weighing installations	from 650 to 23000 kg/m^3	$U_{0.95} = 5.0 \cdot 10^{-3}$ kg/m^3	Comparison with GET 18 using comparator (density measures – transfer standards)
40.2	Liquid density standards (calibration liquids)	from 650 to 1630 kg/m^3	$U_{0.95} = 2.0 \cdot 10^{-3}$ %	Method of direct measurements on GET 18
40.3	Secondary standards of the unit of density in flow	from 280 to 2000 kg/m^3	$U_{0.95} = 3.0 \cdot 10^{-2}$ kg/m^3	Comparison with GET 18 using comparator (calibration liquid)
40.4	Automatic in–line and submersible density meters, density converters, density measurement channels of mass flow meters and measuring systems	from 0.17 to 170 kg/m^3 from 0.1 to 10 MPa	$U_{0.95} = 2.7 \cdot 10^{-2}$ %	Direct measurement method (pure gases)
		ab. 170 to 280 kg/m^3	$U_{0.95} = 3.0 \cdot 10^{-1}$ %	
		ab. 280 to 650 kg/m^3	$U_{0.95} = 3.0 \cdot 10^{-2}$ kg/m^3	Method of direct measurements on GET 18

1	2	3	4	5
		ab. 650 to 3000 kg/m^3	$U_{0.95} = 1.0 \cdot 10^{-1}$ kg/m^3	Method of direct Comparison with working standard
40.5	Densitometers automatic laboratory	from 0.17 to 170 kg/m^3 from 0.1 to 10 MPa	$U_{0.95} = 2.7 \cdot 10^{-2}$ %	Direct measurement method (pure gases)
		ab. 170 to 280 kg/m^3	$U_{0.95} = 3.0 \cdot 10^{-1}$ %	
		ab. 280 to 650 kg/m^3	$U_{0.95} = 3.0 \cdot 10^{-2}$ kg/m^3	Method of direct measurements on GET 18
		ab. 650 to 3000 kg/m^3	$U_{0.95} = 3.0 \cdot 10^{-3}$ kg/m^3	Method of direct comparison with working standard
40.6	Glass pycnometers	from 5 to 24 cm^3 ab. 24 to 49 cm^3 ab. 49 to 99 cm^3 ab. 99 to 2000 cm^3	$U_{0.95} = 1.3 \cdot 10^{-3}$ % $U_{0.95} = 7.5 \cdot 10^{-4}$ % $U_{0.95} = 5.0 \cdot 10^{-4}$ % $U_{0.95} = 3.6 \cdot 10^{-4}$ %	Comparison with GET 18 using comparator (calibration liquid)
40.7	Pressure metal pycnometers	from 100 to 399 cm^3 from 400 to 2000 cm^3	$U_{0.95} = 7.6 \cdot 10^{-4}$ % $U_{0.95} = 1.1 \cdot 10^{-3}$ %	
40.8	Settings pycnometric	from 500 to 2000 kg/m^3	$U_{0.95} = 1.0 \cdot 10^{-1}$ kg/m^3	
40.9	Gas density meters	from 0.17 to 170.00 kg/m ^{3} from 0.1 to 10.0 MPa	$U_{0.95} = 2.7 \cdot 10^{-2}$ %	Direct measurement method (pure gases)
		ab. 170 to 280 kg/m^3	$U_{0.95} = 3.0 \cdot 10^{-1}$ %	
		ab. 280 to 400 kg/m^3	$U_{0.95} = 3.0 \cdot 10^{-2}$ kg/m^3	Method of direct measurements on GET 18
40.10	Hydrometers	from 650 to 1850 kg/m^3	$U_{0.95} = 0.09$ kg/m^3	Method of direct measurements on GET 18
40.11	pressure hydrometers	from 300 to 650 kg/m^3	$U_{0.95} = 0.4$ kg/m^3	
40.12	Reference measures for the density of a solid	from 200 to 23000 kg/m^3	$U_{0.95} = 1.8 \cdot 10^{-3}$ kg/m^3	Method of direct comparisons on GET 18
THERMOPHYMICAL AND TEMPERATUWS MEASUREMENTS				
41	**Temperature measuring instruments**			
41.1	Standard platinum resistance thermometers,	(minus 200 – 0) °C	$U_{0.95} = (2 \cdot 10^{-3} – 1.4 \cdot 10^{-4})$ °C	Method of direct measurements in fixed point cells of MTS–90
		(0 – 660.323) °C	$U_{0.95} = (1.4 \cdot 10^{-4} – 4 \cdot 10^{-3})$ °C	
		(660.323 – 1100 °C)	$U_{0.95} = (4 \cdot 10^{-3} – 4 \cdot 10^{-2})$ °C	
41.2	Equipment for realization of fixed points, temperature standards	(minus 189.3442 – – 0) °C	$U_{0.95} = (2 \cdot 10^{-3} – 1.4 \cdot 10^{-4})$ °C	Method of direct comparison with standard
		(0 – 660.323) °C	$U_{0.95} = (1.4 \cdot 10^{-4} – 1 \cdot 10^{-3})$ °C	
		(660.323 – 1085 °C)	$U_{0.95} = (1 \cdot 10^{-3} – 2 \cdot 10^{-3})$ °C	
		(1085 – 3000 °C)	$U_{0.95} = (1 \cdot 10^{-3} – 0.2)$ °C	
41.3	Thermoelectric platinum–rhodium converters – platinum, thermoelectric converters made of precious metals	(231.928 – 1084.62)°C (300 – 1200) °C	$U_{0.95} = (2 \cdot 10^{-3} – 2 \cdot 10^{-2})$ °C $U_{0.95} = 0.7$ °C	Method of direct measurements in fixed point cells of MTS–90

1	2	3	4	5
41.4	Platinum–rhodium thermoelectric converters, precious metal thermoelectric converters	(660.323 – 1768.4) °C (600 – 1800) °C	$U_{0.95} = (2 \cdot 10^{-3}–2 \cdot 10^{-1})$ °C $U_{0.95}$ = (0.7 – 1.5) °C	Method of direct measurements in fixed point cells of MTS–90
41.5	Non–precious metal thermoelectric converters	(minus 200 – 2500) °C	$U_{0.95}$ = (0.8 – 3.5) °C	Method of direct comparison with standard thermometer
41.6	Thermal converters (thermometers) of resistance, sets of thermometers	Temperature range (minus 200 – 850) °C Temperature difference range (0 – 180) °C	$U_{0.95}$ = (0.004 – 0.1) °C	Method of direct comparison with standard thermometer
41.7	Temperature calibrators and dry– well thermostats	(minus 200 – 1800) ° C (0.01 – 4000) Ω (minus 0.1 – 12) V (0 – 50) mA	$U_{0.95}$ = (0.01 – 20) °C	Direct measurement method
41.8	Temperature calibrators and liquid thermostats	(minus 100 – 1100) ° C (0.01 – 4000) Ω (minus 0.1 – 12) V (0 – 50) mA	$U_{0.95}$ = (0.01 – 20) °C	Direct measurement method
41.9	Bimetallic thermometers	(minus 200 – 300) °C	$U_{0.95}$ = 1.0 °C	Method of direct comparison with standard thermometer
41.10	Manometric thermometers	(minus 100 – 300) °C	$U_{0.95}$ = 1.0 °C	Method of direct comparison with standard thermometer
41.11	Quartz semiconductor thermometers,	(minus 80 – 300) °C	$U_{0.95}$ = (0.007 – 0.01) °C	Method of direct comparison with standard thermometer
41.12	Digital thermometers, thermometers, thermometers with unified digital signal	(minus 200 – 2500) °C (0 – 24) mA (0 – 12) V	$U_{0.95}$ = (0.009 – 0.6) °C	Method of direct comparison with standard thermometer
41.13	Liquid glass thermometers	(minus 80 – 300) °C	$U_{0.95}$ = (0.03 – 0.4) °C	Method of direct comparison with standard thermometer
41.14	Secondary temperature converters, measuring–regulators	(minus 200 – 2500) ° C	$U_{0.95}$ = (0.01 – 30) °C	Method of direct comparison with standard
41.15	Standard temperature lamps (bright)	(800 – 2100) °C	$U_{0.95}$ = (0.2 – 2.0) °C	Comparison method using comparator
41.16	Standard temperature lamps (color)	(900 – 3000) °C	$U_{0.95}$ = (0.4 – 4.0) °C	Comparison method using comparator
41.17	Monochromatic pyrometers, standard monochromatic pyrometers	from 250 to 15000 °C	$U_{0.95} = (3.05 \cdot 10^{-4} \cdot t + 2)$ °C, where t – temperature, °C	Direct measurement method (or) comparison using comparator
41.18	Spectral distribution pyrometers	from 250 to 3500 °C	$U_{0.95} = (3.05 \cdot 10^{-4} \cdot t + 2)$ °C, where t – temperature, °C	Direct measurement method (or) comparison using comparator

1	2	3	4	5
41.19	Pyrometers of total and partial standard radiation	from 220 to 273 K from 0 to 3000 °C	$U_{0.95} = (5.66 \cdot 10^{-3} \cdot T + 0.3)$ K, where T – temperature, K $U_{0.95} = (1.8 \cdot 10^{-3} \cdot t + 0.6)$ °C, where t – temperature, °C	Direct measurement method (or) comparison using comparator
41.20	Total and partial radiation pyrometers, radiation thermometers, infrared thermometers	from 220 to 273 K from 0 to 3000 °C	$U_{0.95} = (2.26 \cdot 10^{-2} \cdot T +$ $+ 0.8)$ K, where T – temperature, K $U = (1.9 \cdot 10^{-3} \cdot t +$ $+ 0.8)$ °C, where t – temperature, °C	Direct measurement method (or) comparison using comparator
41.21	Thermal imagers, standard thermal imagers, pyrometric image converters, thermographs, infrared cameras	from 220 to 273 K from 0 to 3000 °C	$U_{0.95} = (2.26 \cdot 10^{-2} \cdot T +$ $+ 0.8)$ K, where T – temperature, K $U_{0.95} = (1.9 \cdot 10^{-3} \cdot t + 0.8)$ °C, where t – temperature, °C	Direct measurement method
41.22	Standard black body emitters, standard black body emitters, extended black body emitters	from 220 to 273 K from 0 to 3000 °C	$U_{0.95} = (5.66 \cdot 10^{-3} \cdot T +$ $+ 0.3)$ K, where T – temperature, K $U_{0.95} = (1.8 \cdot 10^{-3} \cdot t +$ $+ 0.6)$ °C, where t – temperature, °C	Comparison with comparator
41.23	pH/pX meters and converters for laboratory and industrial use, ionometers, redox meters	from minus 5 to 95 °C	$U_{0.95}$ = 0.1 °C	SK 03–209–6.1.2.2/01
41.24	Liquid analyzers: conductometric, salt meters, total salt content meters, signaling devices and conductometric type concentrators	from minus 5 to 95 °C	$U_{0.95}$ = 0.1 °C	SK 03–2450–001–T
41.25	Installations for conductometric testing	from minus 5 to 95 °C	$U_{0.95}$ = 0.2 °C	SK 03–2450–001–T
42	**Instruments measuring thermal conductivity**			
42.1	Instruments measuring thermal conductivity of solids	from 0,02 to 500 W/(m K) from 90 to 1100 K	$U^{o}_{0.95}$ = 1 %	Direct measurement method or comparison using comparator
42.2	Working standards – thermal conductivity measures	from 0,02 to 500 W/(m K)	$U^{o}_{0.95}$ = 1 %	Method of direct measurements on GET 59, comparison using comparator
42.3	Instruments measuring thermal resistance	from 0.2 to 6 $m^2 \cdot K/W$ from 250 to 350 K	$U^{o}_{0.95}$ = 1 %	Direct measurement method
42.4	Instruments measuring heat transfer resistance	from 0.4 to 6.5 m^2 K/W from 250 to 350 K	$U^{o}_{0.95}$ = 1 %	Direct measurement method
43	**Instruments measuring thermal diffusivity**			
43.1	Instruments measuring thermal diffusivity	$(1 \cdot 10^{-7} – 40 \cdot 10^{-7})$ m^2/s (273.15 – 700) K	$U^{o}_{0.95}$ = 1 %	Direct measurement method

1	2	3	4	5
44	**Instruments measuring surface density of heat fluxes**			
44.1	Instruments measuring density of heat fluxes	from 2 to 100 W/m^2 from 250 to 350 K	$U^{o}_{0.95}$ = 1 %	Direct measurement method
45	**Instruments measuring energy of combustion, the amount of dissolution heat, reactions, phase transformations**			
45.1	Measures of volumetric energy of combustion based on gaseous hydrocarbons or natural gas	(3 – 11) MJ/m^3 (ab. 11 – 25) MJ/m^3 (ab. 25 – 50) MJ/m^3 (ab. 50 – 90) MJ/m^3	$U^{o}_{0.95}$ = 0.3 % $U^{o}_{0.95}$ = 0.2 % $U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.2 %	SK 03–2414–04–2021–T Method of direct measurements on GET 16
45.2	Measures of specific combustion energy	(12638 – 45890) kJ/kg	$U^{o}_{0.95}$ = 0.013 %	SK 03–2414–07–2021–T Method of direct measurements on GET 16
45.3	Measures of the amount of heat of solution and reactions based on solid and liquid substances	(5 – 50) J (ab. 50 – 1200) J	$U^{o}_{0.95}$ = 0.15 % $U^{o}_{0.95}$ = 0.07 %	SK 03–2414–08–2021–T Method of direct measurements on GET 133
45.4	Combustion bomb calorimeters	(2 – 8) kJ (ab. 8 – 40) kJ	$U^{o}_{0.95}$ = 0.15 % $U^{o}_{0.95}$ = 0.05 %	SK 03–2414–05–2020–T Direct measurement method using GSO and working standards
45.5	Calorimeters, instruments, gas analyzers for natural gas, high and low calorific gases, Wobbe numbers	(3 – 11) MJ/m^3 (ab. 11 – 25) MJ/m^3 (ab. 25 – 50) MJ/m^3 (ab. 50 – 90) MJ/m^3	$U^{o}_{0.95}$ = 0.6 % $U^{o}_{0.95}$ = 0.4 % $U^{o}_{0.95}$ = 0.2 % $U^{o}_{0.95}$ = 0.4 %	SK 03–2414–06–2021–T Method of direct measurements using CRMs and working standards
45.6	Instruments measuring amount of heat of dissolution, reactions, phase transformations	(5 – 50) J (ab. 50 – 1200) J	$U^{o}_{0.95}$ = 0.3 % $U^{o}_{0.95}$ = 0.07 %	SK 03–2414–09–2021–T Method of direct measurements using CRMs and working standards
46	**Instruments measuring temperature coefficient of linear expansion (TCLE)**			
46.1	Secondary standards for the unit of temperature coefficient of linear expansion of solids, dilatometers and measures	TCLE in temperature range from 90 to 400 K: ± $(0.01\cdot10^{-6} – 0.5\cdot10^{-6})$K^{-1} ± $(0.5\cdot10^{-6} – 5\cdot10^{-6})$ K^{-1} ± $(5\cdot10^{-6} – 27\cdot10^{-6})$ K^{-1} ± $(27\cdot10^{-6} – 40\cdot10^{-6})$K^{-1} ± $(40\cdot10^{-6} – 100\cdot10^{-6})$K^{-1}	$U_{0.95} = 0.12\cdot10^{-8}$ K^{-1} $U_{0.95} = 0.39\cdot10^{-8}$ K^{-1} $U_{0.95} = 0.45\cdot10^{-8}$ K^{-1} $U_{0.95} = 1.65\cdot10^{-8}$ K^{-1} $U_{0.95} = 3.2\cdot10^{-8}$ K^{-1}	Direct measurement method
		Temperature range from 400 to 1800 K: ± $(0.5\cdot10^{-6} – 5\cdot10^{-6})$ K^{-1} ± $(5\cdot10^{-6} – 10\cdot10^{-6})$ K^{-1} ± $(10\cdot10^{-6} – 27\cdot10^{-6})$K^{-1} ± $(27\cdot10^{-6} – 40\cdot10^{-6})$K^{-1} ± $(40\cdot10^{-6} – 100\cdot10^{-6})$K^{-1}	$U_{0.95} = 0.73\cdot10^{-8}$ K^{-1} $U_{0.95} = 2.2\cdot10^{-8}$ K^{-1} $U_{0.95} = 3.1\cdot10^{-8}$ K^{-1} $U_{0.95} = 12.8\cdot10^{-8}$ K^{-1} $U_{0.95} = 14.2\cdot10^{-8}$ K^{-1}	

1	2	3	4	5
		Temperature range from 1800 to 3000 K: $\pm (3\cdot10^{-6} - 10\cdot10^{-6})K^{-1}$ $\pm (10\cdot10^{-6} - 17\cdot10^{-6})K^{-1}$ $\pm (17\cdot10^{-6} - 27\cdot10^{-6})K^{-1}$ $\pm (27\cdot10^{-6} - 50\cdot10^{-6})K^{-1}$ $\pm (50\cdot10^{-6} - 100\cdot10^{-6})K^{-1}$	$U_{0.95} = 3\cdot10^{-8}$ K^{-1} $U_{0.95} = 7\cdot10^{-8}$ K^{-1} $U_{0.95} = 12\cdot10^{-8}$ K^{-1} $U_{0.95} = 32\cdot10^{-8}$ K^{-1} $U_{0.95} = 76\cdot10^{-8}$ K^{-1}	
46.2	Working standards for the unit of temperature coefficient of linear expansion of solids	TCLE in temperature range from 90 to 400 K: $\pm (0.05\cdot10^{-6} - 0.5\cdot10^{-6})K^{-1}$ $\pm (0.5\cdot10^{-6} - 5\cdot10^{-6})K^{-1}$ $\pm (5\cdot10^{-6} - 27\cdot10^{-6})K^{-1}$ $\pm (27\cdot10^{-6} - 40\cdot10^{-6})K^{-1}$ $\pm (40\cdot10^{-6} - 100\cdot10^{-6})K^{-1}$ Temperature range from 400 – 1900 K: $\pm (0.5\cdot10^{-6} - 5\cdot10^{-6})$ K^{-1} $\pm (5\cdot10^{-6} - 10\cdot10^{-6})$ K^{-1} $\pm (10\cdot10^{-6} - 16\cdot10^{-6})K^{-1}$ $\pm (16\cdot10^{-6} - 27\cdot10^{-6})K^{-1}$ $\pm (27\cdot10^{-6} - 40\cdot10^{-6})K^{-1}$ $\pm (40\cdot10^{-6} - 100\cdot10^{-6})K^{-1}$ Temperature range: from 1900 to 3000 K $\pm (3\cdot10^{-6} - 17\cdot10^{-6})$ K^{-1} $\pm (17\cdot10^{-6} - 30\cdot10^{-6})$ K^{-1} $\pm (30\cdot10^{-6} - 100\cdot10^{-6})K^{-1}$	$U_{0.95} = 1\cdot10^{-7}$ K^{-1} $U_{0.95} = 2\cdot10^{-7}$ K^{-1} $U_{0.95} = 2.7\cdot10^{-7}$ K^{-1} $U_{0.95} = 3.4\cdot10^{-7}$ K^{-1} $U_{0.95} = 4\cdot10^{-7}$ K^{-1} $U_{0.95} = 3\cdot10^{-7}$ K^{-1} $U_{0.95} = 3.8\cdot10^{-7}$ K^{-1} $U_{0.95} = 5.5\cdot10^{-7}$ K^{-1} $U_{0.95} = 6.2\cdot10^{-7}$ K^{-1} $U_{0.95} = 6.8\cdot10^{-7}$ K^{-1} $U_{0.95} = 7.6\cdot10^{-7}$ K^{-1} $U_{0.95} = 7.6\cdot10^{-8}$ K^{-1} $U_{0.95} = 1.5\cdot10^{-7}$ K^{-1} $U_{0.95} = 2.2\cdot10^{-7}$ K^{-1}	Direct measurement method
46.3	Measures of temperature coefficient of linear expansion (TCLE measures)	TCLE in temperature range from 90 to 400 K: $\pm (0.01\cdot10^{-6} - 0.5\cdot10^{-6})K^{-1}$ $\pm (0.5\cdot10^{-6} - 5\cdot10^{-6})K^{-1}$ $\pm (5\cdot10^{-6} - 27\cdot10^{-6})K^{-1}$ $\pm (27\cdot10^{-6} - 40\cdot10^{-6})K^{-1}$ $\pm (40\cdot10^{-6} - 100\cdot10^{-6})K^{-1}$ Temperature range from 400 to 1800 K: $\pm (0.5\cdot10^{-6} - 5\cdot10^{-6})$ K^{-1} $\pm (5\cdot10^{-6} - 10\cdot10^{-6})$ K^{-1} $\pm (10\cdot10^{-6} - 27\cdot10^{-6})K^{-1}$ $\pm (27\cdot10^{-6} - 40\cdot10^{-6})K^{-1}$ $\pm (40\cdot10^{-6} - 100\cdot10^{-6})K^{-1}$	$U_{0.95} = 0.12\cdot10^{-8}$ K^{-1} $U_{0.95} = 0.39\cdot10^{-8}$ K^{-1} $U_{0.95} = 0.45\cdot10^{-8}$ K^{-1} $U_{0.95} = 1.65\cdot10^{-8}$ K^{-1} $U_{0.95} = 3.2\cdot10^{-8}$ K^{-1} $U_{0.95} = 0.73\cdot10^{-8}$ K^{-1} $U_{0.95} = 2.2\cdot10^{-8}$ K^{-1} $U_{0.95} = 3.1\cdot10^{-8}$ K^{-1} $U_{0.95} = 12.8\cdot10^{-8}$ K^{-1} $U_{0.95} = 14.2\cdot10^{-8}$ K^{-1}	Direct measurement method
		Temperature range from 1800 to 3000 K: $\pm (3\cdot10^{-6} - 10\cdot10^{-6})$ K^{-1} $\pm (10\cdot10^{-6} - 17\cdot10^{-6})K^{-1}$ $\pm (17\cdot10^{-6} - 27\cdot10^{-6})K^{-1}$ $\pm (27\cdot10^{-6} - 50\cdot10^{-6})K^{-1}$ $\pm (50\cdot10^{-6} - 100\cdot10^{-6})K^{-1}$	$U_{0.95} = 3\cdot10^{-8}$ K^{-1} $U_{0.95} = 7\cdot10^{-8}$ K^{-1} $U_{0.95} = 12\cdot10^{-8}$ K^{-1} $U_{0.95} = 32\cdot10^{-8}$ K^{-1} $U_{0.95} = 76\cdot10^{-8}$ K^{-1}	

1	2	3	4	5
46.4	Interference, comparator, optical and pusher dilatometers	TCLE in temperature range from 90 to 400 K: $\pm (0.05 \cdot 10^{-6} – 0.5 \cdot 10^{-6})$ K^{-1} $\pm (0.5 \cdot 10^{-6} – 5 \cdot 10^{-6})$ K^{-1} $\pm (5 \cdot 10^{-6} – 27 \cdot 10^{-6})$ K^{-1} $\pm (27 \cdot 10^{-6} – 40 \cdot 10^{-6})$ K^{-1} $\pm (40 \cdot 10^{-6} – 100 \cdot 10^{-6})$ K^{-1} Temperature range from 400 to 1900 K: $\pm (0.5 \cdot 10^{-6} – 5 \cdot 10^{-6})$ K^{-1} $\pm (5 \cdot 10^{-6} – 10 \cdot 10^{-6})$ K^{-1} $\pm (10 \cdot 10^{-6} – 16 \cdot 10^{-6})$ K^{-1} $\pm (16 \cdot 10^{-6} – 27 \cdot 10^{-6})$ K^{-1} $\pm (27 \cdot 10^{-6} – 40 \cdot 10^{-6})$ K^{-1} $\pm (40 \cdot 10^{-6} – 100 \cdot 10^{-6})$ K^{-1} Temperature range from 1900 to 3000 K: $\pm (3 \cdot 10^{-6} – 10 \cdot 10^{-6})$ K^{-1} $\pm (10 \cdot 10^{-6} – 17 \cdot 10^{-6})$ K^{-1} $\pm (17 \cdot 10^{-6} – 30 \cdot 10^{-6})$ K^{-1} $\pm (30 \cdot 10^{-6} – 100 \cdot 10^{-6})$ K^{-1}	$U_{0.95} = 0.1 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 0.12 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 0.17 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 0.24 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 0.30 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 0.5 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 0.8 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 1 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 1.4 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 2 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 2.5 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 0.5 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 2 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 4 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 8 \cdot 10^{-7}$ K^{-1}	Direct measurement method
47	**Measuring instruments for complex analysis of thermomechanical quantities**			
47.1	Instruments for complex thermomechanical analysis of materials	Temperature from 90 to 400 K ab. 400 to 600 K ab. 600 to 850 K ab. 850 to 1000 K ab. 1000 to 1500 K ab. 1500 to 3000 K	$U_{0.95} = 0.2$ K $U_{0.95} = 0.5$ K $U_{0.95} = 1$ K $U_{0.95} = 2$ K $U_{0.95} = 4$ K $U_{0.95} = 9$ K	Direct measurement method
		Specific elongation ±0.3	$U_{0.95} = 0.3 \cdot 10^{-3}$	
		Linear increment $(0.02 \cdot 10^{-3} – 0.8)$ mm	$U_{0.95} = 4 \cdot 10^{-6}$ mm	
		TCLE in temperature range from 90 to 400 K: $\pm (0.05 \cdot 10^{-6} – 0.5 \cdot 10^{-6})K^{-1}$ $\pm (0.5 \cdot 10^{-6} – 10 \cdot 10^{-6})K^{-1}$ $\pm (10 \cdot 10^{-6} – 27 \cdot 10^{-6})K^{-1}$ $\pm (27 \cdot 10^{-6} – 100 \cdot 10^{-6})K^{-1}$	$U_{0.95} = 0.2 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 0.3 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 0.34 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 0.42 \cdot 10^{-7}$ K^{-1}	
		Temperature range from 400 to 1900 K: $\pm (0.5 \cdot 10^{-6} – 5 \cdot 10^{-6})K^{-1}$ $\pm (5 \cdot 10^{-6} – 16 \cdot 10^{-6})$ K^{-1} $\pm (16 \cdot 10^{-6} – 27 \cdot 10^{-6})K^{-1}$ $\pm (27 \cdot 10^{-6} – 40 \cdot 10^{-6})K^{-1}$ $\pm (40 \cdot 10^{-6} – 100 \cdot 10^{-6})K^{-1}$	$U_{0.95} = 0.5 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 1.2 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 1.8 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 2.5 \cdot 10^{-7}$ K^{-1} $U_{0.95} = 3 \cdot 10^{-7}$ K^{-1}	

1	2	3	4	5
		Temperature range from 1900 to 3000 K: ± ($3·10^{–6}$ – $10·10^{–6}$) $K^{–1}$ ± ($10·10^{–6}$ – $17·10^{–6}$)$K^{–1}$ ± ($17·10^{–6}$ – $30·10^{–6}$)$K^{–1}$ ± ($30·10^{–6}$ – $100·10^{–6}$) $K^{–1}$	$U_{0.95} = 0.7·10^{–7}\ K^{–1}$ $U_{0.95} = 2.1·10^{–7}\ K^{–1}$ $U_{0.95} = 4.5·10^{–7}\ K^{–1}$ $U_{0.95} = 10·10^{–7}\ K^{–1}$	
		Modulus of elasticity from $10^{–3}$ to 0.1 Pa ab. 0.1 to 10^2 Pa ab. 10^2 to 10^5 Pa ab. 10^5 to 10^9 Pa ab. 10^9 to 10^{16} Pa	$U_{0.95} = 5·10^{–5}$ Pa $U_{0.95} = 5·10^{–3}$ Pa $U_{0.95} = 0.1$ Pa $U_{0.95} = 1·10^3$ Pa $U_{0.95} = 5·10^4$ Pa	
		Mechanical loss angle tangent (0.00005 – 100)	$U^{o}_{0.95} = 3$ %	
		Force from $10^{–4}$ to $10^{–2}$ N ab. $10^{–2}$ to 0.1 N ab. 0.1 to $5·10^6$ N	$U^{o}_{0.95} = 5$ % $U^{o}_{0.95} = 3$ % $U^{o}_{0.95} = 1$ %	
		Mass from $1·10^{–3}$ to $1·10^2$ g ab. $1·10^2$ to $1·10^3$ g	$U^{o}_{0.95} = 3$ % $U^{o}_{0.95} = 1$ %	
		Frequency of mechanical vibrations (1 – 200) Hz	$U^{o}_{0.95} = 3$ %	
48	**Instruments measuring specific heat capacity, specific enthalpy, amount of heat, specific heat of phase and structural transformations**			
48.1	Standard (reference) instruments measuring specific heat capacity of solids, specific heat measures	(465 – 1654) J/(kg K) in temperature range (273.15 – 700) K	$U^{o}_{0.95} = 0.1$ %	Direct measurement method Comparison with a comparator
48.2	Instruments for combined thermal analysis, thermal analyzers, synchronous thermogravimeters , instruments for thermogravimetric and differential thermal analysis	Temperature (273 – 700) K	$U^{o}_{0.95} = 2$ %	Direct measurement method
		Amount of heat (0 – 1200) J	$U^{o}_{0.95} = 2$ %	
		Specific heat of phase and structural transformations (10 – 1000) kJ/kg	$U^{o}_{0.95} = 2$ %	
		Specific heat (250 – 1654) J/(kg K)	$U^{o}_{0.95} = 3$ %	
		Mass 10 mg to 5 g	$U^{o}_{0.95} = 3$ %	
48.3	Differential scanning calorimeters	Temperature (273 – 700) K	$U^{o}_{0.95} = 1$ %	Direct measurement method
		Amount of heat (0 – 1200) J	$U^{o}_{0.95} = 2$ %	
		Specific heat of phase and structural transformations (10 – 1000) kJ/kg	$U^{o}_{0.95} = 2$ %	
		Specific heat (250 – 1654) kJ/(kg K)	$U^{o}_{0.95} = 2.5$ %	

1	2	3	4	5
TIME AND FWSQUENCY MEASUREMENTS				
49	**Instruments measuring time and frequency**			
49.1	Electronic frequency counters, frequency synthesizers, frequency comparators	$(1\cdot10^{-2} – 50\cdot10^{6})$ Hz	$U_{0.95}$ = 0.003 Hz	Direct measurement method
ELECTRICAL AND MAGNETIC MEASUREMENTS				
50	**Instruments measuring EMF and DC voltage**			
50.1	DC voltage sources and meters	$(10^{-6}–10^{3})$ V	$U = (10^{-1} – 2\cdot10^{-4})$ %, matrix 1.1	Comparisons using comparator. Direct measurement method
51	**Instruments measuring direct current**			
51.1	Sources and meters of direct current	$(1\cdot10^{-16}$ – 30) A	$U^{o}_{0.95}$ = (5 – 0.001) % matrix 2.1	Method of indirect measurements. Comparisons using comparator. Direct measurement method
52	**Instruments measuring AC voltage**			
52.1	Thermoelectric voltage converters	100 mV – 1000 V 10 Hz – 30 MHz	$U_{0.95}$ = (10 – 1000) µV/V matrix 3.1	Direct comparison method with GET reference transducers
52.2	Calibrators	100 mV – 1000 V 10 Hz – 1 MHz	$U_{0.95}$ = 25·µV/V – – 20 mV/V matrix 3.2	Method of direct measurements on GET
52.3	Voltmeters	100 mV – 1000 V 10 Hz – 2000 MHz	$U_{0.95}$ = 25·µV/V – – 72 µV/V matrix 3.3	Depending on the frequency range: – Method of direct measurements on GET; – Comparison using comparator on GET
53	**Instruments measuring AC current**			
53.1	Converters, calibrators, ammeters	$(10^{-3}$ – 25) A $(20 – 10^{6)}$ Hz	$U_{0.95}$ = (15– 260)µA/A Matrix 4.1	Depending on the frequency range: – Method of direct measurements on GET; – Direct comparison method
53.2	AC shunts	1 mA – 100 A 10 Hz – 100 kHz	$U_{0.95}$ = (15 – 350)µA/A matrix 4.2	Direct comparison method
54	**Instruments measuring amount of electricity and charges**			
54.1	Electrostatic charge meters, universal electrometric voltmeters, electrometers	$(5\cdot10^{-12} – 2\cdot10^{-5})$ C	$U^{o}_{0.95}$ = 2 %	Method of indirect measurements.
54.2	Electric charge surface density meters	$(0.2\cdot10^{-5} – 1\cdot10^{-5})$ C/m^2	$U^{o}_{0.95}$ = 5 %	Method of indirect measurements.
55	**Instruments measuring parameters of electrostatic field**			
55.1	Electrostatic field strength meters	to $1\cdot10^{6}$ V/m	$U^{o}_{0.95}$ = 1.2%	Method of indirect measurements

1	2	3	4	5
55.2	Electrostatic field potential meters	to $3 \cdot 10^{4}$ V	$U^{o}_{0.95} = 0.4$ %	Method of indirect measurements
56	**Instruments measuring electrical resistance. Instruments measuring electrical conductivity**			
56.1	Secondary (working) standards for the unit of DC resistance	$(10^{-4} - 10^{-5})$ Ω	$U^{o}_{0.95} = 2 \cdot 10^{-4}$ %	Comparison method using comparator. Method of direct measurements. Method of indirect measurements. Comparison method
		$(10^{-3} - 1)$ Ω	$U^{o}_{0.95} = 1 \cdot 10^{-4}$ %	
		$(1 - 10^{5})$ Ω	$U^{o}_{0.95} = 1 \cdot 10^{-5}$ %	
		$(10^{5} - 10^{6})$ Ω	$U^{o}_{0.95} = 4 \cdot 10^{-5}$ %	
		$(10^{6} - 10^{8})$ Ω	$U^{o}_{0.95} = 8 \cdot 10^{-5}$ %	
		$(10^{8} - 10^{9})$ Ω	$U^{o}_{0.95} = 1 \cdot 10^{-4}$ %	
		$(10^{9} - 10^{12})$ Ω	$U^{o}_{0.95} = 0.01$ %	
56.2	Single value resistance standards Multivalue resistance standards Calibrators of resistance	$(10^{-6} - 10^{-4})$ Ω	$U^{o}_{0.95} = 4 \cdot 10^{-4}$ %	Comparison method using comparator. Method of direct measurements. Method of indirect measurements. Comparison method. Element by elements check Method
		$(10^{-4} - 10^{-3})$ Ω	$U^{o}_{0.95} = 1 \cdot 10^{-4}$ %	
		$(10^{-3} - 1)$ Ω	$U^{o}_{0.95} = 1 \cdot 10^{-5}$ %	
		$(1 - 10^{5})$ Ω	$U^{o}_{0.95} = 5 \cdot 10^{-5}$ %	
		$(10^{5} - 10^{6})$ Ω	$U^{o}_{0.95} = 8 \cdot 10^{-5}$ %	
		$(10^{6} - 10^{8})$ Ω	$U^{o}_{0.95} = 1 \cdot 10^{-4}$ %	
		$(10^{8} - 10^{9})$ Ω	$U^{o}_{0.95} = 0.001$ %	
		$(10^{9} - 10^{12})$ Ω	$U^{o}_{0.95} = 0.01$ %	
		$(10^{12} - 10^{13})$ Ω	$U^{o}_{0.95} = 0.05$ %	
		$(10^{13} - 10^{14})$ Ω	$U^{o}_{0.95} = 0.1$ %	
		$(10^{14} - 10^{15})$ Ω	$U^{o}_{0.95} = 0.01$ %	
56.3	Resistance meters	$(10^{-6} - 10^{-3})$ Ω	$U^{o}_{0.95} = 0.5$ %	Method of direct measurements. Comparison method
		$(10^{-3} - 1)$ Ω	$U^{o}_{0.95} = 0.05$ %	
		$(1 - 10)$ Ω	$U^{o}_{0.95} = 0.01$ %	
		$(10 - 10^{6})$ Ω	$U^{o}_{0.95} = 0.005$ %	
		$(10^{6} - 10^{7})$ Ω	$U^{o}_{0.95} = 0.01$ %	
		$(10^{7} - 10^{9})$ Ω	$U^{o}_{0.95} = 0.05$ %	
		$(10^{9} - 10^{12})$ Ω	$U^{o}_{0.95} = 0.08$ %	
		$(10^{12} - 10^{13})$ Ω	$U^{o}_{0.95} = 0.1$ %	
		$(10^{13} - 10^{14})$ Ω	$U^{o}_{0.95} = 0.8$ %	
		$(10^{14} - 10^{15})$ Ω	$U^{o}_{0.95} = 1$ %	
	Resistance meters of windings	$(10^{-6} - 200)$ Ω	$U^{o}_{0.95} = 0.2$ %	
56.4	DC and AC shunts	1 μΩ from 10 μΩ to 100 μΩ from 1 mΩ to 1 kΩ 1 mA – 15 kA	$U^{o}_{0.95} = 0.3$ % $U^{o}_{0.95} = 0.1$ % $U^{o}_{0.95} = 0.01$ %	Method of direct measurements. Comparison method using comparator
56.5	Secondary (working) standards for the unit of AC resistance	1 mΩ – 10 mΩ 10 mΩ – 100 mΩ 1 Ω – 10 kΩ 100 kΩ – 1 MΩ 10 MΩ – 100 MΩ to 1 kHz	$U^{o}_{0.95} = 0.01$ % $U^{o}_{0.95} = 1 \cdot 10^{-3}$ % $U^{o}_{0.95} = 1 \cdot 10^{-4}$ % $U^{o}_{0.95} = 3 \cdot 10^{-3}$ % $U^{o}_{0.95} = 5 \cdot 10^{-3}$ %	Method of direct measurements. Comparison method using comparator. Method of indirect measurements
		1 mΩ – 10 mΩ 10 mΩ – 100 mΩ 100 mΩ – 10 Ω	$U^{o}_{0.95} = 0.01$ % $U^{o}_{0.95} = 5 \cdot 10^{-3}$ % $U^{o}_{0.95} = 5 \cdot 10^{-3}$ %	

1	2	3	4	5
		100 Ω – 10 kΩ 100 kΩ – 1 MΩ 10 MΩ – 100 MΩ to 100 kHz	$U^{o}_{0.95} = 3\cdot10^{-3}$ % $U^{o}_{0.95} = 5\cdot10^{-3}$ % $U^{o}_{0.95} = 0.01$ %	
		100 mΩ – 10 Ω 10 Ω – 10 kΩ 100 kΩ – 1 MΩ to 10 MHz	$U^{o}_{0.95} = 0.02$ % $U^{o}_{0.95} = 0.01$ % $U^{o}_{0.95} = 0.02$ %	
56.6	AC resistance standards	1 mΩ – 10 mΩ 10 mΩ – 100 mΩ 1 Ω – 10 kΩ 100 kΩ – 1 MΩ 10 MΩ – 100 MΩ to 1 kHz	$U^{o}_{0.95} = 0.01$ % $U^{o}_{0.95} = 1\cdot10^{-3}$ % $U^{o}_{0.95} = 1\cdot10^{-4}$ % $U^{o}_{0.95} = 3\cdot10^{-3}$ % $U^{o}_{0.95} = 5\cdot10^{-3}$ %	Method of direct measurements. Comparison method using comparator
		1 mΩ – 10 mΩ 10 mΩ – 100 mΩ 100 mΩ – 10 Ω 100 Ω – 10 kΩ 100 kΩ – 1 MΩ 10 MΩ – 100 MΩ to 100 kHz	$U^{o}_{0.95} = 0.01$ % $U^{o}_{0.95} = 5\cdot10^{-3}$ % $U^{o}_{0.95} = 5\cdot10^{-3}$ % $U^{o}_{0.95} = 3\cdot10^{-3}$ % $U^{o}_{0.95} = 5\cdot10^{-3}$ % $U^{o}_{0.95} = 0.01$ %	
		100 mΩ – 10 Ω 10 Ω – 10 kΩ 100 kΩ – 1 MΩ to 10 MHz	$U^{o}_{0.95} = 0.02$ % $U^{o}_{0.95} = 0.01$ % $U^{o}_{0.95} = 0.02$ %	
56.7	Multivalue AC resistance standards AC Resistance Calibrators	10 mΩ – 100 mΩ 1 Ω – 10 kΩ 100 kΩ – 1 MΩ 10 MΩ – 100 MΩ to 1 kHz	$U^{o}_{0.95} = 1\cdot10^{-3}$ % $U^{o}_{0.95} = 1\cdot10^{-4}$ % $U^{o}_{0.95} = 3\cdot10^{-3}$ % $U^{o}_{0.95} = 5\cdot10^{-3}$ %	Method of direct measurements. Comparison method using comparator
		10 mΩ – 100 mΩ 100 mΩ – 10 Ω 100 Ω – 10 kΩ 100 kΩ – 1 MΩ 10 MΩ – 100 MΩ to 100 kHz	$U^{o}_{0.95} = 5\cdot10^{-3}$ % $U^{o}_{0.95} = 5\cdot10^{-3}$ % $U^{o}_{0.95} = 3\cdot10^{-3}$ % $U^{o}_{0.95} = 5\cdot10^{-3}$ % $U^{o}_{0.95} = 0.01$ %	
		100 mΩ – 10 Ω 10 Ω – 10 kΩ 100 kΩ – 1 MΩ to 10 MHz	$U^{o}_{0.95} = 0.02$ % $U^{o}_{0.95} = 0.01$ % $U^{o}_{0.95} = 0.02$ %	
56.8	Single value conductivity standards Multivalue conductivity standards	$(1 – 10^{-4})$ S $(10^{-4} – 10^{-6})$ S $(10^{-6} – 10^{-8})$ S 50 Hz – 100 kHz	$U^{o}_{0.95} = 0.002$ % $U^{o}_{0.95} = 0.005$ % $U^{o}_{0.95} = 0.01$ %	Method of direct measurements. Comparison method using comparator. Method of indirect measurements
56.9	AC Bridges, R Immittance Meters Total resistance and total conduction meters:	1 mΩ – 10 mΩ	$U^{o}_{0.95} = 0.01$ %	Method of direct measurements. Method of indirect measurements
		10 mΩ – 100 mΩ	$U^{o}_{0.95} = 1\cdot10^{-3}$ %	
		100 mΩ – 1 Ω	$U^{o}_{0.95} = 1\cdot10^{-4}$ %	
		1 Ω – 10 kΩ	$U^{o}_{0.95} = 5\cdot10^{-5}$ %	
		10 kΩ – 100 kΩ	$U^{o}_{0.95} = 1\cdot10^{-4}$ %	
		100 kΩ – 1 MΩ	$U^{o}_{0.95} = 3\cdot10^{-3}$ %	
		10 MΩ – 100 MΩ	$U^{o}_{0.95} = 5\cdot10^{-3}$ %	

1	2	3	4	5
57	**Instruments measuring electric capacitance**			
57.1	Secondary (working) standards for the unit of electric capacitance	1 fF –10 fF 10 fF – 1 pF 1 pF – 100 pF 100 pF – 100 nF 100 nF – 10 uF 10 uF – 1 mF 1 mF – 100 mF 100 mF – 1 F to 1 kHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 5·10^{-4} % $U^{o}_{0.95}$ = 5·10^{-5} % $U^{o}_{0.95}$ = 0.001 % $U^{o}_{0.95}$ = 0.001 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.03 % $U^{o}_{0.95}$ = 0.3 %	Method of direct measurements. Comparison method using comparator
		1 fF –10 fF 10 fF – 1 pF 1 pF – 1 nF 1 nF – 100 nF 100 nF – 10 uF to 10 kHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 5·10^{-5} % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 %	
		1 fF –10 fF 10 fF – 1 pF 1 pF – 1 nF 1 nF – 100 nF from 10 kHz to 1 MHz	$U^{o}_{0.95}$ = 0.05 % $U^{o}_{0.95}$ = 0.05 % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.01 %	
57.2	Electrical capacitance standards, capacitance boxes and measuring capacitors:	1 fF –10 fF 10 fF – 1 pF 1 pF – 10 pF 10 pF – 100 nF 100 nF – 10 uF 100 uF – 1 mF 1 mF – 100 mF 100 mF – 1 F to 1 kHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 5·10^{-5} % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.03 % $U^{o}_{0.95}$ = 0.05 % $U^{o}_{0.95}$ = 0.5 %	Electrical capacitance standards, capacitance boxes and measuring capacitors
		1 fF – 10 fF 10 fF – 1 pF 1 pF – 1 nF 1 nF – 100 nF 100 nF – 10 uF to 10 kHz	$U^{o}_{0.95}$ = 0.3 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 5·10^{-5} % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 %	
		1 fF –10 fF 10 fF – 1 pF 1 pF – 1 nF 1 nF – 100 nF from 10 kHz to 1 MHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.05 % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.01 %	
		1 pF – 1 nF from 1 MHz to 30 MHz	$U^{o}_{0.95}$ = 0.01 %	
	Small capacity standards	1 fF –10 fF 10 fF – 1 pF 1 pF – 10 pF 1 kHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 5·10^{-5} %	
	High frequency capacitance standards	(100 – 1000) pF 1 MHz	$U^{o}_{0.95}$ = 0.02 %	
	High capacity standards	100 uF – 1 mF 1 mF – 100 mF 100 mF – 1 F 50 Hz – 1 kHz	$U^{o}_{0.95}$ = 0.03 % $U^{o}_{0.95}$ = 0.05 % $U^{o}_{0.95}$ = 0.5 %	

1	2	3	4	5
57.3	AC bridges, capacitance meters for immittance parameters	1 fF –10 fF 10 fF – 1 pF 1 pF – 10 pF 10 pF – 100 nF 100 nF – 10 uF 100 uF – 1 mF 1 mF – 100 mF 100 mF – 1 F to 1 kHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95} = 5 \cdot 10^{-4}$ % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.03 % $U^{o}_{0.95}$ = 0.05 % $U^{o}_{0.95}$ = 0.5 %	Method of direct measurements. Comparison method using comparator
		1 fF –10 fF 10 fF – 1 pF 1 pF – 1 nF 1 nF – 100 nF 100 nF – 10 uF to 10 kHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95} = 5 \cdot 10^{-4}$ % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 %	
		1 fF –10 fF 10 fF – 1 pF 1 pF – 1 nF 1 nF – 100 nF from 10 kHz to 1 MHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.05 % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.01 %	
		1 pF – 1 nF from 1 MHz to 30 MHz	$U^{o}_{0.95}$ = 0.01 %	
57.4	Calibrators of electrical capacitance	1 fF –10 fF 10 fF – 1 pF 1 pF – 10 pF 10 pF – 100 nF 100 nF – 10 uF 100 uF – 1 mF 1 mF – 100 mF 100 mF – 1 F to 1 kHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95} = 1 \cdot 10^{-4}$ % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.03 % $U^{o}_{0.95}$ = 0.05 % $U^{o}_{0.95}$ = 0.5 %	Method of direct measurements. Comparison method using comparator
		1 fF –10 fF 10 fF – 1 pF 1 pF – 1 nF 1 nF – 100 nF 100 nF – 10 uF to 10 kHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95} = 1 \cdot 10^{-4}$ % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 %	
		1 fF –10 fF 10 fF – 1 pF 1 pF – 1 nF 1 nF – 100 nF from 10 kHz to 1 MHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.05 % $U^{o}_{0.95}$ = 0.005 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.01 %	
		1 pF – 1 nF from 1 MHz to 30 MHz	$U^{o}_{0.95}$ = 0.01 %	
58	**Instruments measuring inductance**			
58.1	Secondary (working) standards for the unit of inductance	10 nH – 10 μH	$U^{o}_{0.95}$ = 0.1 %	Method of direct measurements. Comparison method using comparator
		10 μH – 100 μH	$U^{o}_{0.95}$ = 0.05 %	
		100 μH – 1mH	$U^{o}_{0.95}$ = 0.01 %	
		1 mH – 100 mH	$U^{o}_{0.95}$ = 0.001 %	
		100 mH – 10 H	$U^{o}_{0.95}$ = 0.01 %	
		10 H – 1 kH	$U^{o}_{0.95}$ = 0.02 %	

1	2	3	4	5
58.2	Inductance standards, inductance boxes	10 nH – 10 μH 10 μH – 100 μH 100 μH – 1 mH 1 mH – 100 mH 100 mH – 10 H 10 H – 1 kH 1 kH – 10 kH to 1 kHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.05 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.001 % $U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.02 % $U^{o}_{0.95}$ = 0.05 %	Method of direct measurements. Comparison method using comparator
	AC Bridges, L Immittance Meters	10 nH – 10 μH 10 μH – 10 H ab. 1 kHz to 1 MHz	$U^{o}_{0.95}$ = 0.1 % $U^{o}_{0.95}$ = 0.05 %	
	Inductance meters, inductance calibrators	10 nH – 10 μH 10 μH – 100 μH 100 μH – 1 mH ab. 1 MHz to 100 MHz	$U^{o}_{0.95}$ = 0.3 % $U^{o}_{0.95}$ = 0.2 % $U^{o}_{0.95}$ = 0.1 %	
58.3	Working standards for the unit of mutual inductance, mutual inductance boxes	0.1 mH ; 1 mH ; 10 mH 1 μH – 10 mH to 50 kHz	$U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.05 %	Method of direct measurements. Comparison method using comparator
59	**Instruments measuring dielectric loss angle (dielectric loss tangent)**			
59.1	Secondary (working) standards for the loss tangent unit	$D = 0{,}5 \cdot 10^{-5} – 1$ at C = 10 pF – 10 μF to 1 MHz	$U_{0.95} = (0.3 \cdot 10^{-5} +$ $+ 0.001 \cdot D)$, where D – loss angle value	Method of direct measurements. Comparison method using comparator
59.2	Single and multiple value loss tangent standards	$10^{-5} – 1$ at C = 1pF – 100 mF to 10 MHz	$U_{0.95} = (10^{-5} + 0.001 \cdot D)$, where D – loss angle value	Method of direct measurements. Comparison method using comparator
59.3	AC bridges, loss tangent immitance meters Loss tangent meters	from $1 \cdot 10^{-5}$ to $1 \cdot 10^{-4}$ from $2 \cdot 10^{-4}$ to 1 to 10 MHz $(1 \cdot 10^{-4} – 1)$ at C = 1 pF – 10 μF	$U_{0.95} = 1 \cdot 10^{-5}$ $U_{0.95} = 1 \cdot 10^{-4}$ $U_{0.95} = 0.005 \cdot D$, where D – loss angle value	Direct measurement method
60	**Instruments measuring electrical quality factor**			
60.1	Q measures, Q meters, AC bridges, Q immitance meters	from 1 to 2 from 2 to 5 from 10 to 100 from 100 to 600 (0.05 – 30) MHz	$U^{o}_{0.95}$ = 1 % $U^{o}_{0.95}$ = 0.5 % $U^{o}_{0.95}$ = 0.2 % $U^{o}_{0.95}$ = 1.5 %	Method of direct measurements. Comparison method using comparator. Method of indirect measurements
61	**Instruments measuring capacitance and loss tangent**			
61.1	High–voltage capacitive bridges, meters of insulation parameters	C =1 pF – 10 nF C = 100 nF – 1 uF $D = 1 \cdot 10^{-5} – 1$ 50 Hz	$U^{o}_{0.95}(C)$ = 0.01% $U^{o}_{0.95}(C)$ =0.1% $U_{0.95}(D) =(1 \cdot 10^{-5} +$ $+ 0.005 \cdot D)$	Direct measurement method
61.2	High–voltage measuring capacitors High voltage loss tangent	from 10 to 100 pF from 1 to 10 nF from 10 pF to 10 nF to 100 kV	$U^{o}_{0.95}$ = 0.005% $U^{o}_{0.95}$ = 0.05% $U^{o}_{0.95}$ = 1 %	Method of direct measurements. Comparison method using comparator

1	2	3	4	5
	standards	$D = 10^{-4} - 1$ at C = 10pF – 0.1uF to 100 kV	$U_{0.95} = (1 \cdot 10^{-4} + 0.005 \cdot D)$	
62	**Instruments measuring specific electrical conductivity**			
62.1	Electrical conductivity measures (metals and alloys)	(0.4 – 60) MS/m	$U^{o}_{0.95} = 0.5\%$	Method of indirect measurements. Comparison method using comparator
62.2	Electrical Conductivity Meters	(0.4 – 60) MS/m	$U^{o}_{0.95} = 1.5\%$	Direct measurement method
63	**Instruments measuring relative permittivity**			
63.1	Samples (standards) of permittivity, complex permittivity, measuring cells	ε from 1 to 4 ε from 4 to 10 ε from 10 to 60 ε from 60 to 100 to 10 MHz	$U^{o}_{0.95} = 0.01\%$ $U^{o}_{0.95} = 0.1\%$ $U^{o}_{0.95} = 2\%$ $U^{o}_{0.95} = 5\%$	Method of indirect measurements
64	**Instruments measuring voltage and electrical voltage ratios**			
64.1	High–voltage capacitive converters (HVCC)	(6 – 100) kV K from 1 to 10000 where K is the scaling factor	$U^{o}_{0.95} = 0.01\%$	Current comparator method
64.2	Voltage measuring transformers	K = 1 – 1000 to 100 kV	$U^{o}_{0.95} = 0.01\%$	Current comparator method. Comparison method
64.3	Capacitive voltage dividers	K =1 – 10000 to 100 kV	$U^{o}_{0.95} = 0.01\%$	Current comparator method. Comparison Method
64.4	Inductive dividers	0.01 – 10 0.001 – 0.01; 10 – 100	$U^{o}_{0.95} = 1 \cdot 10^{-6}$ % $U^{o}_{0.95} = 10 \cdot 10^{-6}$ %	Method of indirect measurements
64.5	Voltage dividers, high voltage battery gauges	K = (1 – 10000) variable voltage (1 – 100) kV DC voltage (1 – 130) kV	$U^{\circ}_{0.95} = 0.01\%$ $U^{\circ}_{0.95} = 0.01\%$	Current comparator method. Comparison method
64.6	High–voltage measuring converters	(1 – 100) kV	$U^{\circ}_{0.95} = 0.01\%$	Current comparator method. Comparison method
64.6	High voltage measuring systems, kilovoltmeters, voltage sources, devices for measuring electric strength of insulation	AC voltage (1 – 100) kV	$U^{o}_{0.95} = 0.2\%$	Direct measurement method
		DC voltage (1 – 130) kV	$U^{\circ}_{0.95} = 0.2\%$	
65	**Instruments measuring amount of electricity (electric charge)**			
65.1	Partial discharge meters	1 pC – 10 pC from 11 pC to 10 nC	$U^{o}_{0.95}$ =1 pC $U^{o}_{0.95}$ = 1 %	Method of direct measurements. Method of indirect measurements.
65.2	Apparent charge calibrators	from 1 to 10 pC from 11 pC to 2 nC	$U_{0.95}$ = 1 pC $U^{\circ}_{0.95}$ = 1%	Method of direct measurements. Method

1	2	3	4	5
		from 2 nC to 10 nC	$U°_{0.95}$ = 5%	of indirect measurements.
66	**Current, voltage, power measuring transducers**			
66.1	Secondary standards for the unit of electric power and standards of the 1st and 2nd classes	from 300 to 1200 W at 53 Hz	$U°_{0.95} = 14·10^{-4}$ %	Comparison with state primary power standard GET 153
		from 0 to 10000 W at frequency from 40 to 70 Hz	$U°_{0.95} = 20·10^{-4}$ %	
		from 0 to 2500 W at frequency from 1 to 2500 Hz and at *PC* = 1; *PC* = minus 1	$U°_{0.95} = 47·10^{-4}$ %	
66.2	Current transformers	from 0.5 to 30000 A/ 1; 5 A at frequency from 40 to 70 Hz	$U°_{0.95}$ = 0.05%	Comparison with reference current transformer
66.3	Current transducers	from 0.01 to 200 A from 200 to 5000 A	$U°_{0.95}$ = 0.01% $U°_{0.95}$ =0.05 %	Comparison with reference current transducer
66.4	Wattmeters and varmeters	from 300 to 1200 W at 53 Hz	$U°_{0.95} = 14·10^{-4}$ %	Comparison with GET 153 or with standard of the 1st class
		from 0 to 10000 W at frequency from 40 to 70 Hz	$U°_{0.95} = 20·10^{-4}$ %	
		from 0 to 30000 W at frequency from 40 to 70 Hz	$U°_{0.95} = 47·10^{-4}$ %	
		from 0 to 2500 W at frequency from 1 to 2500 Hz and at *PC* = 1; *PC* = minus 1	$U°_{0.95} = 47·10^{-4}$ %	
66.5	Power transducers	from 300 to 1200 W at 53 Hz	$U°_{0.95} = 14·10^{-4}$ %	Comparison with GET 153 or with standard of the 1st accuracy class
		from 0 to 10000 W at frequency from 40 to 70 Hz	$U°_{0.95} = 20·10^{-4}$ %	
		from 0 to 30000 W at frequency from 40 to 70 Hz	$U°_{0.95} = 47·10^{-4}$ %	
		from 0 to 2500 W at frequency from 1 to 2500 Hz and at *PC* = 1; *PC* = minus 1	$U°_{0.95} = 47·10^{-4}$ %	
66.6	Power coefficient (*PC*) meters	*PC* from minus 1 to 1 at frequency from 40 to 70 Hz	$U°_{0.95}$ = 0.0001 %	Comparison with GET 153 or with standard of the 1st class
66.7	Instruments for vector measurements of electrical voltage and current	from 0 to 1000 V from 0.001 to 100 A from 40 to 70 Hz from 0° to 360°	$U_{0.95} = 3·10^{-5}$ $U_{0.95} = 3·10^{-5}$ $U_{0.95}$ = 0.00005 Hz $U_{0.95}$ = 0.003°	Comparison with reference vector meter

1	2	3	4	5
67	**Calibration tools for electrical measuring instruments**			
67.1	Power calibrators	from 300 to 1200 W at 53 Hz	$U^{\circ}_{0.95} = 14 \cdot 10^{-4}$ %	Comparison with GET 153 or with standard of the 1st class
		from 0 to 10000 W at frequencies from 40 to 70 Hz	$U^{\circ}_{0.95} = 20 \cdot 10^{-4}$ %	
		from 0 to 30000 W at frequencies from 40 to 70 Hz	$U^{\circ}_{0.95} = 47 \cdot 10^{-4}$ %	
		from 0 to 2500 W at frequencies from 1 to 2500 Hz and at $PC = 1$; $PC = -1$	$U^{\circ}_{0.95} = 47 \cdot 10^{-4}$ %	
67.2	Installations for verification of multifunctional electric power measuring instruments	from 0 to 50 A at voltages from 0 to 1000 V and at frequencies 40 to 70 Hz	$U^{\circ}_{0.95} = 3 \cdot 10^{-3}$ %	Comparison with GET 153 or with standard of the 1st class
		from 50 to 200 A at voltage from 0 to 1000 V and at frequencies from 40 to 70 Hz	$U^{\circ}_{0.95} = 5 \cdot 10^{-3}$ %	
		from 0 to 10 A at voltages from 0 to 1000 V and at frequencies from 1 to 2500 Hz	$U^{\circ}_{0.95} = 5 \cdot 10^{-3}$ %	
68	**Instruments measuring quality and accounting of quantity of electricity**			
68.1	Active and reactive energy meters	5 A at voltage up to 250 V	$U^{\circ}_{0.95} = 14 \cdot 10^{-4}$ %	Comparison with GET 153 or with standard of the 1st class
		from 0 to 10 A at voltage 0 to 1000 V	$U^{\circ}_{0.95} = 20 \cdot 10^{-4}$ %	
		from 10 to 50 A at voltage 0 to 1000 V	$U^{\circ}_{0.95} = 30 \cdot 10^{-4}$ %	
		from 50 to 200 A at voltage 0 to 1000 V	$U^{\circ}_{0.95} = 47 \cdot 10^{-4}$ %	
68.2	DC electricity meters	to 10 V via current channel	$U_{0.95} = 2 \cdot 10^{-5}$	Comparison with GET 153 or with standard of the 1st class
		from 0 to 1000 V	$U_{0.95} = 2 \cdot 10^{-5}$	
68.3	Installations for verification of AC electricity meters	from 0 to 10 A at voltage from 0 to 1000 V	$U^{\circ}_{0.95} = 2 \cdot 10^{-3}$ %	Comparison with GET 153 or with standard of the 1st class
		from 10 to 50 A at voltage from 0 to 1000 V	$U^{\circ}_{0.95} = 3 \cdot 10^{-3}$ %	
		from 50 to 200 A at voltage from 0 to 1000 V	$U^{\circ}_{0.95} = 5 \cdot 10^{-3}$ %	

1	2	3	4	5
68.4	Instruments for monitoring the quality of electrical energy (PQE) and parameters of electrical circuits	Voltage (root mean square value RMSV) U_{nom} (1 – 500) V from 0.01 U_{nom} to 2 U_{nom}	$U_{0.95} = 2 \cdot 10^{-5}$	Comparison with GET 153 or with standard of the 1st class
		First harmonic voltage from 0.01 to 1000 V	$U_{0.95} = 2 \cdot 10^{-5}$	Comparison with GET 153 or with standard of the 1st class
		AC frequency from 40 to 80 Hz	$U_{0.95}$ = 0.00005 Hz	Comparison with GET 153 or with reference frequency meter
		Voltage deviation from 0 to 100%	$U_{0.95} = 5 \cdot 10^{-5}$	Comparison with GET 153 or with standard of the 1st class
		Voltage unbalance coefficient in reverse and zero sequence 0 to 20%	$U_{0.95}$ = 0.015 %	Comparison with GET 153 or with standard of the 1st class
		Total harmonic component coefficient of voltage and current from 0 to 3% from 3 to 30% from 30 to 100%	$U_{0.95}$ = 0.001 % $U_{0.95}$ = 0.002 % $U_{0.95}$ = 0.003 %	Comparison with GET 153 or with standard of the 1st class
		Coefficient of harmonic component of voltage and current of order *h* from 2 to 50 (0 – 50)% from 0 to 3% from 3 to 30% from 30 to 100%	$U_{0.95}$ = 0.001 % $U_{0.95}$ = 0.002 % $U_{0.95}$ = 0.003 %	Comparison with GET 153 or with standard of the 1st class
		Direct–sequence, zero–sequence and reverse–sequence voltages from 0 to 10 V from 0 to 100 V from 100 to 500 V	$U_{0.95}$ = 0.0005 V $U_{0.95}$ = 0.005 V $U_{0.95}$ = 0.02 V	Comparison with GET 153 or with standard of the 1st class
		Current (RMSV) from 0.1 to 200 A from 200 to 3000 A	$U^{o}_{0.95}$ = 0.01 % $U^{o}_{0.95}$ = 0.05 %	Comparison with GET 153 or with standard of the 1st class
		Phase angle between voltage and current of the first harmonic of one phase from 0° to 360°	$U_{0.95}$ = 0.003°	Comparison with GET 153 or with standard of the 1st class
69	**Instruments measuring magnetic quantities**			
69.1	Instruments measuring DC magnetic induction	$(1 \cdot 10^{-8} – 1 \cdot 10^{-6})$ T	$U^{o}_{0.95}$ = 0.3 nT	Comparison method with GET 12
		$(1 \cdot 10^{-6} – 1 \cdot 10^{-3})$ T	$U^{o}_{0.95}$ = 0.06 nT	
		$(1 \cdot 10^{-3} – 1.2)$ T	$U^{o}_{0.95}$ = 0.02 %	
		$(1 \cdot 10^{-6} – 1 \cdot 10^{-5})$ T/A	$U^{o}_{0.95}$ = 0.1 %	
		$(1 \cdot 10^{-5} – 1 \cdot 10^{-3})$ T/A	$U^{o}_{0.95}$ = 0.001 %	
		$(1 \cdot 10^{-3} – 5 \cdot 10^{-2})$ T/A	$U^{o}_{0.95}$ = 0.01 %	

1	2	3	4	5
69.2	Instruments measuring AC magnetic induction in frequency range (0 – 20) kHz	$(1 \cdot 10^{-6} - 1 \cdot 10^{-3})$ T/A	$U^{o}_{0.95} = 0.05$ %	Comparison method with GET 12
		$(1 \cdot 10^{-3} - 20)$ Wb/T	$U^{o}_{0.95} = 0.1$ %	
		$(5 \cdot 10^{-8} - 1 \cdot 10^{-3})$ T	$U^{o}_{0.95} = 0.3$ %	
		$(1 - 1 \cdot 10^{4})$ V/T	$U^{o}_{0.95} = 0.1$ %	
69.3	Instruments measuring magnetic flux	$(1 \cdot 10^{-6} - 1 \cdot 10^{-4})$ Wb	$U^{o}_{0.95} = 0.5$ µWb	Comparison method with GET 12
		$(1 \cdot 10^{-4} - 0.1)$ Wb	$U^{o}_{0.95} = 0.15$ %	
		$(1 \cdot 10^{-4} - 1 \cdot 10^{-2})$ Wb/A	$U^{o}_{0.95} = 0.1$ %	
69.4	Instruments measuring magnetic moment	$(1 \cdot 10^{-6} - 1 \cdot 10^{3})$ A·m^{2} $(1 \cdot 10^{-5} -$ $- 3 \cdot 10^{-2})$ Wb/(A·m^{2}) $(1 \cdot 10^{-4} - 30)$ (A·m^{2})/A	$U^{o}_{0.95} = 0.3$ %	Comparison method with GET 12
69.5	Instruments measuring gradient of magnetic induction	$(1 \cdot 10^{-6} - 1)$ T·m^{-1}	$U^{o}_{0.95} = 3$ %	Comparison method with GET 12
		$(1 \cdot 10^{-5} -$ $- 2 \cdot 10^{-1})$ T·m^{-1}·A^{-1}	$U^{o}_{0.95} = 1$ %	
69.6	Instruments measuring static characteristics of magnetically soft materials	$(1 \cdot 10^{-5} - 0.1)$ Wb (magnetic flux capacitance)	$U^{o}_{0.95} = 0.5$ %	Method of indirect measurements
		$(1 \cdot 10^{-3} - 1 \cdot 10^{3})$ A (magnetomotive force)	$U^{o}_{0.95} = 0.2$ %	
69.7	Instruments measuring magnetic susceptibility and magnetic permeability of para–, dia– and weak ferromagnetic materials	$1 \cdot 10^{-5} - 10$	$U_{0.95} = 1.5$ %	Method of indirect measurements
		1 – 20	$U_{0.95} = 0.5$ %	
69.8	Instruments measuring characteristics of hard magnetic materials	$(1 \cdot 10^{3} - 3 \cdot 10^{5})$ A/m (coercive force)	$U^{o}_{0.95} = 2$ %	Method of indirect measurements
70	**Instruments measuring power of electric current**			
70.1	Phase calibrators	(0 – 360)° 0.01 Hz – 20 MHz	$U_{0.95} = 0.05°$	Direct measurement method
70.2	Phase difference meters	(0 – 360)° 0.01 Hz – 20 MHz	$U_{0.95} = 0.05°$	Direct measurement method
OPTICAL–PHYSICAL MEASUREMENTS				
71	**Instruments measuring energy brightness and radiation intensity**			
71.1	Thermal emitters	$(40 - 61 \cdot 10^{3})$ W/(sr·m^{2}) $(1 \cdot 10^{-4} - 15)$ W/sr	$U_{0.95} = 1.5$ % $U_{0.95} = 2.4$ %	Comparison with a comparator
71.2	Radiometers, IR receivers	$(40 - 61 \cdot 10^{3})$ W/(sr·m^{2}) $(1 \cdot 10^{-4} - 15)$ W/sr	$U_{0.95} = 3$ % $U_{0.95} = 5$ %	Comparison with a comparator
72	**Instruments measuring rotation angle of polarization plane**			
72.1	Reference settings (automatic polarimeters)	from minus 80° to 80°	$U_{0.95} = 0.0025°$	Direct measurement method
72.2	Polarimeters, visual saccharimeters, semi–automatic, automatic	from minus 90° to 90°	$U_{0.95} = 0.005°$	Direct measurement method

1	2	3	4	5
73	**Instruments measuring refractive index**			
73.1	Total internal reflection (TIR) refractometers (Pulfrich , Abbe , submersible, specialized)	from 1.25 to 1.94	$U_{0.95} = 3 \cdot 10^{-5}$	Direct measurement method
74	**Instruments measuring color coordinates**			
74.1	Colorimeters, spectrocolorimeters by coordinates: *X* *Y* *Z*	 from 2.5 to 109.0 from 1.4 to 98.0 from 1.7 to 107.0	$U_{0.95} = 0.4$	Direct measurement method
75	**Instruments measuring chromaticity coordinates**			
75.1	Colorimeters, spectrocolorimeters by coordinates: *x* *y*	 from 0.0039 to 0.7347 from 0.0048 to 0.8338	$U_{0.95} = 0.003$	Direct measurement method
76	**Instruments measuring spectral coefficient of directional transmission**			
76.1	Spectrophotometers, photoelectric colorimeters	from 1 to 99 % in wavelength range: from 0.20 to 0.40 μm from 0.40 to 0.78 μm from 0.78 to 2.5 μm	 $U_{0.95}$ = 0.6 % (abs.) $U_{0.95}$ = 0.3 % (abs.) $U_{0.95}$ = 0.6 % (abs.)	Direct measurement method
76.2	Sets of measures of spectral directional transmissions	from 1 to 95 % in the wavelength range: from 0.20 to 0.40 μm from 0.40 to 0.78 μm from 0.78 to 2.5 μm	 $U_{0.95}$ = 0.6 % (abs.) $U_{0.95}$ = 0.3 % (abs.) $U_{0.95}$ = 0.6 % (abs.)	Direct measurement method
77	**Instruments measuring integral and reduced spectral directional transmissions**			
77.1	Sets of measures of integral and reduced directional transmissions	from 1 to 95 % in the wavelength range: from 0.20 to 0.40 μm from 0.40 to 0.78 μm from 0.78 to 2.5 μm	 $U_{0.95}$ = 0.6 % (abs.) $U_{0.95}$ = 0.3 % (abs.) $U_{0.95}$ = 0.6 % (abs.)	Direct measurement method
78	**Instruments measuring optical density**			
78.1	Microplate photometers and immunoassay and immunochemical analyzers	from 0.01 to 1.0 B from 1.0 to 2.0 B from 2.0 to 3.0 B from 3.0 to 4.0 B	$U_{0.95}$ = 0.004 B $U_{0.95}$ = 0.007 B $U_{0.95}$ = 0.011 B $U_{0.95}$ = 0.02 B	Direct measurement method
79	**Instruments measuring spectral coefficient of diffuse reflection**			
79.1	Analyzers of liquid, solid and bulk substances and materials	from 2 to 99 %	$U_{0.95}$ = 2.9 % (abs.)	Direct measurement method
80	**Instruments measuring meteorological optical range (MOR), directional transmission (DT)**			
80.1	Measuring transducers and measuring channels of meteorological optical range, directional	(10 – 50000) m	$U_{0,95} = (1 + 0.05 \cdot S)$ m, where *S* – meteorological optical range, m	Direct measurements using DT measures

1	2	3	4	5
	transmission (DT) of atmosphere of stationary, portable and remote multifunctional meteorological stations	(0 – 100) %	$U_{0.95}$ = 0.2 %	
MEASUREMENTS OF CHARACTERISTICS OF IONIZING RADIATIONS AND NUCLEAR CONSTANTS				
81	**Means of measurement of kerma in air, kerma in air, exposure dose, ambient, individual, directed dose equivalents and their rates**			
81.1	Secondary standards – dosimetric installations for air kerma, exposure dose, ambient, individual, directed dose equivalents and their X–ray radiation rates	(5 – 300) kV $(1\cdot10^{-6}$ – 10) Gy $(3\cdot10^{-8} – 3\cdot10^{-1})$ C/kg $(1\cdot10^{-7}$ – 1) Gy/s $(3\cdot10^{-9} – 3\cdot10^{-2})$ A/kg $(1\cdot10^{-6}$ – 10) Sv $(1\cdot10^{-7} – 1\cdot10^{-2})$ Sv/s	$U^{o}_{0.95}$ = 1.2 %	SK03–RP–Department No. 210–01–14–2019T
81.2	Secondary standards – dosimetric installations for air kerma, exposure dose, ambient , individual, directed dose equivalents and their gamma radiation rates	(0.06 – 3) MeV $(1\cdot10^{-7}$ – 20) Gy $(3\cdot10^{-9} – 6\cdot10^{-1})$ C/kg $(1\cdot10^{-8} – 2\cdot10^{-2})$ Gy/s $(3\cdot10^{-10} – 6\cdot10^{-4})$ A/kg $(1\cdot10^{-7}$ – 10) Sv $(1\cdot10^{-8} – 1\cdot10^{-2})$ Sv/s	$U^{o}_{0.95}$ = 1.5 %	SK03–210/MK–01–15–2015–T
81.3	Secondary standards – dosimeters with ionization chambers measuring air kerma, exposure dose and their x–ray and gamma radiation rates	(0.005 – 3) MeV $(1\cdot10^{-7}$ – 20) Gy $(3\cdot10^{-9} – 6\cdot10^{-1})$ C/kg $(1\cdot10^{-8}$ – 2) Gy/s $(3\cdot10^{-10} – 6\cdot10^{-2})$ A/kg	$U^{o}_{0.95}$ = 1.3 %	SK03–210/MK–01–02–2010–T, SK03–210/MK–01–01–2008–T, SK03–210/MK–01–06–2010–T
81.4	Working standards (WS) – radionuclide sources of x–rays – ^{55}Fe, ^{109}Cd	$(1\cdot10^{-10} – 2\cdot10^{-4})$ Gy/s $(3\cdot10^{-12} – 6\cdot10^{-6})$ A/kg	$U^{o}_{0.95}$ = 2 %	SK03–210/MK–01–04–2011–T
81.5	WS – dosimetric verification installations of X–ray radiation	(5 – 300) kV $(1\cdot10^{-8}$ – 200) Gy $(3\cdot10^{-10}$ – 6) C/kg $(1\cdot10^{-9}$ – 2) Gy/s $(3\cdot10^{-11} – 6\cdot10^{-2})$ A/kg $(1\cdot10^{-8}$ – 10) Sv $(1\cdot10^{-9} – 3\cdot10^{-2})$ Sv/s	$U^{o}_{0.95}$ = 1.5 %	SK03–RP–Department No. 210–01–14–2019T
81.6	WS – meters of the product of the dose (kerma in air) on the area reference	(40 – 250) kV $(1\cdot10^{-7}$ – 10) Gy·m ^{2} $(1\cdot10^{-9} – 3\cdot10^{-2})$ Gr·m^{2}/s	$U^{o}_{0.95}$ = 4 %	SK03–RP– Otd . No. 210–01–11–2019–T
81.7	High accuracy air kerma and exposure dose meters	$(2\cdot10^{-9} – 1\cdot10^{-1})$ P·s^{-1} $(2\cdot10^{-11} – 1\cdot10^{-3})$ Gy/s $(2\cdot10^{-10}$ – 30) Gy $(2\cdot10^{-11} – 1\cdot10^{-3})$ Sv/s $(2\cdot10^{-10}$ – 30) Sv	$U^{o}_{0.95}$ = 1.3 %	SK03–210/MK–01–02–2010–T, SK03–210/MK–01–01–2008–T, SK03–210/MK–01–06–2010–T
81.8	Measuring instruments (MI) – meters of dose product (kerma in air) by area	$(1\cdot10^{-7}$ – 10) Gy·m^{2} $(1\cdot10^{-9} – 3\cdot10^{-2})$ Gy·m^{2}/s	$U^{o}_{0.95}$ = 4 %	SK03–RP– Otd . No. 210–01–11–2019–T

1	2	3	4	5
81.9	MI – meters of the product of dose (kerma in air) by length	$(3\cdot10^{-5}$ – 500) Gy·cm $(3\cdot10^{-6}$ – 20) Gy·cm/s	$U^{o}_{0.95}$ = 5 %	SK03–RP– Otd . No. 210–01–11–2019–T
81.10	WS – reference energy flow calorimeters	(5 – 200) kV $(2\cdot10^{-5} – 2\cdot10^{-3})$ W	$U^{o}_{0.95}$ = 7 %	Comparator method
81.11	MI – X–ray energy flux sources	$(2\cdot10^{-5} – 2\cdot10^{-3})$ W	$U^{o}_{0.95}$ = 20 %	SK03–RP–Department No. 210–01–09–2019
81.12	MI – instruments for non–invasive measurement of anode voltage of X–ray diagnostic devices	(22 – 150) kV	$U^{o}_{0.95}$ = 2 %	SK03–RP–Otd.210–01–12–2019–T
81.13	WS – radionuclide sources of gamma radiation ^{137}Cs, 60Co, ^{226}Ra, ^{241}Am, ^{57}Co	$(1\cdot10^{-10} – 2\cdot10^{-4})$ Gy/s $(3\cdot10^{-12} – 6\cdot10^{-6})$ A/kg	$U^{o}_{0.95}$ = 1.4 %	SK03–210/MK–01–04–2011–T, SK03–210/MK–01–15–2015–T
81.14	WS – dosimetric verification installations for gamma radiation	(0.06 – 3) MeV $(1\cdot10^{-9}$ – 10) Gy $(3\cdot10^{-11} – 3\cdot10^{-1})$ C/kg $(1\cdot10^{-10} – 1\cdot10^{-2})$ Gy/s $(3\cdot10^{-11}$ – 3 $10^{-4})$ A/kg $(1\cdot10^{-9}$ – 10) Sv $(1\cdot10^{-10} – 1\cdot10^{-2})$ Sv/s	$U^{o}_{0.95}$ = 1.4 %	SK03–210/MK–01–15–2015–T
81.15	WS – mobile dosimetric verification setups for gamma radiation	(0.06 – 0.7) MeV $(1\cdot10^{-9} – 2\cdot10^{-1})$ Gy $(3\cdot10^{-11} – 6\cdot10^{-3})$ C/kg $(1\cdot10^{-10} – 2\cdot10^{-4})$ Gy/s $(3\cdot10^{-12} – 6\cdot10^{-6})$ A/kg	$U^{o}_{0.95}$ = 1.4 %	SK03–210/MK–01–15–2015–T
81.16	MI – dosimetric radionuclide sources	$(1\cdot10^{-10} – 2\cdot10^{-4})$ Gy/s $(3\cdot10^{-12} – 6\cdot10^{-6})$ A/kg	$U^{o}_{0.95}$ = 1.4 %	SK03–210/MK–01–04–2011–T, SK03–210/MK–01–15–2015–T, SK03–210/MK–01–05–2011–T
81.17	MI – individual dosimeters and dosimetric systems	$(1\cdot10^{-8}$ – 10) Sv $(3\cdot10^{-11} – 5\cdot10^{-3})$ Sv/s	$U^{o}_{0.95}$ = 1.3 %	SK03–210/MK–01–02–2010–T, SK03–210/MK–01–01–2008–T, SK03–210/MK–01–06–2010–T
81.18	MI – dosimetric irradiation installations	$(1\cdot10^{-9}$ – 2·10 $^{3})$ Gy $(3\cdot10^{-11}$ – 60) C/kg	$U^{o}_{0.95}$ = 1.4 %	SK03–210/MK–01–15–2015–T
81.19	WS – dosimeters for air kerma, exposure dose, ambient, individual, directed dose equivalents of X–ray and gamma radiation	(0.005 – 3) MeV $(1\cdot10^{-9}$ – 200) Gy $(3\cdot10^{-11}$ – 6) C/kg $(1\cdot10^{-10}$ – 2) Gy/s $(3\cdot10^{-12} – 6\cdot10^{-2})$ A/kg $(1\cdot10^{-9}$ – 10) Sv $(1\cdot10^{-10} – 3\cdot10^{-2})$ Sv/s	$U^{o}_{0.95}$ = 1.3 %	SK03–210/MK–01–02–2010–T, SK03–210/MK–01–01–2008–T, SK03–210/MK–01–06–2010–T, SK03–210/MK–01–03–2010–T
81.20	WS – radionuclide sources of gamma radiation ^{137}Cs, ^{60}Co, ^{226}Ra, ^{241}Am, ^{57}Co, ^{75}Se, ^{192}Ir, ^{153}Gd	$(3\cdot10^{-11} – 2\cdot10^{-3})$ Gy/s $(9\cdot10^{-13} – 6\cdot10^{-5})$ A/kg	$U^{o}_{0.95}$ = 1.4 %	SK03–210/MK–01–04–2011–T, SK03–210/MK–01–15–2015–T, SK03–210/MK–01–05–2011–T,

1	2	3	4	5
				SK03–210/MK–01–08–2014–T
81.21	WS – radionuclide sources of x–rays ^{55}Fe, ^{109}Cd, ^{125}I	$(1\cdot10^{-11} – 2\cdot10^{-5})$ Gy/s $(3\cdot10^{-13} – 6\cdot10^{-7})$ A/kg	$U^{o}_{0.95}$ = 1.9 %	SK03–210/MK–01–04–2011–T
81.22	MI – dosimeters for air kerma, exposure dose, ambient, directed dose equivalents of x–ray and gamma radiation	$(1\cdot10^{-9} – 200)$ Gy $(3\cdot10^{-11} – 6)$ C/kg $(1\cdot10^{-10} – 2)$ Gy/s $(3\cdot10^{-12} – 6\cdot10^{-2})$ A/kg $(1\cdot10^{-9} – 10)$ Sv $(1\cdot10^{-10} – 3\cdot10^{-2})$ Sv/s	$U^{o}_{0.95}$ = 1.3 %	SK03–210/MK–01–02–2010–T, SK03–210/MK–01–01–2008–T, SK03–210/MK–01–06–2010–T, SK03–210/MK–01–03–2010–T
81.23	MI – dosimeters for air kerma, exposure dose, ambient, directed dose equivalents	$(1\cdot10^{-9} – 200)$ Gy $(3\cdot10^{-11} – 6)$ C/kg $(1\cdot10^{-10} – 2)$ Gy/s $(3\cdot10^{-12} – 6\cdot10^{-2})$ A/kg $(1\cdot10^{-9} – 10)$ Sv $(1\cdot10^{-11} – 3\cdot10^{-2})$ Sv/s	$U^{o}_{0.95}$ = 1.3 %	SK03–210/MK–01–02–2010–T, SK03–210/MK–01–01–2008–T, SK03–210/MK–01–06–2010–T, SK03–210/MK–01–03–2010–T
82	**Instruments measuring absorbed dose of photon radiation**			
82.1	WS – dosimetric calibration setups (verification by absorbed dose in water)	$(1\cdot10^{-1} – 1\cdot10^{2})$ Gy	$U^{o}_{0.95}$ = 2 %	SK03–210/MK–08–01–2010, SK–03–RP–Otd No. 210–08–01–2020
82.2	WS – dosimetric instruments (verification by absorbed dose in water)	$(1\cdot10^{-1} – 1\cdot10^{2})$ Gy	$U^{o}_{0.95}$ = 2 %	SK03–210/MK–08–01–2010
82.3	MI – absorbed dose dosimeters for special purposes	$(1\cdot10^{-1} – 1\cdot10^{2})$ Gy	$U^{o}_{0.95}$ = 1.3 %	SK–03–RP–Otd No. 210–08–01–2020
83	**Instruments measuring air kerma, air kerma, exposure dose, ambient individual, directed dose equivalents and their pulsed X–ray radiation rates**			
83.1	WS – pulsed X–ray dosimeters	(50 – 600) keV $(8\cdot10^{-8} - 1\cdot10^{2})$ C/kg $(3\cdot10^{-6} - 6\cdot10^{3})$ Gy $(3\cdot10^{-6} - 6\cdot10^{3})$ Sv $(8\cdot10^{-9} - 3\cdot10^{-2})$ A/kg $(3\cdot10^{-7} – 1)$ Gy/s $(3\cdot10^{-7} – 1)$ Sv/s	$U_{0.95}$ = 5 %	SK–03–RP–Otd No. 210–08–01–2020
83.2	WS – dosimeters of pulsed photon radiation	(0.05 – 3) MeV $(8\cdot10^{-6} - 1\cdot10^{-2})$ C/kg	$U^{o}_{0.95}$ = 5 %	SK03–RP–Department No. 210–01–10–2015–T
83.3	MI – pulsed X–ray dosimeters	$(8\cdot10^{-8} - 1)$ C/kg $(3\cdot10^{-6} – 60)$ Gy $(3\cdot10^{-6} – 60)$ Sv $(8\cdot10^{-9} - 3\cdot10^{-2})$ A/kg $(3\cdot10^{-7} – 1)$ Gy/s $(3\cdot10^{-7} – 1)$ Sv/s	$U^{o}_{0.95}$ = 5 %	SK03–RP–Department No. 210–01–10–2015–T
83.4	MI – sources of pulsed X–ray radiation	$(8\cdot10^{-8} - 1\cdot10^{2})$ C/kg at the pulse repetition rate up to 1000 Hz	$U^{o}_{0.95}$ = 6 %	SK03–RP–Department No. 210–01–10–2015–T

1	2	3	4	5
83.5	MI – dosimetric installations of pulsed X–ray radiation	$(3 \cdot 10^{-4} – 3)$ C/kg	$U^{o}_{0.95} = 6$ %	SK03–RP–Department No. 210–01–14–2019T, SK03–RP–Department No. 210–01–10–2015
84	**Instruments measuring absorbed dose and absorbed dose rate of beta radiation in tissue –equivalent material**			
84.1	Secondary standards for the absorbed dose of beta radiation in tissue equivalent material: – radionuclide sources of beta radiation: ^{147}Pm, ^{204}Tl, ^{90}Sr + ^{90}Y; – measuring installations	$(1 \cdot 10^{-3} – 1 \cdot 10^{2})$ Gy $(1 \cdot 10^{-5} – 1)$ Gy/s $(1 \cdot 10^{-5} – 1 \cdot 10^{2})$ Gy $(1 \cdot 10^{-8} – 1)$ Gy/s	$U^{o}_{0.95} = 5$ %	SK–03–RP–Department No. 210–03–01–2009–T
84.2	WS for the absorbed dose of beta radiation in tissue –equivalent material: – radionuclide sources of beta radiation: ^{147}Pm, ^{204}Tl, ^{90}Sr + ^{90}Y; – measuring installations	$(1 \cdot 10^{-5} – 1 \cdot 10^{2})$ Gy $(1 \cdot 10^{-8} – 1)$ Gy/s $(1 \cdot 10^{-5} – 1 \cdot 10^{2})$ Gr $(1 \cdot 10^{-8} –1)$ Gy/s	$U^{o}_{0.95} = 7$ %	SK–03–RP–Department No. 210–03–01–2009–T
84.3	MI for the absorbed dose of beta radiation in tissue –equivalent material: – radionuclide sources of beta radiation: 147Pm, ^{204}Tl, ^{90}Sr, ^{90}Y; – electronic dosimeters, direct– reading; – solid–state dosimeters; – technological installations	$(1 \cdot 10^{-5} – 1 \cdot 10^{3})$ Gy $(1 \cdot 10^{-8} – 1)$ Gy/s $(1 \cdot 10^{-3} – 1 \cdot 10^{5})$ Gy $(1 \cdot 10^{-5} – 10)$ Gy/s $(1 – 1 \cdot 10^{6})$ Gy $(1 – 10)$ Gy/s $(1– 1 \cdot 10^{6})$ Gy $(1 – 10)$ Gy/s	$U^{o}_{0.95} = 3$ %	SK–03–RP–Department No. 210–03–02–2009–T
85	**Instruments measuring flux and flux density of neutron radiation, the ambient dose equivalent rate of neutron radiation**			
85.1	Secondary standards: radionuclide neutron sources, measuring installations , dosimeters	$(1 \cdot 10^{3} – 1 \cdot 10^{14})$ s^{-1} $(1 \cdot 10^{4} – 1 \cdot 10^{10})$ s^{-1}m^{2} $(5 \cdot 10^{-4} – 5 \cdot 10^{2})$ µSv/s	$U^{o}_{0.95} = 1.2$ %	SK 03–210/MK–05–04–2011–T SK 03–210/MK–05–10–2020–T SK 03–210/MK–05–06–2011–T SK 03–210/MK–05–05–2009–T
85.2	WS – neutron sources	$(1 \cdot 10^{2} – 1 \cdot 10^{9})$ s^{-1} $(1 \cdot 10^{4} – 1 \cdot 10^{10})$ s^{-1}m^{-2} $(5 \cdot 10^{-4} – 5 \cdot 10^{2})$ µSv/s $(1 \cdot 10^{3} – 1 \cdot 10^{9})$ s^{-1} $(1 \cdot 10^{4} – 1 \cdot 10^{10})$ s^{-1}m^{-2}	$U^{o}_{0.95} = 1.2$ %	SK 03–210/MK–05–03–2008–T SK 03–210/MK–05–01–2008–T SK 03–210/MK–05–04–2011–T SK 03–210/MK–05–06–2011–T SK 03–210/MK–05–05–2009–T

1	2	3	4	5
85.3	WS – neutron flux density radiometers	$(1{\cdot}10^{8} – 1{\cdot}10^{15})$ $s^{-1}m^{2}$ $(1{\cdot}10^{3} – 5{\cdot}10^{8})$ $s^{-1}m^{-2}$ $(1{\cdot}10^{4} – 1{\cdot}10^{15})$ $s^{-1}m^{-2}$	$U^{o}_{0.95}$ = 1.5 %	SK 03–210/MK–05–06–2011–T SK 03–210/MK–05–05–2009–T SK 03–210/MK–05–06–2011–T SK 03–210/MK–05–05–2009–T
85.4	MI – dosimeters of neutron radiation	$(5{\cdot}10^{-4} – 1{\cdot}10^{6})$ μSv/s	$U^{o}_{0.95}$ = 1.5 %	SK 03–210/MK–06–01–2008–T SK 03–210/MK–06–02–2008–T SK 03–210/MK–06–03–2010–T SK–03T–RP–No. 210–06–17–2010 SK–03T–RP–Department No. 210–06–05–2010–T
85.5	MI – neutron radiation radiometers	$(1{\cdot}10^{3} – 1{\cdot}10^{15})$ $s^{-1}m^{-2}$	$U^{o}_{0.95}$ = 1.5 %	SK 03–210/MK–06–12–2010–T SK 03–210/MK–06–13–2010–T SK 03–210/MK–06–14–2010–T
86	**Instruments measuring activity, specific, volumetric activity of radionuclides, particle flux and flux density**			
86.1	Secondary standards – solutions of alpha, beta, gamma emitting radionuclides	$(1{\cdot}10^{4} – 1{\cdot}10^{8})$ $Bq{\cdot}g^{-1}$	$U_{0.95}$ = 1.5 %	SK 03–210/MK–06–06–2010–T SK 03–210/MK–06–08–2009–T SK 03–210/MK–06–09–2009–T
86.2	WS – sources of photon radiation	$(2 – 2{\cdot}10^{11})$ Bq $(5 – 5{\cdot}10^{8})$ s^{-1} $(10 – 1{\cdot}10^{8})$ $s^{-1}m^{-2}$	$U^{o}_{0.95}$ = 1 %	SK 03–210/MK–06–08–2009–T SK 03–210/MK–06–09–2009–T
86.3	Secondary standards – sources of alpha, beta, photon radiation	$(2 – 2{\cdot}10^{11})$ Bq $(5 – 5{\cdot}10^{4})$ 1/s $(5{\cdot}10^{3} – 5{\cdot}10^{8})$ $1/(s{\cdot}m^{2)}$	$U_{0.95}$ = 1 %	SK 03–210/MK–06–06–2010–T
86.4	WS – sources of alpha radiation (OSAI, P9, etc.)	$(2 – 2{\cdot}10^{11})$ Bq $(5 – 5{\cdot}10^{8})$ s^{-1} $(10 – 1{\cdot}10^{8})$ $s^{-1}m^{-2}$	$U^{o}_{0.95}$ = 1 %	SK 03–210/MK–06–01–2008–T SK 03–210/MK–06–02–2008–T SK 03–210/MK–06–03–2010–T SK–03T–RP–No. 210–06–17–2010 SK–03T–RP–Department No. 210–06–05–2010–T
86.5	WS – sources of beta radiation (SO, ORIBI, etc.)	$(2 – 2{\cdot}10^{11})$ Bq $(5 – 5{\cdot}10^{8})$ s^{-1} $(10 – 1{\cdot}10^{8})$ $s^{-1}m^{-2}$	$U^{o}_{0.95}$ = 1 %	SK 03–210/MK–0 6 –15 –201 0 –T

1	2	3	4	5
86.6	WS – solutions of alpha–, beta–, gamma–emitting radionuclides	$(1·10^3 – 1·10^8)$ Bq	$U^o_{0.95}$ = 1 %	SK–03–RP–Department No. 210–06–48–2020–T
86.7	Working standards – radionuclide sources for special purposes	$(1 – 1·10^{12})$ Bq $(1·10^2 – 1·10^6)$ $Bq·kg^{–1}$ $(5 – 5·10^5)$ 1 /s $(5·10^3 – 5·10^8)$ $1/(s·m^2)$ $(5·10^3 – 5·10^8)$ 1/(s·sr)	$U_{0.95}$ = 3 %	SK 03–210/MK–06–15–2010–T
86.8	Secondary standards – radiometric installations for alpha, beta, photon radiation	$(1 – 1·10^{13})$ Bq $(5 – 5·10^5)$ 1/s $(5·10^3 – 5·10^8)$ 1/(s·sr)	$U^o_{0.95}$ = 0.5 %	SK–03T–RP–Department No. 210–06–19–2011
86.9	MI – dosimeters–radiometers of alpha, beta radiation, XRD monitors , surface contamination radiometers	$(2 – 1·10^6)$ $min^{–1}·cm^{–2}$ (alpha) $(6 – 1·10^6)$ $min^{–1}·cm^{–2}$ (beta)	$U^o_{0.95}$ = 5 %	SK03–RP–Department No. 210–04–09–2018 SK03–RP–Department No. 210–04–08–2018
86.10	MI – radiometers dose calibrators	$(1·10^6 – 5·10^9)$ Bq	$U^o_{0.95}$ = 5 %	SK–03RP–Department No. 210–06–45–2018
86.11	MI – spectrometer–radiometers, radiometers	$(0.05 – 1.5·10^5)$ Bq (alpha) $(1 – 2·10^5)$ Bq (beta) $(1 – 1·10^5)$ Bq (gamma) $(5 – 1·10^4)$ $Bq·kg^{–1}$ (gamma)	$U^o_{0.95}$ = 6 %	SK 03–210/MK–06–52–2021–S
86.12	MI – liquid scintillation beta–radiation radiometers	$(2 – 1·10^7)$ Bq	$U^o_{0.95}$ = 5 %	SK 03–210/MK–06–53–2021
86.13	β–radiation radiometers	$(2 – 2·10^5)$ Bq	$U^o_{0.95}$ = 5 %	SK03–RP–Department No. 210–04–08–2018
86.14	MI – radiometers of volumetric activity of natural radioactive gases	$(1 – 2·10^6)$ $Bq·m^{–3}$	$U^o_{0.95}$ = 5 %	SK 03–210/MK–06–15–2010–T
86.15	MI – radiometers of volumetric activity of natural radioactive aerosols	$(1 – 1·10^6)$ $Bq·m^{–3}$	$U^o_{0.95}$ = 5%	SK–03T–RP–Department No. 210–06–19–2011
86.16	Secondary standards – sources of gamma radiation based on radionuclide Ra–226, solutions of Ra–226	(0.001 – 200) mg $(0.1 – 1·10^6)$ ng $(3.7 – 3.7·10^7)$ Bq	$U^o_{0.95}$ = 1 %	SK 03–RP–Department No. 210–06–21–2011–T SK 03–RP–Department No. 210–06–22–2011–T
86.17	WS – sources of gamma radiation based on radionuclide Ra –226, solutions of Ra –226	(0.001 – 200) mg $(0.1 – 1\ 10^6)$ ng $(3.7 – 3.7·10^7)$ Bq	$U^o_{0.95}$ = 1 %	SK–03RP–Department No. 210–06–16–2010–T
86.18	MI – sources of gamma radiation based on radionuclide Ra –226	(0.001 – 1 00) mg $(0.1 – 1·10^6)$ ng $(3.7 – 3.7·10^7)$ Bq	$U^o_{0.95}$ = 1 %	SK 03–RP–Department No. 210–06–21–2011–T SK 03–RP–Department No. 210–

1	2	3	4	5
				06–22–2011–T
87	**Instruments measuring flux, flux density and fluence (transfer) of electrons, flux, flux density and fluence (transfer) of energy of electron and bremsstrahlung**			
87.1	Secondary standards – radiometric and dosimetric installations of industrial accelerators	(0.1 – 50) MeV $(1{\cdot}10^{12} – 1{\cdot}10^{21})$ s^{-1} $(1{\cdot}10^{10} – 1{\cdot}10^{19})$ $s^{-1}{\cdot}cm^{-2}$ $(1{\cdot}10^{10} – 1{\cdot}10^{21})$ cm^{-2} $(1{\cdot}10^{-1} – 1{\cdot}10^{3})$ W $(1{\cdot}10^{-2} – 1{\cdot}10^{2})$ $W{\cdot}cm^{-2}$ $(1{\cdot}10^{-1} – 1{\cdot}10^{3})$ $J{\cdot}cm^{-2}$	$U°_{0.95}$ = 1.8 %	SK 03–210/MK–04–04–2020–T
87.2	Secondary standards – radiometric and dosimetric installations of medical accelerators	(1 – 50) MeV $(1{\cdot}10^{10} – 1{\cdot}10^{16})$ s^{-1} $(1{\cdot}10^{8} – 1{\cdot}10^{14})$ $s^{-1}{\cdot}cm^{-2}$ $(1{\cdot}10^{9} – 1{\cdot}10^{16})$ cm^{-2} $(1{\cdot}10^{-4} – 1{\cdot}10^{2})$ W $(1{\cdot}10^{-5} – 10)$ $W{\cdot}cm^{-2}$ $(1{\cdot}10^{-3} – 1{\cdot}10^{3})$ $J{\cdot}cm^{-2}$	$U°_{0.95}$ = 1.8 %	SK 03–210/MK–04–10–2021–S
87.3	MI – flux radiometers, flux density and fluence (transfer) of high precision electrons	(0.1 – 15) MeV $(1{\cdot}10^{10} – 1{\cdot}10^{22})$ s^{-1} $(1{\cdot}10^{8} – 1{\cdot}10^{19})$ $s^{-1}{\cdot}cm^{-2}$ $(1{\cdot}10^{9} – 1{\cdot}10^{21})$ cm^{-2}	$U°_{0.95}$ = 1.8 %	SK 03—RP–Department No. 210–04–08–2018
87.4	MI – increased accuracy dosimeters of flux, flux density and fluence (transfer) of energy of electronic and bremsstrahlung	(1 – 50) MeV $(1{\cdot}10^{-4} – 10^{4})$ W $(1{\cdot}10^{-5} – 1{\cdot}10^{2})$ $W{\cdot}cm^{-2}$ $(1{\cdot}10^{-3} – 1{\cdot}10^{3})$ J cm^{-2}	$U^{o}_{0.95}$ = 1.8 %	SK–03–RP–Department No. 210–04–09–2015
MEDICAL MEASUREMENTS				
88	**Instruments measuring characteristics of nucleic acids**			
88.1	Bioanalytical measuring complexes, including instruments for polymerase chain reaction, also in real time, DNA amplifiers, PCR analyzers	from $1{\cdot}10^{3}$ to $1{\cdot}10^{8}$ cm^{-3} (copies/ml) from 1 to 50 g/kg	$U^{o}_{0.95}$ = 12 %	SK 03–16k–21–T
89	**Instruments measuring characteristics of biological fluids**			
89.1	Immunological analyzers	to 70 nmol/l	$U°_{0.95}$ = 11 %	SK 03–244–14k–21–T
89.2	Body Fluid Analyzers	to 100 g/dm^{3} to 500 $mmol/dm^{3}$ to 2.5 f.u.p.	$U°_{0.95}$ = 7 % $U°_{0.95}$ = 7 % $U°_{0.95}$ = 7 %	SK 03–209–6.1.2/02
89.3	Hematological analyzers	RBC: to $9.9{\cdot}10^{12}$ dm^{-3} WBC: to $99.9{\cdot}10^{9}$ dm^{-3} HGB: to 300 mg/dm^{3}	$U°_{0.95}$ = 7 % $U°_{0.95}$ = 7 % $U°_{0.95}$ = 5 %	SK 03–244–13k–21–T
89.4	Urine analyzers	Molar concentration of glucose ($C_{glucose}$) to 35 $mmol/dm^{3}$ Mass concentration of protein ($C_{protein}$)	$U°_{0.95}$ = 10 % $U°_{0.95}$ = 10 % $U°_{0.95}$ = 10 % $U_{0.95}$ = 0.02	SK 03–244–15k–21–T

1	2	3	4	5
		up to 10 g/l Density (ρ): up to 1.2 g/ml pH: to 12		
89.5	Hemoglobinometers	to 0.5 f.u.p. to 300 mg/dm^3	$U°_{0.95} = 5$ % $U°_{0.95} = 5$ %	Method of comparison with CRM
ELEMENTS OF MEASURING SYSTEMS (MS)				
90	**Measuring systems and elements of measuring systems**			
90.1	Information–measuring systems (IMS) for electricity metering , IMS for monitoring the quality of electrical energy, parameters of electrical circuits and telemetry, current–measuring complexes of IMS, elements of IMS, measuring channels of automated information and measurement system for energy accounting	(0 – 20) mA	$U_{0.95} = 0.02$ mA	Method of direct measurements, comparison with grade standard
		(minus 100 – 100) mV	$U_{0.95} = 0.01$ mV	
		(0 – 10) V	$U_{0.95} = 0.01$ V	
		1 Hz – 16 kHz	$U_{0.95} = 0.0001$ kHz	
		(minus 200 – 2500) ºC	$U_{0.95} = 0.03$ ºC	
		(10^{-2} – 10^{5}) Ohm	$U_{0.95} = 0.02$ Ω	
		(10^{-3} – 750) V	$U_{0.95} = 0.01$ V	
		(10^{-4} – 240) A	$U_{0.95} = 0.01$ A	
		kW h (Depending on MI ranges and errors used in the system)	$U_{0.95} = 0.02$ kWh	
90.2	Information–measuring systems (IMS) of wide (targeted) application, developed for serial and single production in accordance with the scope of accreditation, IMS complexes, IMS channels, IMS elements	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	Direct measurement method
90.3	Measuring multichannel systems for measuring hydrological parameters of the aquatic environment of seas and oceans, including: marine and oceanological sounding devices and profilers, measuring hydrological equipment of drifting, towed, automatic, manned and autonomous surface underwater vehicles with measuring channels and measuring transducers	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)

1	2	3	4	5
90.4	Multi–channel measuring systems and complexes for measuring meteorological parameters of the air (surface layer of the atmosphere), including : measuring equipment for automatic and manned meteorological stations for synoptic observations (weather stations), profilers, equipment for meteorological support of land and sea–based aviation, ship weather stations with measuring channels and measuring transducers	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)
90.5	Measuring systems, mobile measuring complexes, measuring channels (using, inter alia, joint, cumulative and indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)
2, Fedyuninsky Str., Lomonosov 2198412, St. Petersburg				
MECHANICAL MEASUREMENTS				
91	**Instruments measuring linear motion parameters**			
91.1	Reference accelerometers of the 1st class	$(1 \cdot 10^{-3} – 500)$ m/s^2	$U^o_{0.95} = (4.4 – 0.0003)$ %	Method of direct measurements using state primary standard for the units of linear acceleration and flat angle during angular displacement of a solid body GET 94
91.2	Reference rotary installations of the 2nd class	$(1 \cdot 10^{-3} – 10)$ m/s^2	$U^o_{0.95} = (4.4 – 0.0003)$ %	Comparison with reference accelerometer
91.3	Reference centrifuges of the 2nd class	(5 – 500) m/s^2	$U^o_{0.95} = 0.01$ %	Comparison with reference accelerometer
91.4	Double reference centrifuges of the 2nd class	(5 – 100) m/s^2 (0.5 – 30) Hz	$U^o_{0.95} = 0.02$ %	Comparison with reference accelerometer
91.5	High accuracy accelerometers	$(1 \cdot 10^{-3} – 3500)$ m/s ^{2}	$U^o_{0.95} = (0.006 –$ $– 0.0003)$ %	Method of direct measurements using state primary standard for the units of linear acceleration and flat angle during angular displacement of solid body GET 94

1	2	3	4	5
91.6	Instruments measuring linear speed, bullet flight speed recorders, ballistic recorders	(1 – 2000) m/s	$U^{o}_{0.95} = 0.1$ %	Method of indirect measurements using state working standard and the state secondary standard of the speed unit
91.7	Measuring instruments for linear speed, including laser anemometers	($1 \cdot 10^{-2}$ – 100) m/s	$U^{o}_{0.95} = 0.1$ %	Method of indirect measurements using state working standard of the 3rd class for the unit of length and state working standard for the unit of speed
92	**Instruments measuring parameters of angular motion**			
92.1	Reference transducers of flat angle at angular displacement of solid body. Angle measuring transducers.	0.4" – 360°	$U_{0.95} = 0.1"$	Method of direct measurements using state primary standard for the units of linear acceleration and flat angle during angular displacement of solid body GET 94
92.2	Instruments measuring angular vibration and calibration devices	(0.1 – 100) Hz ($5 \cdot 10^{-5}$ – 1) rad ($1.5 \cdot 10^{-3}$ – 12) rad/s ($2 \cdot 10^{-1}$ – 350) rad/s^2	$U^{o}_{0.95} = 0.5$ %	GOST R ISO 16063–15–2012, comparison with reference angle transducer
92.3	Angular accelerometers	($2 \cdot 10^{-1}$ – 500) rad/s^2	$U^{o}_{0.95} = 0.5$ %	GOST R ISO 16063–15–2012
92.4	Angular accelerometers	($2 \cdot 10^{-1}$ – $5 \cdot 10^{2}$) rad/s^2 (0.5 – $1 \cdot 10^{3}$) Hz	$U^{o}_{0.95} = 1$ %	GOST R ISO 16063–15–2012
		(ab. $5 \cdot 10^{2}$ – $2 \cdot 10^{3}$) rad/s^2 (0.5 – $1 \cdot 10^{3}$) Hz	$U^{o}_{0.95} = 2$ %	
		(10 – $1 \cdot 10^{4}$) rad/s^2 ($1 \cdot 10^{3}$ – $4 \cdot 10^{3}$) Hz	$U^{o}_{0.95} = 1$ %	
		(ab. $1 \cdot 10^{4}$ – – $1 \cdot 10^{5}$) rad/s^2 ($1 \cdot 10^{3}$ – $4 \cdot 10^{3}$) Hz	$U^{o}_{0.95} = 3$ %	
		(ab. $1 \cdot 10^{5}$ – $25 \cdot 10^{4}$) rad/s^2 ($1 \cdot 10^{3}$ – $4 \cdot 10^{3}$) Hz	$U^{o}_{0.95} = 10$ %	
92.5	Tachometers, strobo-scopes, speed sensors	($1 \cdot 10^{-2}$ – $1 \cdot 10^{4}$) rad/s (0.01 – 99999.99) rpm	$U^{o}_{0.95} = 0.01$ %	Method of direct measurements using state primary special standard for the units of angular speed GET 108
92.6	Tachometers, stroboscopes, speed sensors	(0.1 – 600000) rpm	$U^{o}_{0.95} = 0.02$ %	
		($1 \cdot 10^{-2}$ – $6 \cdot 10^{4}$) rad/s	$U^{o}_{0.95} = 0.02$ %	
		($1 \cdot 10^{-2}$ – $2.5 \cdot 10^{4}$) Hz	$U^{o}_{0.95} = 0.02$ %	
		($1 \cdot 10^{-2}$ – 100) m/s	$U^{o}_{0.95} = 0.1$ %	
92.7	Calibrators, simulators of signals of primary speed converters	($1 \cdot 10^{-2}$ – $2.5 \cdot 10^{4}$) Hz	$U^{o}_{0.95} = 0.001$ %	Method of direct measurements using frequency meter

1	2	3	4	5
92.8	Tachometric, taximetric verification setups	$(0.1 – 6·10^3)$ rad/s	$U^o_{0.95}$ = 0.01 %	Comparison with state secondary standard for the rotational speed unit
92.9	Instruments measuring angular speed, installations for reproducing angular speeds by the rotation method	$(5·10^{-8} – 20)$ rad/s	$U_{0.95} = 4.4·10^{-9}$ rad/s	Method of direct measurements using state primary special standard for the units of angular speed GET 108, comparison using comparator from the composition of the state primary special standard for the units of angular speed GET 108
92.10	Gyroscopic MI, angular speed sensors (AVS)	$(5·10^{-8} – 200)$ rad/s	$U_{0.95}$ = 4.4 10^{-9} rad/s	Method of direct measurements using GET 108
92.11	Electromechanical meters	$(0.1 – 10^5)$ vol.	$U^o_{0.95}$ = 0.01 %	
93	**Instruments measuring parameters of the state of the Earth**			
93.1	Relative gravimeters	6000 mGal	$U_{0.95}$ = 5 μGal	Comparison with reference gravimeter
93.2	Absolute gravimeters	(9.77 – 9.85) m/s^2 (977 – 985) Gal	$U_{0.95}$ = 5 μGal	Method of direct measurements using GET 190
93.3	Gravimetric polygons	*g* values (9.77 – 9.85) m/s^2 (977 – 985) Gal values of differences g (0 – 500) 10^{-5} m/s^2 (0 – 500) mGal, where *g* – free fall acceleration, m/s^2	$U_{0.95}$ = 10 μGal $U_{0.95}$ = 10 μGal	Method of direct measurements using state primary standard for the units of acceleration in gravimetry GET 190
93.4	Measuring instruments and verification facilities for seismic vibration parameters. Seismic receivers and seismic transducers	$(5·10^{-7} – 1.0)$ m/s (0.001 – 1000) Hz *f* = 0.001 – 30 Hz, where f – frequency, Hz $X = 10^{-4} – 2·10^{-2}$ m, where *X* is the amplitude of movement, m $V = 1·10^{-7} – 1.0$ m/s, where *V* – speed amplitude, m/s $a = 4·10^{-7} – 10$ m/s^2, where *a* – acceleration amplitude, m/s^2	$U^o_{0.95}$ = 0.01 %	Method of direct measurements using GET 159. Comparison with reference accelerometer
93.5	Seismometric installations	$(1·10^{-6} – 10)$ m/s^2 (0.001 – 100) Hz	$U^o_{0.95}$ = 0.01 %	Comparison with reference accelerometer
94	**Measuring instruments used for transport**			
94.1	Decelerometers, friction coefficient meters	(0 – 9.81) m/s^2 0.00 – 1.00	$U^o_{0.95}$ = 0.1 % $U^o_{0.95}$ = 1 %	Method of direct measurements using state working standard

1	2	3	4	5
				of the second class for the unit of linear acceleration.
94.2	Tachograph programmers. Instruments measuring and controlling the parameters of movement of vehicles	(0.1 – 999999.9) km (0 – 400) km/h (0 – 48) h	$U^{o}_{0.95}$ = 0.05 % $U_{0.95}$ = 1 km/h $U_{0.95}$ = 1 s/day	Method of direct measurements using frequency meter
95	**Instruments measuring torque force**			
95.1	Torque force transducers, installations for reproducing torque force	(1 – 300) kN·m	$U^{o}_{0.95}$ = 0.1 %	GOST R 8. 796 “GMI Torque Meters. Verification procedure”, APPENDIX A
96	**Instruments measuring vibration parameters**			
96.1	Secondary standards for the units of length, speed and acceleration in oscillatory motion of solid body	$(1·10^{-8} – 5·10^{-2})$ m $(1·10^{-4} – 1·10^{-1})$ m/s $(1·10^{-3} – 1·10^{3})$ m/s^2 $(2·10^{1} – 8·10^{2})$ Hz	$U^{o}_{0,95}$ = 0.3 %	GOST ISO 16063–11–2013 GOST R 8.815–2013 MI 1929–2007
		$(5·10^{-1} – 2·10^{3})$ Hz	$U^{o}_{0,95}$ = 1.0 %	
		$(5·10^{-1} – 5·10^{3})$ Hz	$U^{o}_{0,95}$ = 1.6 %	
		$(1·10^{-1} – 1·10^{4})$ Hz	$U^{o}_{0,95}$ = 3.0 %	
		$(1·10^{-1} – 2·10^{4})$ Hz	$U^{o}_{0,95}$ = 5.0 %	
96.2	Vibration setups of the 1st class used for verification	$(2·10^{-8} – 1·10^{-1})$ m $(1·10^{-4} – 1·10^{-1})$ m/s $(1·10^{-1} – 1·10^{3})$ m/s^2 $(2·10^{1} – 8·10^{2})$ Hz	$U^{o}_{0,95}$ = 0.5 %	GOST ISO 16063–11–2013 GOST ISO 16063–21–2013 MI 1929–2007
		$(5·10^{-1} – 2·10^{3})$ Hz	$U^{o}_{0,95}$ = 1.0 %	
		$(5·10^{-1} – 5·10^{3})$ Hz	$U^{o}_{0,95}$ = 2.0 %	
		$(1·10^{-1} – 1·10^{4})$ Hz	$U^{o}_{0,95}$ = 5.0 %	
		$(1·10^{-1} – 2·10^{4})$ Hz	$U^{o}_{0,95}$ = 8.0 %	
96.3	Vibrometers and vibration transducers of the 1st class	$(1 – 1·10^{4})$ m/s^2 $(2·10^{1} – 8·10^{2})$ Hz	$U^{o}_{0,95}$ = 0.4 %	GOST ISO 16063–11–2013 GOST ISO 16063–41–2014 SK 03–2520–029–2009–T
		$(5·10^{-1} – 5·10^{3})$ Hz	$U^{o}_{0,95}$ = 0.6 %	
		$(1·10^{-1} – 1·10^{4})$ Hz	$U^{o}_{0,95}$ = 0.8 %	
		$(1·10^{-1} – 2·10^{4})$ Hz	$U^{o}_{0,95}$ = 1.0 %	
96.4	Vibration setups of the 2nd class used for verification	$(2·10^{-8} – 1·10^{-1})$ m $(1·10^{-4} – 1·10^{-1})$ m/s $(1·10^{-1} – 1·10^{3})$ m/s^2 $(2·10^{1} – 8·10^{2})$ Hz	$U^{o}_{0,95}$ = 2.0 %	GOST ISO 16063–21–2013 MI 1929–2007
		$(5·10^{-1} – 2·10^{3})$ Hz	$U^{o}_{0,95}$ = 3.0 %	
		$(5·10^{-1} – 5·10^{3})$ Hz	$U^{o}_{0,95}$ = 4.0 %	
		$(1·10^{-1} – 1·10^{4})$ Hz	$U^{o}_{0,95}$ = 6.0 %	
96.5	Vibrometers and vibration transducers	$(1·10^{-7} – 1)$ m $(1·10^{-4} – 1)$ m/s $(1·10^{-3} – 1·10^{4})$ m/s^2	$U^{o}_{0,95}$ = 0.6 %	GOST ISO 16063–11–2013 GOST ISO 16063–21–2013

1	2	3	4	5
		$(1\cdot10^{-1} – 2\cdot10^{4})$ Hz		SK 03–2520–029–2009–T
96.6	Vibrometers and vibration transducers. Vibration measuring and control information systems	$(1\cdot10^{-8} – 1)$ m $(1\cdot10^{-6} – 10)$ m/s $(1\cdot10^{-5} – 1\cdot10^{5})$ m/s ^{2} $(2\cdot10^{1} – 8\cdot10^{2})$ Hz	$U^{o}_{0,95}$ = 1.2 %	GOST ISO 16063–11–2013 GOST ISO 16063–21–2013 SK 03–2520–029–2009–T
		$(1\cdot10^{-1} – 2\cdot10^{4})$ Hz	$U^{o}_{0,95}$ = 5.0 %	
96.7	Vibration analyzers	$(1\cdot10^{-8} – 1)$ m $(1\cdot10^{-6} – 10)$ m/s $(1\cdot10^{-5} – 1\cdot10^{5})$ m/s^{2} $(2\cdot10^{1} – 8\cdot10^{2})$ Hz	$U^{o}_{0,95}$ = 1.2 %	GOST ISO 16063–11–2013 GOST ISO 16063–21–2013 SK 03–2520–029–2009–T
		$(1\cdot10^{-1} – 2\cdot10^{4})$ Hz	$U^{o}_{0,95}$ = 5.0 %	
96.8	Measuring charge amplifiers	$(1\cdot10^{-2} – 1\cdot10^{4})$ mV/ pC $(1\cdot10^{-1} – 1\cdot10^{5})$ Hz	$U^{o}_{0,95}$ = 0.2 %	SK 03–2520–029–2009–T
97	**Instruments measuring shock acceleration parameters**			
97.1	Installations with parametric excitation of the 1st class	$(1\cdot10^{1} – 4\cdot10^{3})$ m/s^{2} $(2\cdot10^{2} – 5\cdot10^{4})$ ms	$U^{o}_{0,95}$ = 6.0 %	GOST R ISO 16063–13–2012 GOST R ISO 16063–22–2012
97.2	Installations with a peak shock accelerometer of the 1st class	$(1\cdot10^{1} – 1\cdot10^{6})$ m/s^{2} $(18 – 5\cdot10^{4})$ ms	$U^{o}_{0,95}$ = 6.0 %	GOST R ISO 16063–13–2012 GOST R ISO 16063–22–2012
97.3	Peak shock accelerometer installation of the 2nd class	$(1\cdot10^{1} – 1\cdot10^{4})$ m/s^{2} $(2\cdot10^{2} – 5\cdot10^{4})$ ms	$U^{o}_{0,95}$ = 6.0 %	GOST R ISO 16063–22–2012
97.4	Shock accelerometers	$(1\cdot10^{1} – 1\cdot10^{6})$ m/s^{2} $(18 – 5\cdot10^{4})$ ms	$U^{o}_{0,95}$ = 2.0 %	GOST R ISO 16063–13–2012 GOST R ISO 16063–22–2012
97.5	Instruments measuring shock speed	$(1\cdot10^{-1} – 3\cdot10^{1})$ m/s	$U^{o}_{0,95}$ = 3.0 %	GOST R ISO 16063–13–2012 GOST R ISO 16063–22–2012
97.6	Measuring charge amplifiers	$(1\cdot10^{-2} – 1\cdot10^{4})$ mV/ pC $(1\cdot10^{-1} – 1\cdot10^{5})$ Hz	$U^{o}_{0,95}$ = 0.2 %	SK 03–2520–029–2009–T
98	**Instruments measuring speed of sound in liquid (acoustic measurements)**			
98.1	Measuring channels of systems, stations, complexes, hydrological probes for measuring speed of sound propagation in liquid	(1402 – 1560) m/s	$U_{0.95}$ = 0.15 m/s	Method of indirect measurements in accordance with GSDS 202
MEASUREMENTS OF FLOW, FLOW SPEED, LEVEL, VOLUME OF SUBSTANCES				
99	**Instruments measuring water flow speed**			
99.1	Hydrodynamic measuring installation	(0.02 – 20.0) m/s	$U^{o}_{0,95}$ = 0.2 %	Direct measurement method
99.2	Measuring pools	(0.01 – 5.0) m /s	$U^{o}_{0,95}$ = 0.1 %	Method of indirect measurements
99.3	Flow meters	(0.05 – 20) m/s	$U^{o}_{0,95}$ = 0.5 %	Direct comparison

1	2	3	4	5
99.4	Laser flow meters	(0.005 – 25) m/s	$U^{o}_{0,95}$ = 0.5 %	Method of indirect measurements
99.5	Hydrometric turntables	(0.05 – 5.0) m /s	$U^{o}_{0,95}$ = 0.5 %	Direct comparison
100	**Instruments measuring air flow speed**			
100.1	Aerodynamic measuring instruments	(0.05 – 100) m/s	$U_{0.95}$ =(0.0006 + 0.01 V) m/s, where V – air flow speed, m/s	Direct comparison
100.2	Instruments measuring air flow speed	(0.05 – 100) m/s	$U_{0.95}$ = (0.0006 + 0.01V) m/s, where V – air flow speed, m/s	Direct comparison
100.3	Instruments measuring direction of the air flow	(0 – 360)°	$U_{0.95}$ = 2°	Direct measurement method
100.4	Total and static pressure receivers	(1 – 100) m/s	$U_{0.95}$ =(0.0006 + 0.01 V) m/s, where V – air flow speed, m/s	Direct comparison
100.5	Anemometers	(0.05 – 80) m/s	$U_{0.95}$ = (0.0006 + 0.01V) m/s, where V – air flow speed, m/s	Direct comparison
101	**Instruments measuring mass and volume, mass and volume flow speed**			
101.1	Verification setups for verification of PTCC (piston tube calibration device) and compact provers	(0.02 – 1.0) m^3 ab. (1.0 – 45) m^3	$U^{o}_{0,95}$ = 0.01 % $U^{o}_{0,95}$ = 0.02 %	Direct comparison comparison with comparator
101.2	Calibration PTCC, including compact provers	Nominal capacity of measuring section from 0.005 to 45 m^3	$U^{o}_{0,95}$ = 0.03 % $U^{o}_{0,95}$ = 0.1 %	Direct comparison comparison with a comparator
101.3	Installations for calibration Instruments measuring volume and volume flow of liquid	Nominal capacity of the measuring section from 0.1 to 2.4 m^3	$U^{o}_{0,95}$ = 0.015 %	Method of indirect measurements
		ab. 2.8 m^3 ab. 22.0 m^3 in the range from 0.01 to 10000 m^3/h	$U^{o}_{0,95}$ = 0.063 % $U^{o}_{0,95}$ = 0.024 %	Comparison with comparator
101.4	Installations for calibration of instruments measuring mass and mass flow of liquid	from 0.01 to 2000 t/h from 0.01 to 10000 t/h	$U^{o}_{0,95}$ = 0.03 % $U^{o}_{0,95}$ = 0.05 %	Method of indirect measurements
101.2	Calibration systems for filling liquids	from 0.5 to 3 t from 0.5 to 3 m^3	$U^{o}_{0,95}$ = 0.04 % $U^{o}_{0,95}$ = 0.05 %	Direct measurement method Direct measurement method
101.6	Instruments measuring volume, volume flow	(0.012 – 320) m^3/h	$U^{o}_{0,95}$ = 0.1 %	Direct comparison

1	2	3	4	5
101.7	Instruments measuring mass, mass flow of liquid	(0.012 – 320) t/h	$U^{o}_{0,95}$ = 0.1 %	Direct comparison
101.3	Liquid level measuring instruments for non–pressure pipelines	(0.001 – 6) m	$U_{0.95}$ = 2.0 mm	Direct comparison
101.4	Fluid speed measuring instruments for non–pressure pipelines	(0.05 – 6.0) m/s	$U_{0.95}$ = 1.0%	Direct comparison
101.5	Information processing devices for oil, gas and oil products metering systems: calculators for flow, volume and mass of liquid, measuring and computing systems, gas volume correctors, programmable control complexes	Input signals: (0.1 – 40000) Hz (0.4 – 20) mA (1 – 5) V (0 – 10) V	$U^{o}_{0.95}$ = 0.001 % $U_{0.95}$ = 0.003 mA $U_{0.95}$ = 0.005 V $U_{0.95}$ = 0.005 V	Direct comparison
101.6	Flow meters and gas meters	0.001 – 2000 m3/h (2.0 · 10 $^{-2}$ – 36) m $^{3/}$s	$U_{0.95}$ = 0.5 % $U_{0.95}$ = 1.0 %	Direct comparison Method of indirect measurements
101.12	Measures of capacity: metal gauges, tank trucks	(3.0 – 50) m ^{3} (3.0 – 50) m ^{3}	$U_{0.95}$ = 0.1 % $U_{0.95}$ = 0.5 %	Direct comparison
102	**Mechanical instruments measuring air flow speed**			
102.1	Measuring transducers and measuring channels of air speed of stationary, portable and remote multifunctional meteorological stations measuring air speed	(0.05 – 80) m/s	$U_{0.95}$ = 1 rpm	Direct comparison with wind parameter generator (WPG)
103	**Instruments measuring level of liquids**			
103.1	Measuring channels of systems, stations, complexes for measuring level of liquids (water level on watercourses)	(0 – 40) m	$U_{0.95}$ = 5.77 mm	Direct comparison with hydrostatic pressure meter
		(40 – 90) m	$U_{0.95}$=(0.115·(H + 10)) mm, where H is level value, m	
103.2	Measuring metal cups	(0.001 – 3) m^3	$U_{0.95}$ = 0.006%	Method of indirect measurements
PRESSURE MEASUREMENTS, VACUUM MEASUREMENTS				
104	**Instruments measuring variable pressure**			
104.1	Secondary standards of the unit of pressure for the range of variable pressures	(1·10^2 – 25·10^6) Pa (5·10^{-1} – 1·10^4) Hz (1·10^{-5} – 10) s	$U^{o}_{0,95}$ = 1.0 %	MP 2520–060–2014 SK 02–31–18.
104.2	Harmonic pressure installation	(1·10^2 – 25·10^6) Pa (5·10^{-1} – 1·10^4) Hz	$U^{o}_{0,95}$ = 6.0 %	MP 2520–060–2014 SK 02–31–18.
104.3	Intermittent pressure gauges	(1·10^2 – 25·10^6) Pa (5·10^{-1} – 1·10^4) Hz	$U^{o}_{0,95}$ = 1.5 %	MK 2520–011–2006, MP 2520–019–2008, SK 02–31–18

1	2	3	4	5
104.4	Pulse pressure gauges	$(1\cdot10^{2} – 25\cdot10^{6})$ Pa $(1\cdot10^{-5} – 10)$ s	$U^{o}_{0,95}$ = 1.5 %	MK 2520–011–2006, MP 2520–019–2008, SK 02–31–18
104.5	Harmonic pressure generators	$(1\cdot10^{2} – 25\cdot10^{6})$ Pa $(5\cdot10^{-1} – 1\cdot10^{4})$ Hz	$U^{o}_{0,95}$ = 1.7 %	MP 2520–060–2014 SK 02–31–18
104.6	Pulse pressure generators	$(1\cdot10^{2} – 25\cdot10^{6})$ Pa $(1\cdot10^{-5} – 10)$ s	$U^{o}_{0,95}$ = 1.3 %	MK 2520–011–2006, MP 2520–019–2008, SK 02–31–18
104.7	Harmonic pressure transducers and gauges	$(1\cdot10^{2} – 25\cdot10^{6})$ Pa $(5\cdot10^{-1} – 1\cdot10^{4})$ Hz	$U^{o}_{0,95}$ = 3.0 %	MK 2520–011–2006, MP 2520–019–2008, SK 02–31–18
104.8	Pulse pressure transducers and manometers	$(1\cdot10^{2} – 25\cdot10^{6})$ Pa $(1\cdot10^{-5} – 10)$ s	$U^{o}_{0,95}$ = 3.0 %	MK 2520–011–2006, MP 2520–019–2008, SK 02–31–18
104.9	Intermittent pressure transducers and manometers	$(1\cdot10^{2} – 25\cdot10^{6})$ Pa $(5\cdot10^{-1} – 1\cdot10^{4})$ Hz P_{st} to 5 MPa, where P_{st} – constant pressure, MPa	$U^{o}_{0,95}$ = 3.0 %	MK 2520–011–2006, MP 2520–019–2008, SK 02–31–18
104.10	Harmonic pressure generators	$(1\cdot10^{2} – 25\cdot10^{6})$ Pa $(5\cdot10^{-1} – 1\cdot10^{4})$ Hz	$U^{o}_{0,95}$ = 3.5 %	MP 2520–060–2014 SK 02–31–18.
104.11	Pulse pressure generators	$(1\cdot10^{2} – 25\cdot10^{6})$ Pa $(1\cdot10^{-5} – 10)$ s	$U^{o}_{0,95}$ = 3.5 %	MP 2520–060–2014 SK 02–31–18.
104.12	Intermittent pressure generators	$(1\cdot10^{2} – 25\cdot10^{6})$ Pa $(5\cdot10^{-1} – 1\cdot10^{4})$ Hz P_{st} to 5 MPa, where P_{st} – constant pressure, MPa	$U^{o}_{0,95}$ = 3.5 %	MP 2520–060–2014 SK 02–31–18.
OPTICAL–PHYSICAL MEASUREMENTS				
105	**Instruments measuring energy illumination by solar radiation**			
105.1	Working standards of the 2nd class; actinometers, pyranometers; measuring channels of systems, stations and complexes	(10 – 1600) W/m^{2}	$U^{o}_{0.95}$ = 1.5 %	Direct comparison with reference pyrheliometer
ELEMENTS OF MEASURING SYSTEMS (MS)				
106	**Measuring systems and elements of measuring systems**			
106.1	Measuring multichannel systems for measuring hydrological parameters of the aquatic environment of seas and oceans, including : marine and oceanological sounding devices and profilers, measuring hydrological equipment of drifting, towed, automatic, manned and autonomous surface underwater vehicles with measuring channels and measuring transducers	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)

1	2	3	4	5
106.2	Multichannel measuring systems and complexes for measuring meteorological parameters of air environment (surface layer of the atmosphere), including : measuring equipment of automatic and manned meteorological stations for synoptic observations (weather stations), profilometers, equipment for meteorological support of land and sea–based aviation, ship weather stations with measuring channels and measuring transducers	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)
106.3	Measuring systems, mobile measuring complexes, measuring channels (using, inter alia, joint, cumulative and indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)
19, Chayinoye ozero Str., Toksovo 188664, Vsevolozhsk district, St. Petersburg				
ELECTRICAL AND MAGNETIC MEASUREMENTS				
107	**Measuring instruments for magnetic quantities**			
107.1	Instruments measuring BC magnetic induction	$(1\cdot10^{-8} – 1\cdot10^{-6})$ T	$U^{o}_{0,95}$ = 0.3 nTl	Comparison method with GET 12
		$(1\cdot10^{-6} – 1\cdot10^{-3})$ T	$U^{o}_{0,95}$ = 0.06 nTl	
		$(1\cdot10^{-6} – 1\cdot10^{-5})$ T/A $(0 \pm 4)^{\circ}$; $(90 \pm 4)^{\circ}$	$U^{o}_{0,95}$ = 0.1 % $U_{0.95}$ = 6'	
		$(1\cdot10^{-5} – 1\cdot10^{-3})$ T/A $(0 \pm 4)^{\circ}$; $(90 \pm 4)^{\circ}$	$U^{o}_{0,95}$ = 0.001 % $U_{0.95}$= 6'	
		$(1\cdot10^{-3} – 5\cdot10^{-2})$ T/A $(0 \pm 4)^{\circ}$; $(90 \pm 4)^{\circ}$	$U^{o}_{0,95}$ =0.01 % $U_{0.95}$ = 6'	
107.2	Instruments measuring magnetic moment	$(1\cdot10^{-6} – 10^{3})$ A·m^2 $(1\cdot10^{-5} – 3\cdot10^{-2})$ Wb/(A·m^2) $(1\cdot10^{-4} – 30)$ (A·m ^{2})/A	$U^{o}_{0,95}$ = 0.3 %	Method of indirect measurements and comparisons with GET 12
107.3	Instruments measuring magnetic susceptibility and magnetic permeability of para–, dia– and weak ferromagnetic materials	$1\cdot10^{-5}$ – 10	$U^{o}_{0,95}$ = 1.5 %	Method of indirect measurements and comparisons with GET 12
		1 – 20	$U^{o}_{0,95}$ = 0.5 %	

1	2	3	4	5
ELEMENTS OF MEASURING SYSTEMS (MS)				
108	**Measuring systems and elements of measuring systems**			
108.1	Measuring systems, mobile measuring complexes, measuring channels (using, inter alia, joint, cumulative and indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)
Sosnovka Park, Vyborgsky District, 194354, St. Petersburg				
GEOMETRIC MEASUREMENTS				
109	**Length measuring instruments**			
109.1	Distance meters	to 3500 m	$U_{0.95}$ = Q[1] [0.9; $1.7 \cdot 10^{-6} L$] mm, where L – length, mm	SK 03–251–40/20–T
109.2	Electronic tacheometers	to 10000 m	$U_{0.95}$ = Q[1] [0.9; $1.7 \cdot 10^{-6} L$] mm, where L – length, mm	SK 03–251–40/20–T
29/5 B Kozhevennaya line, Vasilyevsky Island, 199106, St. Petersburg,				
ELECTRICAL AND MAGNETIC MEASUREMENTS				
110	**Instruments measuring coefficient and angle of scaling transformation of sinusoidal current**			
110.1	Current transformers	(5 – 5000) A/1; 5 A (50; 60) Hz	$U^o_{0.95}$ = 0.01 %	Comparison with reference current transformer
111	**Instruments measuring electrical resistance**			
111.1	DC and AC shunts	$(6 \cdot 10^{-6}$ – 800) Ω 1 mA – 10 kA 50 Hz – 100 kHz	$U^o_{0.95}$ = 0.01 %	Method of direct measurements. Comparison method using comparator
112	**Instruments measuring voltage and electrical voltage ratios**			
112.1	Capacitive large–scale voltage converters measuring high–voltage	(6 – 330/√3) kV/ (100/3 – 230) V (50; 60) Hz	$U^o_{0.95}$ = 0.01 %	Current comparator method. Comparison method
112.2	Voltage transformers	(1 – 330/√3) kV/ (100/3 – 230) V (50; 60) Hz	$U^o_{0.95}$ = 0.01 %	Current comparator method. Comparison method
ELEMENTS OF MEASURING SYSTEMS (MS)				
113	**Measuring systems and elements of measuring systems**			
113.1	Measuring systems, mobile measuring complexes, measuring channels (using, inter alia, joint, cumulative and indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)	In accordance with the scope of accreditation for all types of measurements (including indirect measurements)
2, Upper Podstepnovka, Volzhsky district, 443004, Samara region				
MEASUREMENTS OF FLOW, FLOW RATE, LEVEL, VOLUME OF SUBSTANCES				
114	**Measuring instruments for volume and volume flow**			
114.1	Flowmeters, meters and converters of volume and volume flow of liquids	(0.0025 – 7.5) m^3/h (0.05 – 40) m^3/h (0.9 – 500) m^3/h	$U_{0.95}$ = 0.02 % $U^o_{0.95}$ = 0.02 % $U^o_{0.95}$ = 0.015 %	Direct comparison

1	2	3	4	5
		(2.5 – 10000) m^3/h when using section with a volume of 2.8 m^3 (2.5 – 10000) m^3/h when using section with a volume of 22 m^3	$U^o_{0.95}$ = 0.063 % $U^o_{0.95}$ = 0.024 %	
167, Volchanskaya Str., Belgorod 308009, Russia				
MEASUREMENT OF PARAMETERS OF FLOW, FLOW RATE, LEVEL, VOLUME OF SUBSTANCES				
115	**Measuring instruments for mass and volume, mass and volume flow rate**			
115.1	Flowmeters, meters and converters of volume and volume flow of liquids	(4 – 3100) m^3/h	$U_{0.95}$ = 0.1 %	Direct comparison
115.2	Mobile installations Fuel dispensers Oil dispensers	(5 – 160) l/min (5 – 160) l/min (5 – 160) l/min	$U_{0.95}$ = 0.1 % $U_{0.95}$ = 1.0 % $U_{0.95}$ = 1.0 %	Direct comparison
115.3	Oil and oil products metering systems and installations Piston provers (PP) as a part of CQCS (crude quality control system) Loading systems	(20 – 800) m^3/h (20 – 800) m^3/h (20 – 800) m^3/h	$U_{0.95}$ = 0.25 % $U_{0.95}$ = 0.03 % $U_{0.95}$ = 0.15 %	Method of indirect measurements Direct comparison Direct comparison
115.4	Verification setups for verification of PPs, compact provers	(0.02 – 40) m^3 (0.02 – 40) m^3	$U^o_{0,95}$ = 0.03 % $U^o_{0,95}$ = 0.1 %	Direct comparison Comparison with comparator
115.5	Instruments measuring Volume, volume flow	(20 – 800) m^3/h	$U_{0.95}$ = 0.1 %	Direct comparison
115.6	Instruments measuring mass, mass flow of liquid	(20 – 800) t/h	$U_{0.95}$ = 0.15 %	Method of indirect measurements
3–7 Zh, 24th Line, Vasilyevsky Island, 199106 St. Petersburg				
ELECTRICAL AND MAGNETIC MEASUREMENTS				
116	**Instruments measuring voltage and electrical voltage ratios**			
116.1	Voltage dividers and converters, high voltage	K = (1 – 10000) AC voltage (1 – 165) kV DC voltage (0.1 – 165) kV	U^o =(0.1 – 5) % U^o =(0.1 – 5) %	Current comparator method. Comparison method
116.2	High voltage measuring systems, kilovoltmeters	AC voltage (1 – 165) kV DC voltage (0.1 – 165) kV	U^o = (0.2 – 5) % U^o = (0.2 – 5) %	Direct measurement method

1	2	3	4	5
117	**Instruments measuring amount of electricity (electric charge)**			
117.1	Partial discharge meters and calibrators	1 pC – 10 pC	$U^{o}_{0.95}$ =1 pC	Method of direct measurements. Method of indirect measurements
	Apparent charge calibrators	from 11 pC to 10 nC	$U^{o}_{0.95}$ = 1 %	

Director General
D.I. Mendeleyev Institute for Metrology (VNIIM)
position of authorized person

signature

A.N. Pronin
initials, surname

stamp

[1] Q [a, b] denotes the square root of the sum of the squares of the terms in brackets.

[2] The Note indicates the implemented methods (procedures) of calibration. If the designation of the document establishing the calibration method(s) is dated, only that particular method is used. If the designation of the document establishing a method (procedure) of calibration is not dated, the latest edition of the specified method (including any changes) is used.

[3] The expanded measurement uncertainty is expressed in accordance with ILAC – P 14 and EA –4/02, it is a part of the CMC and represents the smallest expanded uncertainty achievable for the best available calibration item. The coverage probability corresponds to approximately 95%, and the coverage factor k = 2, unless otherwise indicated. Uncertainty values without units of quantity are relative with respect to the measured value of the quantity, unless otherwise indicated.

Matrix 1.1 DC voltage sources and meters

Subrange, V	Expanded uncertainty, %
10^{-6}	$1\cdot10^{-1}$
10^{-5}	$1\cdot10^{-1}$
10^{-4}	$1\cdot10^{-2}$
10^{-3}	$1\cdot10^{-3}$
10^{-2}	$2\cdot10^{-4}$
10^{-1}	$2\cdot10^{-4}$
1	$2\cdot10^{-4}$
10^{1}	$2\cdot10^{-4}$
10^{2}	$2\cdot10^{-4}$
10^{3}	$2\cdot10^{-4}$

Matrix 2.1 DC sources and meters

Subrange, A	Expanded uncertainty (measured/reproduced), %
10^{-16}	5/5
10^{-15}	2/2
10^{-14}	0.5/0.5
10^{-13}	0.4/0.4
10^{-12}	0.3/0.3
10^{-11}	0.2/0.2
10^{-10}	0.1/0.1
10^{-9}	0.05/0.05
10^{-8}	0.03/0.03
10^{-7}	0.01/0.01
10^{-6}	0.006/0.008
10^{-5}	0.004/0.01
10^{-4}	0.003/0.005
10^{-3}	0.001/0.001
10^{-2}	0.001/0.001
10^{-1}	0.002/0.002
1	0.003/0.003
10	0.005/0.005
30	0.01/0.01

Matrix 3.1 Thermoelectric voltage converters

Voltage, V	The value of the relative expanded uncertainty, μV/V, at a frequency													
	10 Hz	20 Hz	100 Hz	400 Hz	ab. 0.4 kHz to 10 kHz	20 kHz	50 kHz	100 kHz	300 kHz	500 kHz	1 MHz	10 MHz	20 MHz	30 MHz
0.1	88	56	38	38	44	50	56	63	75	100	120	240	590	1000
0.3	75	44	25	25	31	38	44	56	69	88	100	220	520	650
0.5	63	31	20	20	25	31	38	44	50	75	88	200	455	585
1	50	25	15	15	19	25	31	38	44	69	81	130	390	520
3	50	25	10	10	15	25	31	38	44	69	81	130	390	520
5	38	25	10	10	15	20	25	35	38	44	75	160	420	550
10	38	25	15	15	19	25	35	38	44	50	69	200	455	585
20	38	25	15	15	19	25	35	38	44	50	69	200	455	585
30	50	38	20	19	25	35	38	44	100	120	200	260	520	650
50	50	38	20	19	25	35	38	44						
100	63	38	25	25	31	38	44	50						
200	69	50	25	25	31	38	44	50						
300	75	50	38	38	44	50	56	63						
500	88	63	38	38	44	50	56	63						
700	100	75	50	50	56	63	69	75						
1000	125	75	50	50	56	63	69	75						

Matrix 3.2 Calibrators

Voltage, V	Value of the relative expanded uncertainty, µV/V, at a frequency										
	10 Hz	20 Hz	100 Hz	400 Hz	ab. 0.4 kHz to 10 kHz	20 kHz	50 kHz	100 kHz	300 kHz	500 kHz	1 MHz
0.1	188	94	75	75	88	100	113	125	150	200	225
0.3	150	88	50	50	63	75	88	113	138	175	200
0.5	125	88	38	38	50	63	75	88	100	150	175
1	100	63	25	25	38	50	63	75	88	138	163
3	100	63	25	25	25	50	63	75	88	138	163
5	100	63	25	25	25	38	50	63	75	88	150
10	100	63	25	25	38	50	63	75	88	100	138
20	113	75	25	25	38	50	63	75	88	100	138
30	113	100	38	38	50	63	75	88			
50	113	100	38	38	50	63	75	88			
100	125	100	50	50	63	75	88	100			
200	150	125	50	50	63	75	88	100			
300	175	125	75	75	88	100	113	125			
500	188	150	75	75	88	100	113	125			
700	200	163	100	100	113	125	138	150			
1000	250	163	100	100	113	125	138	150			

Voltage, V	Value of relative expanded uncertainty, mV/V, at frequency								
	30 MHz	100 MHz	200 MHz	400 MHz	600 MHz	800 MHz	1000 MHz	1500 MHz	2000 MHz
0.1	3	3	4	5	7	eight	9	12	20
0.3	2	2	2	3	4	6	8	9	20
0.5	1	1	1	2	3	5	7	7	20
1	1	1	1	1	3	4	5	8	20
3	2	2	2	3	3	5	7	10	20
5	7	2	3	4	4	5	7		
10	14	2	3	4	4	6	8		

Matrix 3.3 Voltmeters

Voltage, V	The value of the relative expanded uncertainty, μV/V, at a frequency											
	10 Hz	20 Hz	100 Hz	400 Hz	ab. 0.4 kHz to 10 kHz	20 kHz	50 kHz	100 kHz	300 kHz	500 kHz	1 MHz	10 MHz	30 MHz
0.1	188	94	75	75	88	100	113	125	150	200	225	2	
0.3	150	88	50	50	63	75	88	113	138	175	200		
0.5	125	88	38	38	50	63	75	88	100	150	175		
1	100	63	25	25	38	50	63	75	88	138	163		
3	100	63	20	20	25	50	63	75	88	138	163		
5	100	63	20	20	25	38	50	63	75	88	150		
10	100	63	25	25	38	50	63	75	88	100	138		
20	113	75	25	25	38	50	63	75	88	100	138		
30	113	100	38	38	50	63	75	88					
50	113	100	38	38	50	63	75	88					
100	125	100	50	50	63	75	88	100					
200	150	125	50	50	63	75	88	100					
300	175	125	75	75	88	100	113	125					
500	188	150	75	75	88	100	113	125					
700	200	163	100	100	113	125	138	150					
1000	250	163	100	100	113	125	138	150					

Voltage, V	Value of relative expanded uncertainty, mV/V, at frequency								
	30 MHz	100 MHz	200 MHz	400 MHz	600 MHz	800 MHz	1000 MHz	1500 MHz	2000 MHz
0.1	6	ten	12	14	16	17	20	48	72
0.3	4	6	8	10	11	14	17	30	48
1	2	4	4	5	6	8	12	24	36
3	2	4	5	5	7	9	13	30	48
10	2	5	5	6	7	10	14	36	60

Matrix 4.1 Transducers, calibrators, ammeters

Current, A	Value of relative expanded uncertainty, μA/A, at frequency					
	20 Hz	1 kHz	10 kHz	50 kHz	100 kHz	1MHz
0.001	15	15	20	26	40	75
0.01	15	15	20	26	40	75
0.02	15	15	20	26	40	75
0.05	20	20	26	40	52	90
0.1	20	20	26	40	52	90
0.2	26	26	40	52	104	
0.5	40	40	52	78	130	
1	52	52	65	104	156	
2	65	65	78	130	182	
5	78	78	91	156	208	
10	91	91	104	182	234	
25	104	104	130	208	260	

Matrix 4.2 AC Shunts

Current, A	Value of relative expanded uncertainty, µA/A, at frequency					
	10 Hz	20 Hz	1 kHz	10 kHz	50 kHz	100 kHz
0.001	40	15	15	20	26	40
0.01	40	15	15	20	26	40
0.02	40	15	15	20	26	40
0.05	60	20	20	26	40	52
0.1	60	20	20	26	40	52
0.2	70	26	26	40	52	104
0.5	90	40	40	52	78	150
1	120	52	52	65	104	156
2	140	65	65	78	150	182
5	170	78	78	91	156	208
10	200	91	91	104	182	234
20	220	104	104	130	208	260
50	250	117	117	156	234	286
100	260	130	130	195	260	350