

SCOPE OF ACCREDITATION

CALIBRATION LABORATORIES

Limited Liability Company "S 7 ENGINEERING"

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

For compliance with requirements

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

name and details of interstate or national standard

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address of the place of activity\

N p/p	Measurement	Measured value	Calibration object	Range of measurements	Supplementary parameters	Extended measurement uncertainty	Calibration method/technique	Notes
1. Calibration of measuring instruments								
1.1	Mechanical values measurements	Force	Dynamometers	10,0... 5000,0) H (1,0...500,0) kg		$U_{0,95} = 0,009 \%$ $U_{0,95} = 0,009 \%$	Method of calibration of General-Purpose Spring Dynamometers MK-11-19	
1.2	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		$U_{0,95} = 0,021 \%$	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	
1.3	Measurements of mechanical quantities	Torque of force	Torque wrenches (screwdrivers)	(0,2... 1100) N·m		$U_{0,95} = 8,0 \cdot 10^{-4} \text{ N}\cdot\text{m}$	Method of calibration of Measuring Instruments for Standardized Tightening of Threaded Connections MK-112-19	
1.4	Measurements of mechanical quantities	Deformation	Strain gauges	(10,0... 5000,0) N (1,0...500,0) kgf		$U_{0,95} = 0,009 \%$ $U_{0,95} = 0,009 \%$;	Strain gauge calibration technique MK-124-19	
1.5	Pressure measurements, vacuum measurements	Pressure	Manometers, vacuum meters, indicating manovacuummeters	(-0,1... 0) MPa (0... 60) MPa		$U_{0,95} = 5,8 \text{ Pa}$ $U_{0,95} = 6,0 \text{ Pa}$	Method of calibration of manometers, indicating vacuum gauges MK-14-19	

1.6	Pressure measurements, vacuum measurements	Pressure	Oxygen manometers	(0... 40) MPa		$U_{0,95} = 6,0 \text{ Pa}$	Method of calibration of manometers, indicating vacuum gauges MK-14-19	
1.7	Time and frequency measurements	Frequency	Digital counting frequency counters	0.1 Hz... 1.3 GHz		$U_{0,95} = 5,8 \cdot 10^{-13}$	Method of calibration of frequency counter MK-24-19	
1.8	Time and frequency measurements	Frequency	Analog frequency counters	(45... 1000) Hz		$U_{0,95} = 2,1 \cdot 10^{-6} \text{ Hz}$	Method of calibration of analog frequency counters MK-13-19	
1.9	Time and frequency measurements	Time	Mechanical stopwatches	(0... 60) min		$U_{0,95} = 5,8 \cdot 10^{-4} \text{ s}$	Method of calibration of mechanical stopwatches MK-25-19	
1.10	Time and frequency measurements	Time	Electric stopwatches	(1... 10) s		$U_{0,95} = 2,7 \cdot 10^{-7} \text{ s}$	Method of calibration of electric stopwatches MK-26-19	
1.11	Time and frequency measurements	Time	Digital stopwatches	(0,01... 10000) s		$U_{0,95} = 2,7 \cdot 10^{-7} \text{ s}$	Method of calibration of electric digital stopwatch SEC-100 MK-08-17 Method of calibration of digital stopwatch SETS-10000 MK-10-17 Method of calibration of electric stopwatch INTEGRAL S-01 MK-142-23	
1.12	Time and frequency measurements	Frequency Voltage Weakening Harmonic coefficient	Low-frequency signal generators	0.1 Hz ... 30 MHz (0 ... 200) dB (0 ... 100) dB Cr (0,0015... 5) %		$U_{0,95} = 1,1 \cdot 10^{-5} \text{ Hz}$ $U_{0,95} = 5,8 \cdot 10^{-8} \text{ V}$ $U_{0,95} = 0,03 \text{ dB}$ $U_{0,95} = 5,0 \cdot 10^{-4} \%$	Method of calibration of low-frequency signal generators MK-27-19	

1.13	Time and frequency measurements	Frequency Power Amplitude modulation Frequency modulation	Standard Signal Generators	0,1 MHz... 10,5 GHz (0... 2) V AM (0...100) % World Cup (10... 500) kHz		$U_{0,95} = 9,8 \cdot 10^{-10}$ MHz $U_{0,95} = 3,0 \cdot 10^{-7}$ V $U_{0,95} = 0,24$ % $U_{0,95} = 6,0 \cdot 10^{-3}$ kHz	Method of calibration of standard signal generator MK-28-19	
1.14.	Measurements of electrical and magnetic quantities	DC electric current	DC Ammeters	$(1,0 \cdot 10^{-6} \dots 30)$ A		$U_{0,95} = 0,8 \cdot 10^{-9}$ A	Method of calibration of ammeters, volts-meters of analog direct and transmitted current MK-29-19	
1.15.	Measurements of electrical and magnetic quantities	DC electric current	DC Digital Ammeters, Multimeters	$(1 \cdot 10^{-5} \dots 20)$ A		$U_{0,95} = 0,00000015$ A	Method of calibration of ammeters, volts-meters of digital standing and transmitted current MK-30-19 Multimeter Calibration Technique MK-128-19	
1.16	Measurement of electrical and magnetic quantities	DC Intensity	Clamp meter	$(0 \dots 1000)$ A		$U_{0,95} = 0,8 \cdot 10^{-9}$ A	Method of calibration of clamp meters MK-31-19	
1.17	Measurements of electrical and magnetic quantities	DC voltage	DC Voltmeters	$(1 \cdot 10 \dots 1,000)$ V		$U_{0,95} = 5,9 \cdot 10^{-7}$ V	Method of calibration of ammeters, analog volts-meters of direct and transmitted current MK-29-19	
1.18	Measurements of electrical and magnetic quantities	AC electric current	AC Voltmeters digital, Multimeters	$(1,0 \cdot 10^{-4} \dots 1000)$ V		$U_{0,95} = 4,0 \cdot 10^{-7}$ V	Method of calibration of ammeters, volts-meters of analog DIRECT and alternating current MK-30-19 Multimeter Calibration Technique MK-128-19	
1.19	Measurements of electrical and magnetic quantities	AC electric current	Clamp meter	$(0 \dots 600)$ V		$U_{0,95} = 4,0 \cdot 10^{-7}$ V	Method of calibration of clamp meters MK-31-19	

1.20	Measurements of electrical and magnetic quantities	AC electric current	AC Digital Ammeters	$(1,0 \cdot 10^{-5} \dots 20) \text{ A}$	$(20 \dots 1000) \text{ Hz}$	$U_{0,95} = 4,4 \cdot 10^{-8} \text{ A}$	Method of calibration of ammeters, volts-meters of analog DC and AC current MK-29-19	
1.21	Measurements of electrical and magnetic quantities	AC voltage	Digital AC Voltmeters, Multimeters	$(1,0 \cdot 10^{-5} \dots 20) \text{ A}$	$(20 \dots 1200) \text{ Гц}$	$U_{0,95} = 4,4 \cdot 10^{-8} \text{ A}$	Method of calibration of ammeters, volts-meters of direct and transmitted current MK-30-19 Multimeter Calibration Technique MK-128-19	
1.22	Measurements of electrical and magnetic quantities	AC voltage	Clamp meter	$(0 \dots 1000) \text{ A}$	$(50 \dots 400) \text{ Hz}$	$U_{0,95} = 6,4 \cdot 10^{-8} \text{ A}$	Method of calibration of clamp meters MK-31-19	
1.23	Measurements of electrical and magnetic quantities	AC voltage	AC Voltmeters	$(0,06 \dots 600) \text{ V}$	$(20 \dots 1000) \text{ Hz}$	$U_{0,95} = 1,0 \cdot 10^{-5} \text{ V}$	Method of calibration of ammeters, volts-meters of analog direct and transmitted current MK-29-19	
1.24	Measurements of electrical and magnetic quantities	AC voltage	AC voltmeters digital, multimeters	$(1,0 \cdot 10^{-4} \dots 1000) \text{ V}$	$(20 \dots 1,0 \cdot 10^5) \text{ Hz}$	$U_{0,95} = 1,2 \cdot 10^{-6} \text{ V}$	Method of calibration of ammeters, volts-meters of digital direct and transmitted current MK-30-19 Multimeter Calibration Technique MK-128-19	
1.25	Measurements of electrical and magnetic quantities	AC voltage	Clamp meter	$(0 \dots 600) \text{ V}$	$(50 \dots 400) \text{ Hz}$	$U_{0,95} = 1,3 \cdot 10^{-6} \text{ V}$	Method of calibration of clamp meters MK-31-19	
1.26	Electrical resistance measurements	Electrical current resistance	Electrical resistance meters, ohmmeters, multimeters	$(1,0 \cdot 10^{-3} \dots 1,0 \cdot 10^9) \Omega$		$U_{0,95} = 9,1 \cdot 10^{-8} \Omega$	Milliohmmeter Calibration Technique MK-12-19 Multimeter Calibration Technique MK-128-19 Method of calibration of electrical compliance with ohmmeters MK-131-19	

1.27	Electrical resistance measurements	Electrical current resistance	DC resistance box	0,1 Ω ...100,0 m Ω		$U_{0,95} = 2,0 \cdot 10^{-4}$ m Ω	Method of calibration of multi-valued electrical resistance measures (DC resistance box) MK-32-19	
1.28	Electrical resistance measurements	Electrical current resistance	MK-Test Systems-ExLRT (Loop Resistance Tester XLR-1931-02) (loop resistance testers)	(0,02...4100) m Ω		$U_{0,95} = 0,58$ %	Method of calibration Loop Resistance Tester XLR-1931-02 MK-140-21	
1.29	Radiotechnics-electronic and radio-electronic measurements	Electrical capacitance	Capacitance Meters	1 nF...40 mF		$U_{0,95} = 0,00024$ nF	Multimeter Calibration Technique MK-128-19	
1.30	Radiotechnics-electronic and radio-electronic measurements	Amplitude Bandpass range	Oscilloscopes	200 μ V...300 V (0...350) MHz		$U_{0,95} = 0,4$ μ V $U_{0,95} = 1,1 \cdot 10^{-6}$ Hz	Method of calibration of single-channel, multi-channel oscilloscopes MK-87-19 Method of calibration of digital oscilloscopes MK-15-19	
1.31	Radiotechnics-electronic and radio-electronic measurements	Pulse amplitude Pulse duration Pulse repetition period	Measuring pulse generators	($7,0 \cdot 10^{-9}$...1) s 1 mB...100 V 0,1 Hz...10 MHz		$U_{0,95} = 1,1 \cdot 10^{-15}$ s $U_{0,95} = 2,4 \cdot 10^{-5}$ V $U_{0,95} = 1,1 \cdot 10^{-5}$ Hz	Method of calibration of measuring pulse generators MK-88-19	
1.32	Radiotechnics-electronic and radio-electronic measurements	DC voltage DC power	DC Power Supplies	(0,1...300) V (0,01...30) A		$U_{0,95} = 1,1 \cdot 10^{-6}$ V $U_{0,95} = 9,5 \cdot 10^{-6}$ A	DC Power Supply Calibration Technique MK-85-19	
1.33	Radiotechnics-electronic and radio-electronic measurements	DC voltage DC power	Stabilized bench rectifiers VSS-10, VSS-20	(0...50) V (0...20) A		$U_{0,95} = 1,1 \cdot 10^{-6}$ V $U_{0,95} = 3,4 \cdot 10^{-8}$ A;	Method of calibration of stabilized bench rectifiers VSS-10, VSS-20 MK-36-19	
1.34	Radiotechnics-electronic and radio-electronic measurements	DC voltage DC power	Method of calibration of charging devices UL-10; RF-80; AB3000; CA-1550; DC-CA605ED SUPERSEDER	(6...36)V (1...40) A		$U_{0,95} = 4,8 \cdot 10^{-5}$ V $U_{0,95} = 4,7 \cdot 10^{-4}$ A	Method of calibration of charging -discharging devices MK-42-19	

1.35	Radiotechnics-electronic and radio-electronic measurements	AC voltage Frequency	AC Voltmeters Electronic	1 mV... 300 V 10 Hz... 1 GHz		$U_{0,95} = 1,2 \cdot 10^{-6}$ V $U_{0,95} = 1,1 \cdot 10^{-5}$ Hz	Method of calibration of electron analog AC voltmeters MK-86-19	
1.36	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.		$U_{0,95} = 0,0076$ mmHg	Method of calibration of pressure generator GD MK-16-19 Calibration Techniques air pressure meters IVD MK-17-19 Method of calibration of the special pressure meter IDS-2-1 MK-18-19 Digital IDC Pressure Meter Calibration Technique MK-19-19 Digital Precision Manometer Calibration Technique MCP-2-03 MK-20-19	
1.37	Measurements of parameters of aerometric instruments and systems	Pressure Time interval	Control and verification equipment KPA-SSOS-ZSV	760 mmHg Art. 526 mmHg Art. 180 s		$U_{0,95} = 0,013$ mmHg $U_{0,95} = 0,013$ mmHg $U_{0,95} = 0,0030$ μ s	Calibration method of ZSV control and calibration equipment MK-21-19	
1.38	Measurements of parameters of aerometric instruments and systems	Pressure Time interval	Control and verification equipment KPA-PVD	(1... 1317,41) mmHg Art. (0... 2,5) min		$U_{0,95} = 0,046$ mmHg $U_{0,95} = 0,0030$ μ s	Method of calibration of control and calibration equipment KPA-PVD MK-22-19;	
1.39	Measurements of parameters of aerometric instruments and systems	Pressure	Pressure calibrators ADTS, MPS, DPS	(0... 250) kPa		$U_{0,95} = 1,7$ kPa	Method of calibration of the pressure calibrators ADTS, MPS, DPS MK-23-19;	

1.40	Measurements of parameters of aerometric instruments and systems	Pressure	Pressure testers Vent Valve Tester DC600	(0... 4) bar		$U_{0,95} = 8,0 \cdot 10^{-5}$ bar	Method of calibration of Vent Valve Tester DC600 MK-125-19;	
1.41	Measurements of parameters of aerometric instruments and systems	Pressure	Pressure generators Vacuum Generator HCS2025-03	(-100...0) kPa;		$U_{0,95} = 0,0058$ kPa;	Method of calibration of Pressure Generator Vacuum Generator HCS2025-03 MK-126-19;	
1.42	Measurements of parameters of aerometric instruments and systems	Pressure	Pressure regulators F72928-55	(0... 10) psi		$U_{0,95} = 8,7 \cdot 10^{-4}$ psi	Method of calibration of pressure regulator F72928-55 MK-127-19;	
1.43	Measurements of aircraft instrumentation parameters	AC power	Remotes F72917-20	1,86 A; 5,44 A		$U_{0,95} = 5,8 \cdot 10^{-7}$ A	Method of calibration of Ground Fault Circuit Test remotes F72917-20 MK-02-15	
1.44	Measurements of aircraft instrumentation parameters	Electrical resistance	Remotes TEST BOX F80229-16	5,89 Ω		$U_{0,95} = 2,6 \cdot 10^{-4}$ Ω	Method of calibration of the remotes TEST BOX F80229-16 MK-57-19;	
1.45	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) Ω		$U_{0,95} = 4,0 \cdot 10^{-7}$ V $U_{0,95} = 4,7 \cdot 10^{-4}$ mA $U_{0,95} = 0,26$ Ω	Method of calibration of tester TS-420 TEST SET MK-37-19	
1.46	Measurements of aircraft instrumentation parameters;	Resistance	Testers T477W	(0,001...2) Ω		$U_{0,95} = 9,1 \cdot 10^{-8}$ Ω	Method of calibration of Bonding meter T477W MK-129-19;	
1.47	Measurements of aircraft instrumentation parameters	DC power Frequency	TEST SET 42A12D	(10...170) mA (30...45) kHz		$U_{0,95} = 3,0 \cdot 10^{-4}$ mA $U_{0,95} = 1,1 \cdot 10^{-8}$ kHz	Method of calibration of tester ULTRASONIC TEST SET 42A12D MK-38-19	

1.48	Measurements of aircraft instrumentation parameters	Resistance	Testers HCS2047	(3... 900) Ω		$U_{0,95} = 1,8 \cdot 10^{-2} \Omega$	Calibration Methodology for HCS2047 Testers MK-39-19
1.50	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) Ω (1... 100) ms		$U_{0,95} = 6,3 \cdot 10^{-4} V$ $U_{0,95} = 0,76 m\Omega$ $U_{0,95} = 1,0 \cdot 10^{-9} ms$	Method of calibration of the remote-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;
1.51	Measurements of aircraft instrumentation parameters	Resistance	Remotes S26005-1	(100...1100) Ω		$U_{0,95} = 0,76 m\Omega$	Method of calibration of the remotes S26005 of fire detection systems of engines and APU, MK-139-21;
1.52	Measurements of parameters of flight and navigation complex systems	AC voltage	Electronic signal generators S77002-21	(0,03...5,0) V	(1,5; 10; 20; 100) kHz	$U_{0,95} = 5,8 \cdot 10^{-8} V$	Electronic Signal Generator Calibration Technique S77002-21 MK-90-19