

SCOPE OF ACCREDITATION

"S 7 ENGINEERING" Limited Liability Company ("S 7 ENGINEERING" LLC)

name of legal entity

142015, Russia, Moscow region, Domodedovo district,
Property "Domodedovo Airport", building 9, LERM building, 3rd floor

address of the place of activity

Eligibility

GOST ISO/IEU17025-2019 "General requirements for the competence of testing and calibration laboratories"

name and details of an interstate or national standard establishing general requirements for competence and testing and calibration laboratories

Calibration of measuring instruments

N p/p	Measurement	Measured value	Calibration object	Range of measurements	Supplementary parameters	Extended measurement uncertainty (*)	Calibration method/technique	Notes
1	2	3	4	5	6	7	8	9
1	Mechanical values measurements	Force	Dynamometers	(10,0... 5000.0) H (1,0...500,0) kgf		$\ln_{0.95} = 0.07\%$	Calibration method of General Purpose Spring Dynamometers MK-11-19	
2	Mechanical values measurements	Coefficient of adhesion	Airfield Brake trolleys ATT-2, BIO-runway blocks Blocks for recording and measuring the values of the COEFFICIENT of Adhesion BRICS-KS	(10... 100) kgf		$\ln_{0.95} = 0.07\%$	Method of calibration of the airfield brake trolley MK-109-19 Methods for calibration of the registration unit and measurement of the values of the BRICS-KS of adhesion coefficient MK-110-19	

1	2	3	4	5	6	7	8	9
3	Measurements of mechanical quantities	Power torque	Torque wrenches (screwdrivers)	(0,4... 1000) Nm		$U_{0,95} = 0,0046 \text{ Nm}$	ISO6789 Mounting tools for screws and nuts. Manual dynamometric tools. Requirements and test methods for checking the compatibility of the construction, compliance with the quality of the requirements- and the recalibration procedure	
4	Measurements of mechanical quantities	Deformation	Strain gauges	(10,0... 5000.0) N (1,0...500,0) kgf		$ln_{0,95} = 0.07\%$	Strain gauge calibration technique MK-124-19	
5	Pressure measurements, vacuum measurements	Pressure	Manometers, vacuum meters, indicating manovacuummeters	(-0,1... 0) MPa (0... 60) MPa		$At_{0,95} = 0.000029 \text{ MPa}$ $At_{0,95} = 0.00014 \text{ MPa}$	Method of calibration of manometers, indicating vacuum gauges MK-14-19	
6	Pressure measurements, vacuum measurements	Pressure	Oxygen manometers	(0... 40) MPa		$At_{0,95} = 0.00014 \text{ MPa}$	Method of calibration of manometers, indicating vacuum gauges MK-14-19	
7	Time and frequency measurements	Frequency	Digital counting frequency counters	0.1 Hz... 1.3 GHz		$ln_{0,95} = 0.12 \text{ GHz}$	Frequency counter calibration technique MK-24-19	

1	2	3	4	5	6	7	8	9
8	Time and frequency measurements	Frequency	Analog frequency counters	(45... 1000) Hz		$A_{t_{0.95}} = 0.12 \text{ Hz}$	Method of calibration of switch frequency counters MK-13-19	
9	Time and frequency measurements	Time	Mechanical stopwatches	(0... 60) min		$A_{t_{0.95}} = 0.46 \text{ sec}$	Method of calibration of mechanical stopwatches MK-25-19	
10	Time and frequency measurements	Time	Electric stopwatches	(1... 10) sec		$A_{t_{0.95}} = 1.3 \cdot 10^{-8} \text{ sec}$	Method of calibration of electric stopwatches MK-26-19	
11	Time and frequency measurements	Time	Digital stopwatches	(0,01... 10000) sec		$A_{t_{0.95}} = 1.2 \cdot 10^{-8} \text{ sec}$	Method of calibration of electric digital stopwatch SEC-100 MK-08-17 Digital Stopwatch Calibration Technique SETS-10000 MK-10-17	
12	Time and frequency measurements	Frequency Voltage Weakening Harmonic coefficient	Low-frequency signal generators	0.1 Hz ... 30 MHz 50 V (0 ... 100) dB Cr (0,0015... 5) %		$U_{0,95} = 0,12 \text{ Гц}$ $U_{0.95} = 0.00046 \text{ V}$ $\$0.95 = 0.023 \text{ dB}$ $U_{0,95} = 0,025 \%$	Calibration technique for low-frequency signal generators MK-27-19	
13	Time and frequency measurements	Frequency Power Amplitude modulation Frequency modulation	Standard Signal Generators	0,1 МГц... 10,5 ГГц (0... 2) Tue AM (0...100) % World Cup (10... 500) kHz		$A_{t_{0.95}} = 1.2 \cdot 10^{-7} \text{ МГц}$ $I_{n_{0.95}} = 0.00000039 \text{ Вт}$ $I_{n_{0.95}} = 0.025 \%$ $A_{t_{0.95}} = 0.00004 \text{ Гц}$	Standard signal generator calibration technique MK-28-19	

1	2	3	4	5	6	7	8	9
14	Measurements of electrical and magnetic quantities	DC electric current	DC ammeters	(1· 10 ⁻⁵ ... 2) A (1· 10 ⁻⁶ ... (30) A		In _{0.95} = 0.00000015A	Method of calibration of ammeters, volts-meters of analog direct and transmitted current MK-29-19 Multimeter Calibration Technique MK-128-19	
15	Measurements of electrical and magnetic quantities	DC electric current	DC Digital Ammeters	(1· 10 ⁻⁵ ... 2) A		In _{0.95} = 0.00000015A	Method of calibration of ammeters, volts-meters of digital standing and transmitted current MK-30-19 Multimeter Calibration Technique MK-128-19	
16	Measurements of electrical and magnetic quantities	DC voltage	DC Voltmeters	(0,06...1000) V		U _{0.95} = 0.000007 V	Method of calibration of ammeters, volts-meters of analog direct and transmitted current MK-29-19 Multimeter Calibration Technique MK-128-19	

1	2	3	4	5	6	7	8	9
17	Measurements of electrical and magnetic quantities	DC voltage	DC Voltmeters Digital	$(1 \cdot 10^{-4} \dots 1,000) \text{ V}$		$U_{0.95} = 0.000007 \text{ V}$	Method of calibration of ammeters, volts-meters of digital direct and transmitted current MK-30-19 Multimeter Calibration Technique MK-128-19	
18	Measurements of electrical and magnetic quantities	AC electric current	AC ammeters	$(0,1 \dots 2) \text{ A}$ $(20 \dots 1000) \text{ Hz}$ $(0,1 \dots 20) \text{ A } 50 \text{ Hz}$		$I_{n0.95} = 0.00000015 \text{ A}$	Method of calibration of ammeters, volts-meters of analog DIRECT and alternating current MK-29-19 Multimeter Calibration Technique MK-128-19	
19	Measurements of electrical and magnetic quantities	AC electric current	AC Digital Ammeters	$(1 \cdot 10^{-4} \dots 2) \text{ A}$ $(20 \dots 1,2 \cdot 10^3) \text{ Гц}$		$I_{n0.95} = 0.00000023 \text{ A}$	Method of calibration of ammeters, volts-meters of digital DC and AC current MK-30-19 Multimeter Calibration Technique MK-128-19	
20	Measurements of electrical and magnetic quantities	AC electric current	Clamp meter	$(0 \dots 1000) \text{ A } 50 \text{ Hz}$		$I_{n0.95} = 0.00023 \text{ A}$	Method of calibration of clamp meters MK-31-19	

1	2	3	4	5	6	7	8	9
21	Measurements of electrical and magnetic quantities	AC voltage	AC Voltmeters	(15... 600) V 50 Hz		$U_{0.95} = 0.000015$ V	Method of calibration of ammeters, volts-meters of analog direct and transmitted current MK-29-19 Multimeter Calibration Technique MK-128-19	
22	Measurements of electrical and magnetic quantities	AC voltage	DIGITAL AC voltmeters	($1 \cdot 10^{-4}$... 10^3) B (20... $1 \cdot 10^5$) Гц		$U_{0.95} = 0.000000023$ V	Method of calibration of ammeters, volts-meters of digital direct and transmitted current MK-30-19 Multimeter Calibration Technique MK-128-19	
23	Measurements of electrical and magnetic quantities	AC voltage	Clamp meter	(0... 600) V 50 Hz		$U_{0.95} = 0.000015$ V	Method of calibration of clamp meters MK-31-19	
24	Electrical resistance measurements	Electrical current resistance	Electrical resistance meters, ohmmeters	(10^{-3} ... 10^9) Ohm		$A_{t_{0.95}} = 0.0026$ Ohm	Milliohmmeter Calibration Technique MK-12-19 Multimeter Calibration Technique MK-128-19 Method of calibration of electrical compliance with ohmmeters MK-131-19	

1	2	3	4	5	6	7	8	9
25	Electrical resistance measurements	Dc electrical resistance	DC resistive load bank	(0,1... 99999.9) Ohm		$U_{0.95} = 0.0026 \text{ Ohm}$	Method of calibration of multi-valued electrical resistance measures (DC resistive load bank) MK-32-19	
26	Electrical capacitance measurements	Electrical capacitance	Capacitance Meters	(5.10-4... 40) MF		$U_{0,95} = 0,00000017 \text{ mF}$	Multimeter Calibration Technique MK-128-19	
27	Radiotechnics-electronic and radio-electronic measurements	Amplitude Bandpass range	Oscilloscopes	200 μV ... 300 V (0... 350) MHz		$U_{0.95} = 0.0000017 \text{ V}$ $U_{0.95} = 0.12 \text{ Hz}$	Method of calibration of single-channel, multi-channel oscilloscopes MK-87-19	
28	Radio-technical and radio-electronic measurements	Pulse amplitude Pulse duration Pulse repetition period	Measuring pulse generators	(7 $\cdot 10^{-9}$... 1) sec 1 mV... 100 V 0.1 Hz... 10 MHz		$At_{0.95} = 1.2 \cdot 10^{-8} \text{ sec}$ $U_{0.95} = 0.000046 \text{ V}$ $At_{0.95} = 0.12 \text{ Hz}$	Method of calibration of measuring pulse generators MK-88-19	
29	Radio-technical and radio-electronic measurements	DC voltage DC power	DC Power Supplies	(0,1... 300) V (0,01... 10) A		$U_{0.95} = 0.000007 \text{ V}$ $At_{0.95} = 0.00069 \text{ A}$	DC Power Supply Calibration Technique MK-85-19	
30	Radio-technical and radio-electronic measurements	DC voltage DC power	Stabilized bench rectifiers VSS-10, VSS-20	(0... 50) V (0... 20) A		$U_{0.95} = 0.0035 \text{ V}$ $At_{0.95} = 0.00069 \text{ A}$	Method of calibration of stabilized bench rectifiers VSS-10, VSS-20 MK-36-19	

1	2	3	4	5	6	7	8	9
31	Radiotechnics-electronic and radio-electronic measurements	DC voltage DC power	Charging devices; UL-10; RF-80; AB3000; CA-1550; DC-CA605ED; SUPERSEDER	(6... (36) V (1... 40) A		$U_{0.95} = 0.000007 \text{ V}$ $I_{n_{0.95}} = 0.00000046 \text{ A}$	Method of calibration of charging devices Методика UL-10; RF-80; AB3000; CA-1550; DC-CA605ED; SUPERSEDER МК-42-19	
32	Radio-engineering and radio-electronic measurements	AC voltage Frequency	AC Voltmeters Electronic	1 mV... 300 V 10 Hz... 1 GHz		$U_{0.95} = 0.00000002 \text{ V}$ $A_{t_{0.95}} = 0.12 \text{ Hz}$	Method of calibration of electron analog AC voltmeters МК-86-19	
33	Measurements of parameters of aerometric instruments and systems	Pressure	DG pressure generators Air pressure meters IVD absolute pressure, overpressure Special pressure meters IDS-2-1 Digital IDC Pressure Meters Digital precision manometers MCP-2-03	(5... 2250) mmHg Art.		$U_{0.95} = 0.056 \text{ mmHg}$	Method of calibration of pressure generator GD МК-16-19 Calibration Techniques air pressure meters IVD МК-17-19 Method of calibration of the special pressure meter IDS-2-1 МК-18-19 Digital IDC Pressure Meter Calibration Technique МК-19-19 Digital Precision Manometer Calibration Technique MCP-2-03 МК-20-19	

1	2	3	4	5	6	7	8	9
34	Measurements of parameters of aerometric devices and systems	Pressure Time interval	Control and verification equipment KPA-SOS ZSV	760 mmHg Art. 526 mmHg Art. 180 sec		$U_{0.95} = 0.056$ mmHg $At_{0.95} = 0.56$ sec	Calibration method of ZSV control and calibration equipment MK-21-19	
35	Measurements of parameters of aerometric devices and systems	Pressure Time interval	Control and verification equipment KPA-LDPE	(1... 1317.41) mmHg Art. (0... 2.5) min		$U_{0.95} = 0.056$ mmHg $At_{0.95} = 0.075$ min	Method of calibration of control and calibration equipment KPA-LDPE MK-22-19	
36	Measurements of parameters of aerometric devices and systems	Pressure	Pressure calibrators ADTS, MPS, DPS	(0... 250) kPa		$At_{0.95} = 0.006$ kPa	Method of calibration of the pressure calibrators ADTS, MPS, DPS MK-23-19	
37	Measurements of parameters of aerometric devices and systems	Pressure	Pressure testers Vent Valve Tester DC600	(0... 1) bar		$At_{0.95} = 0.0002$ bar	Method of calibration of Vent Valve Tester DC600 MK-125-19	
38	Measurements of parameters of aerometric devices and systems	Pressure	Pressure generators Vacuum Generator HCS2025-03	(-100... 0) kPa		$At_{0.95} = 0.029$ кПа	Vacuum Generator HCS2025-03 Pressure Generator Calibration Technique MK-126-19	
39	Measurements of parameters of aerometric devices and systems	Pressure	Pressure regulators F72928-55	(0... 10) psi		$In_{0.95} = 0.0022$ psi	Method of calibration of pressure regulator F72928-55 MK-127-19	

1	2	3	4	5	6	7	8	9
40	Measurements of aircraft instrumentation parameters	AC power	Remotes F72917-20	1.86 A; 5.44 A		$I_{n_{0.95}} = 0.057A$	Ground Fault Circuit Test Console Calibration Technique F72917-20 MK-02-15	
41	Measurements of aircraft instrumentation parameters	Electrical resistance	Controls TEST BOX F80229-16	5.89 Ohm		$A_{t_{0.95}} = 0.0026 \text{ Ohm}$	Method of calibration of the control TEST BOX F80229-16 MK-57-19	
42	Measurements of aircraft instrumentation parameters	DC voltage DC power Load resistance	Testers TS-420 TEST SET	(0... 10) B (100... 1000) mA (22,6... 90.9) Ohm		$A_{t_{0.95}} \quad U_{0.95} = 00046 \text{ mA}$ $A_{t_{0.95}} = 0.0026 \text{ Ohm}$	Method of calibration of tester TS-420 TEST SET MK-37-19	
43	Measurements of aircraft instrumentation parameters	Resistance	Testers T477W	(0,001... 2) Ohm		$A_{t_{0.95}} = 0.00000023 \text{ Ohm}$	Method of calibration of Bonding meter T477W MK-129-19	
44	Measurements of aircraft instrumentation parameters	DC power Frequency	TEST SET 42A12D	(10... 170) mA (30... 45) KHz		$A_{t_{0.95}} = 0.00046 \text{ mA}$ $A_{t_{0.95}} = 1.2 \cdot 10^{-4} \text{ kHz}$	Method of calibration of tester ULTRASONIC TEST SET 42A12D MK-38-19	
45	Measurements of aircraft instrumentation parameters	Resistance	Testers HCS2047	(3... 900) Ohm		Ohm	Calibration Methodology for HCS2047 Testers MK-39-19	

1	2	3	4	5	6	7	8	9
46	Measurements of aircraft instrumentation parameters	Resistance	Testers VKGA-755 Testers HZR-171	Mohm		Mohm	Ground system tester calibration methodology	
47	Measurements of aircraft instrumentation parameters	DC voltage Resistance Time interval	Testers S27007-27(31) Testers S26002-21 Testers S26006-1	28.0 V (100... 11000) Ohm (1... 100) ms.		$U_{0.95} = 0.000007$ V $At_{0.95} = 0.0026$ Ohm $At_{0.95} = 1.3 \cdot 10^{-5}$ ms	Method of calibration of the control TEST BOX C27007-XX STAB TRIM CONTROL MK-130-19 Calibration methods of the test console of fire detection systems of engines and APU S26002-21 MK-05-16 Method of calibration of the test console of the fire extinguishing system in the cargo compartment S26006-1 MK-04-16	

1	2	3	4	5	6	7	8	9
48	Measurements of parameters of flight and navigation complex systems	AC voltage	Electronic signal generators C77002-21	>1.65 V (1.5 kHz) <1.65 V (10; 20; 100) kHz		$U_{0.95} = 0.0046 \text{ V}$	Electronic Signal Generator Calibration Technique S77002-21 MK-90-19	

Head of Service – Chief
Metrologist

position of authorized person

signature of the authorized

person

A.L.Muratov

initials, surname of the authorized person

1 The symbol "*" next to the serial number indicates that calibration can only be performed outside the permanent place of activity (at the place of temporary work).

2 The Note specifies the calibration methods (techniques) to be implemented. If the designation of the document establishing the calibration method(s) is dated, only that particular technique shall be used. If the designation of the document establishing the calibration method(s) is not dated, the latest version of the specified procedure (including any changes) shall be used.

3 Extended measurement uncertainty, which is part of the calibration and measurement capabilities of the laboratory and represents the least extended uncertainty achievable for the best available calibration object (type (group) of measuring instruments).

The probability of coverage is approximately 95 per cent and the coverage ratio is $k = 2$, unless otherwise stated in the note.

Uncertainty values without specifying units of quantities are relative to the measured value of the quantity, unless otherwise specified in the note.

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