# ACCREDITATION SCOPE

LEGAL ENTITY, INDIVIDUAL ENTREPRENEUR PERFORMING WORK AND (OR) PROVIDING SERVICES IN THE FIELD OF ENSURING THE UNIFORMITY OF MEASUREMENTS

**Ural Research Institute of Metrology – a branch of the Federal State Unitary Enterprise "Russian National Scientific and Research Institute for Metrology named after D. I. Mendeleyev" (UNIIM - Affiliated Branch of the D. I. Mendeleyev Institute for Metrology)**

name

**RA.RU.311975**

Number in the register of accredited persons

**1. 4 Krasnoarmeyskaya str., Yekaterinburg, 620075, Russia**

business addresses

For compliance with the requirements of
GOST ISO/IEC 17025-2019 General requirements for the competence of testing and calibration laboratories

name and details of the interstate or national standard

| No. | Measurements | Measured value | Calibration object | Measurement range | Complementary parameters | Expanded measurement uncertainty | Calibration methods/ procedure | Note |
|---|---|---|---|---|---|---|---|---|
| Instrument calibration | | | | | | | | |
| 1. | Measurements of geometric quantities | Length | Feeler gauges, thickness gauges | (10 - 500) mm | - | Q[0.25+2.5·L; 0.3] μm | Comparison with slip gauges using an optimeter;<br>direct measurements with an optimeter | Measuring range extension |
| 2. | Measurements of geometric quantities | Length | Measures of models and specimens of geometrical defects, control sample for ultrasonic testing | (0.002 - 0.006) mm<br>(0.001 - 0.002) mm | - | 0.5 μm<br>0.5 μm | Direct measurements using a measuring microscope, vernire caliper, measuring head | Measurement uncertainty expansion.<br>Measuring range extension |

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|---|---|---|---|---|---|---|---|---|
| Instrument calibration | | | | | | | | |
| 3. | Measurements of geometric quantities | Length | Solid microstructure analyzers | (0 - 1000) µm | - | 0.1 µm | Direct measurements using line standard metre, micrometer object | Measurement uncertainty expansion. Measuring range extension |
| 4. | Measurements of mechanical quantities | Line density | Line density measures | (10 - 100) kg/m | - | 0.3 % (rel.) | Indirect measurements using the 5$^{th}$ category working measurement standard of mass | Measurement uncertainty expansion |
| 5. | Measurements of mechanical quantities | Deformation | Installations with pure bending of constant section beams | [(-3000) - (+3000)] ppm | - | 0.09 % (rel.) | Indirect measurements using parallel slip gauges, an optimeter, a measuring microscope; indirect measurements using resistance strain gauges with the secondary transducer | Expansion to a new measurement object |
| 6. | Measurements of mechanical quantities | Torque | Meters, torquemeters, transducers, torque measuring channels, calibration units, power nut drivers, power screwdrivers, wrenches, torque screwdrivers, torque multipliers | (0.1 - 1) N·m | - | 0.03 % (rel.) | Direct measurements using GET 149; comparison with GET 149 using torque sensors | Measuring range extension |
| 7. | Pressure measurements, vacuum measurements | Pressure | Measuring instruments for excess pressure | (40 - 600) kPa<br>(0.6 - 100) MPa | - | 0.03 kPa<br>0.005 % (rel.) | Direct measurements using a deadweight pressure gauge | New position |
| 8. | Pressure measurements, vacuum measurements | Pressure | Measuring instruments for absolute pressure | (0 - 40) kPa<br>(40 - 325) kPa<br>(80 - 120) kPa<br>(325 - 650) kPa<br>(650 - 1250) kPa<br>(1.25 – 2.5) MPa | - | 0.004 kPa<br>0.03 kPa<br>0.01 % (rel.)<br>0.01 % (rel.)<br>0.13 kPa<br>0.01 % (rel.) | Direct measurements using a pressure calibrator | New position |

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|---|---|---|---|---|---|---|---|---|
| Instrument calibration | | | | | | | | |
| 9. | Pressure measurements, vacuum measurements | Pressure | Measuring instruments for excess pressure, expansion pressure | ([-100] - 0) kPa<br>(0 - 40) kPa | - | 0.01 kPa<br>0.004 kPa | Direct measurements using a pressure calibrator | New position |
| 10. | Measurement of flow parameters, consumption, level, volume of substances | Volume | Gasometers, gas factor measuring instruments | (300 - 10000) $см^3$ | - | $300 \cdot V^{-1}$ % (rel.) | Indirect measurements using non-automatic scales, weights, thermometer, pressure gauge | V - volume, $cm^3$<br>New position |
| 11. | Measurement of flow parameters, consumption, level, volume of substances | Volume | Gas pycnometers | (0 - 150) $см^3$ | - | $(0.0015 \cdot V + 0.002)$ $см^3$ | Direct measurements using measures, reference materials | V - volume, $cm^3$<br>New position |
| 12. | Measurement of flow parameters, consumption, level, volume of substances | Volume | Volume measures for pycnometry | (0.05 - 100) $см^3$ | - | $(0.0015 \cdot V + 0.002)$ $см^3$ | Indirect measurements using non-automatic scales, weights, thermometer | V - volume, $cm^3$<br>New position |
| 13. | Measurements of physico-chemical composition and properties of substances | Porosity | Porosity, permeability and sorption properties analyzers | (0 - 0.1) % | - | 0.05 % (abs.) | Direct comparison with GET 210;<br>direct measurements using reference materials. | Measuring range extension |
| 14. | Measurements of physico-chemical composition and properties of substances | Mass fraction | Humidity measuring instruments | (0.001 - 100) % | - | (7.2 - 0.04) % (rel.) | Direct measurements using reference materials,<br>direct comparison with GET 173 | Measurement uncertainty expansion.<br>Measuring range extension |
| 15. | Measurements of physico-chemical composition and properties of substances | Mass fraction of moisture (humidity);<br>Mass fraction of milk solids non-fat (MSNF);<br>Mass fraction of fat;<br>Mass fraction of protein | Measuring instruments for quality indices of food products and food raw materials | (0.001 - 100) %<br>(0.5 - 99) %<br>(0.1 - 80) %<br>(0.3 - 100) % | - | (7.2 - 0.04) % (rel.)<br>(0.03 - 0.005) % (abs.)<br>(0.003 - 0.02) % (abs.)<br>(1.1 - 0.4) % (rel.) | Comparison with GET 173 using work samples.<br>Direct measurements using reference materials.<br>Indirect measurements using GET 173, GVET 176-1, GVET 208-1.<br>Direct measurements using reference materials.<br>Direct measurements using GVET 176-1 | Calibration method addition<br>Measurement uncertainty expansion |

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|---|---|---|---|---|---|---|---|---|
| Instrument calibration | | | | | | | | |
| 16. | Thermophysical and temperature measurements | Phase transition temperature<br>Specific (enthalpy) heat of phase transition<br>Specific heat | Measuring instruments for the comprehensive determination of thermophysical properties: thermal analyzers, themogravimetric analyzers, differential scanning calorimeters, thermal analysis instruments | (1040 - 1830) K<br>(360 - 400) kJ/kg<br>(0.09492 - 1.414) kJ/kg | - | 0.60 K<br>1.8 kJ/kg<br>(0.10 - 1.50) % | Direct measurements using reference materials and thermal converters | Measured value addition<br>Measuring range extension |
| 17. | Measurements of electric and magnetic quantities | Magnetic field strength | Installations for measuring the magnetic properties of hard magnetic materials | (5 - 500) kJ/m³ | - | 1.0 % (rel.) | Direct measurements using reference materials | Measurement uncertainty expansion |
| 18. | Measurements of electric and magnetic quantities | Magnetic field strength | Measuring instruments for the strength of a static field | (800 - $4\cdot10^5$) A/m<br>($4\cdot10^5$ - $1.6\cdot10^6$) A/m | - | 0.50 % (rel.)<br>0.10 % (rel.) | Direct measurements using GET 198, magnetic induction gauges | Instead of the abbreviated calibration object: measuring instruments of the magnetic induction of a pulsed field |
| 19. | Measurements of electric and magnetic quantities | Electrical resistivity | Instruments for measuring the electrical resistivity | ($1\cdot10^{-4}$-$1.2\cdot10^4$) Ω • m | - | 1.0 % (rel.) | Direct measurements using reference materials; indirect measurements using electrical resistivity measures | Measurement uncertainty expansion |
| 20. | Optico-physical measurements | Optical density | Photometric measuring instruments (spectrophotometers, photoelectric colorimeters, flame photometers, etc) | (0 - 0.7) B<br>(0.7 - 1.7) B<br>(1.7 - 3) B | - | $(\ln10)^{-1}\cdot0{,}0025\cdot e^D$ B<br>$(\ln10)^{-1}\cdot0{,}0025\cdot e^D$ B<br>$(\ln10)^{-1}\cdot0{,}002\cdot e^D$ B | Direct measurements using optical filters | D - optical density, B<br>Measurement uncertainty expansion |

Branch Director — position of authorized person

signed with an e-signature — authorized person's signature

E.P.Sobina — initials, surname of the authorized person