**On approval of the list of measurements, applicable to state regulation**

*Unofficial translation*

Joint order of the Minister of Agriculture of the Republic of Kazakhstan dated May 23, 2019 no. 208 and the Minister of Industry and Infrastructure Development of the Republic of Kazakhstan dated May 30, 2019 no. 340. Registered with the Ministry of Justice of the Republic of Kazakhstan dated June 4, 2019 no. 18778.

*Unofficial translation*

In pursuance of subparagraph 2) of Article 6-3 of the Law of the Republic of Kazakhstan "On Ensuring the Uniformity of Measurements" **we ORDER**:

Footnote. Preamble - as amended by the joint order of the Minister of Agriculture of the Republic of Kazakhstan dated 20.05.2022 № 159 and Deputy Prime Minister - Minister of Trade and Integration of the Republic of Kazakhstan dated 20.05.2022 № 233- НҚ (effective ten calendar days after the date of its first official publication).

1. to approve the attached list of measurements, applicable to state regulation.

2. Department of Veterinary, Phytosanitary and Food Safety of the Republic of Kazakhstan in accordance with the procedure established by the law shall ensure:

1) state registration of this joint order with the Ministry of Justice of the Republic of Kazakhstan;

2) within ten calendar days from the date of state registration of this joint order, direction of it in Kazakh and Russian languages to the Republican State Enterprise on the right of economic management "Institute of Legislation and Legal Information of the Republic of Kazakhstan" of the Ministry of Justice of the Republic of Kazakhstan for official publication and placement in the Reference Control Bank of the Regulatory Legal Acts of the Republic of Kazakhstan;

3) placement of this joint order on the internet resource of the Ministry of Agriculture of the Republic of Kazakhstan after its official publication;

4) within ten working days from the state registration of this joint order, submission to the Department of Legal Service of the Ministry of Agriculture of the Republic of Kazakhstan of information about implementation of the measures, stipulated by subclauses 1), 2) and 3) of this clause.

3. Control over execution of this joint order shall be entrusted to the supervising Vice-Ministers of Agriculture of the Republic of Kazakhstan.

4. This joint order shall enter into force upon expiry of ten calendar days from the date of its first official publication.

*Minister of Industry and*

*Minister of Agriculture*
*of the Republic of Kazakhstan*
_____ *S. Omarov*

*Infrastructure Development*
*of the Republic of Kazakhstan*
_____ *R. Sklyar*

Approved by the joint order
of the Minister of Agriculture
of the Republic of Kazakhstan
dated May 23, 2019 № 208
and the Minister of Industry and
Infrastructure Development
of the Republic of Kazakhstan
dated May 30, 2019 № 340

## List of measurements related to state regulation

Footnote. The list - as amended by the joint order of the Minister of Agriculture of the Republic of Kazakhstan dated 20.05.2022 № 159 and Deputy Prime Minister - Minister of Trade and Integration of the Republic of Kazakhstan dated 20.05.2022 № 233- НҚ (effective ten calendar days after the date of its first official publication).

| № | Name of measurements indicating the object and application area | Metrological requirements | | Note |
|---|---|---|---|---|
| | | Measuring range | Maximum permissible error or accuracy class | |
| 1 | 2 | 3 | 4 | 5 |
| Chapter 1. Measurements during activities in plant protection and quarantine | | | | |
| Paragraph 1. Measurements when determining the species composition of quarantine objects for the purpose of phytosanitary control in the field of plant quarantine | | | | |
| 1 | Measuring air temperature in technical installations where samples of regulated products with identified quarantine objects are stored | from 0°C to 100°C | ±1°C | |
| 2 | Measurement of mass of reagents for preparation of nutrient media for phytopathological examination | from 0 to 150 g | ±5 mg | |
| Paragraph 2. Measurements during phytosanitary monitoring of the spread of harmful, especially dangerous harmful and quarantine objects to make a phytosanitary forecast in the field of plant protection | | | | |
| 3 | Determination of crop pest masses in laboratory work in order to forecast their spread | from 0 to 2000 gr | ± 3 mg | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| 4 | Measuring the coordinates of the spread area of locust pests, quarantine objects and other pests of agricultural crops in field conditions | without restrictions | ± 0,1 m | |
| Paragraph 3. Measurements during examination of agricultural products for residues of pesticides, nitrates, nitrites and heavy metal salts in the field of plant protection | | | | |
| 5 | Density measurement of liquid chemical products when determining the active ingredient of pesticides | (700...1840) kg/m³ | ± 1 kg/m³ | |
| 6 | Measurement of the mass of substances and materials when determining nitrates, active ingredients and pesticide residue | (2 ×10-6 ...50) kg | ± (2×10-8-0,3) kg | |
| 7 | Time measurement during pesticide extraction | (1...1 × 106) s | ± (2...10) % | |
| 8 | Measurement of solvent dosing volume for determination of active ingredient and pesticide residues | (0,01...10000) mcl | ± (1,5...3,5) % | |
| 9 | Measurement of mass concentration of pesticide in soil, grain, chemicals, fruits and vegetables when determining the active substance and pesticide residual amount | from 1.60 to 4.09 pNO3 | No more than ± 5 mv (0,05 pNO3) | |
| 10 | Measurement of nitrate ion concentration in the determination of nitrate in plant products | (1 × 105...80) % | ± (4...25) % | |
| 11 | Measurement of metal concentrations in soil in the determination of heavy metal salts in crop products | (1 ×10-7...90,0) % | ± (5...25) % | |

| | | | | |
|---|---|---|---|---|
| Chapter 2. Measurements during crop products processing activities | | | | |
| 12 | Measuring relative humidity of ambient air when analyzing samples of grain and grain products | (5 …98) % | ± (1…3) % | |
| 13 | Measuring the temperature of various media using the contact method when analyzing stored grain | from - 80 °C to 800 ° C | ± (0,1...5) °C | |
| 14 | Measurement of atmospheric pressure when analyzing samples of grain and grain products | (600…1100) hPa | ± 0,3 hPa | |
| 15 | Measurement of temperature of different media by non-contact method when determining the condition of stored grain | (- 50…150) °C | ± (0,1...5) °C | |
| 16 | Measurement of mass of substances and materials - grain, grain products, reagents used in laboratory tests of grain and grain products | (2 ×106...50) kg | ± (2×10-8-0,3) kg | |
| 17 | Measurement of time in establishing the technological effect of grain cleaning machine operation and gluten quality in laboratory tests | (1…60) s | ± (2...10) % | |
| 18 | Measurement of dosing volume in the determination of acidity, protein, gluten, fat content in laboratory tests and commercial operations | (0,01…10000) mcl | ± (1,5...3,5)% | |
| 19 | Measurement of the density of liquid media when determining the viscosity of starch of | | ± 1 kg/m3 | |

| | | | | |
|---|---|---|---|---|
| | grain and grain products in trade operations | (700…1840) kg/m3 | | |
| Chapter 3. Measurement of the content of substances - chemical constituents of grain and grain products (protein (amino acids), starch (carbohydrates), fiber (cellulose), vitamins), foreign substances (pesticides, mycotoxins, toxic substances, heavy metals) in various media | | | | |
| 20 | Measurement of residual quantities of active substances of pesticides in grain during laboratory tests and trade operations | (10-3 ….10-12) g/s ( 1...1200) a.m.u. | ± (10...35) %<br>± (0,1...1) a.m.u. | chromatography-mass spectrometry method |
| 21 | Measurement of mycotoxins in grain and grain products in laboratory tests and trade operations | (0,1…10) mg/kg | ± (4...25) % | chromatography method |
| 22 | Measurement of heavy metals in grain and grain products during laboratory tests and trading operations | (0,005…0,03) mg/kg | ± (5...25) % | atomic absorption method |
| 23 | Measurement of protein, moisture, nature, protein, ash content, quantity and quality of crude gluten, dry gluten content, vitreousity, starch, sedimentation index, acid number of oil, fat, calcium, phosphorus in grains and grain products in laboratory tests and trading operations. | (1...80) % | ± (5...20) % | spectrophotometric method |
| 24 | Measurement of acidity in grain products in laboratory tests and trading operations | (1...80) % | ± (2...5) % | titrimetry method |
| 25 | Measurement of fat content in grains and grain products in laboratory analysis and trading operations | (1...80) % | ± (5...10) % | refractometry method |
| | Measurement of microelements in | | | |

| | | | | |
|---|---|---|---|---|
| 26 | grain and grain products in laboratory tests | (- 4… 20) pH(p X) units | ± (0,03...0,3)pH(p X) units | potentiometry method |
| 27 | Measurement of manganese, arsenic, nickel, mercury and selenium in grain and grain products during laboratory tests and trading operations | (0,02...10000,0) kg/ dm3 | ± 20 % | by voltammetry method |
| 28 | Measurement of pesticide content in grain and grain products during laboratory tests and trade operations | (0,1×10-6...199,9) mSm/m | ± (0,5...10,0) % | conductometry method |
| 29 | Measurement of mycotoxins in grain and grain products during laboratory tests and trade operations | (0...1) mg/dm3 | ± (1...10) % | fluorimetry method |
| 30 | Measurement of radioactive substances in grain and grain products during laboratory tests and trade operations | (3...5 × 104) Bq/kg | ± (10...50) % | radiology method |
| 31 | Measurement of gas ion concentration in gas medium during grain storage | (0,1...9,9 × 104) mcSv/h | ± (10...30) % | dosimetry method |
| Chapter 4. Measurement of composition and properties of substances by biological methods | | | | |
| 32 | Measurement of molecular genetic identification of grain in laboratory tests | (0,03…100) % | no more than ± 25 % | by PCR test |
| 33 | Measurement of mycotoxins in grain and grain products in laboratory tests and trade operations | (0,1…100) % | ± (5...10) % | enzyme method |
| Chapter 5. Measurement of composition and properties of substances by microbiological methods | | | | |
| 34 | Measurement of the amount of antibiotic active ingredient for determining the safety of grain and grain products in | | no more than ± 10 % | |

| | | | | |
|---|---|---|---|---|
| | laboratory tests and trade operations | (10…1010) CFU/g / ( cm3) | | |
| 35 | Measurement of microbiological purity to determine the safety of grain and grain products in laboratory tests and trade operations | (1…300) CFU/g / ( cm3) | no more than ± 10 % | |
| Chapter 6. Measurement of composition and properties of substances by microscopic methods | | | | |
| 36 | Measurement of yeast content to determine the safety of grain and grain products, during laboratory tests and trade operations | no more than 300 CFU/g | no more than ± 10 % | |
| 37 | Measurement of mold amount to determine the safety of grain and grain products, during laboratory tests and trade operations | no more than 500 CFU/g | no more than ± 10 % | |
| 38 | Measurement of gluten deformation - the quality of gluten in wheat and flour in laboratory tests and trade operations | from 0 to 120 un.. | ± 2,5 un. | |
| 39 | Measurement of relative air humidity in storage when storing potatoes and vegetables | from 80 % to 98 % | ± 5 % | |
| 40 | Measurement of temperature in storage when storing potatoes and vegetables | from - 3 0C to 5 0C | ± 1 ˚C | |
| 41 | Measurement of starch content of potatoes | from 8 % to 30 % | ± (0,5-1,0) % | |
| 42 | Measurement of reducing sugars content in potatoes | from 0,25 % to 0,4 % | ± 0,05 % | |
| 43 | Measurement of total sugar content in potatoes and vegetable products | from 5 % to 40 % | ± 0,05 % | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| 44 | Measurement of mass when making biochemical quality assays of potato and vegetable products | from 1 to 600 g | ± 0,5 g | |
| 45 | Measurement of nitrate content in potato and vegetable products in field conditions | from 50 to 1500 mg/kg | ± (5…10) mg/kg | |
| 46 | Measurement of nitrate content in potato and vegetable products in laboratory conditions | from 50 to 1500 mg/kg | ± (5…10) mg/kg | |
| 47 | Measurement of sugar content in potatoes and vegetable products in field conditions | from 5 % to 30% | ± (0,5…1,0) % | |
| 48 | Measurement of soil density | from 45 до 180 kg/m2 | ± (0,5…1,0) mg/kg | |
| 49 | Measurement of relative air humidity at a meteorological station | from 30 % to 100 % | ± 5 % | |
| 50 | Measurement of mass for preparing a nutrient medium for growing virus-free potato plants under laboratory conditions | from 0,1 to 220 g | ± 10 g | |
| Chapter 7. Measurement of the mass fraction of organic substances | | | | |
| 51 | Measurement of humus, nitrogen, water extract in soils and grounds | from 0,5 % to 15% | ± (15…20) % | |
| 52 | Measurement of potassium, phosphorus, trace elements in soil and ground analysis | from 10-6 to 105 mg/kg | ± (5…80) % | |
| 53 | Measurement of mass of substance in soil analyses | from 10-6 to 10000 g | ± (1…5) % | |
| 54 | Measurement of plant mass in nutrient analysis | from 0,005 to 10 kg | ± (0,001...0,005) kg | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| 55 | Measurement of soil mass when determining nutrition elements | without restrictions | ± 0,0001 kg | |
| 56 | Measuring the moisture content of soil and plant material | from 3 % to 45% | ± 3 % | |
| 57 | Measurement of sample volume to determine nutrient elements | from 10-6 to 106 m3 | ± 5 % | |
| 58 | Measurement of atmospheric air for carbon dioxide determination | from 600 to 1100 hPa | ± 0,3 hPa | |
| Chapter 8. Measurement of soil parameters in the control test | | | | |
| 59 | Measurement of acidity of soils, water , (hydrogen index), precipitation | from 1 to 14 Ph units | ± (0,05....0,2) Ph units | |
| 60 | Measurement of specific electrical conductivity of soil, water, precipitation | from 2 to 10000 mc/ cm | ± (5…20) % | |
| 61 | Measurement of moisture content of soils, grounds, bottom sediments, sludge, sewage sludge, wastes | from 0,05 % to 99 % | ± (5…10) % | |
| 62 | Measurement of ash content of soils, grounds, bottom sediments, sludge, sewage sludge, wastes | from1 % to 100 % | ± (1-5) % | |
| Chapter 9. Measurement of sample indicators in the control test | | | | |
| 63 | Measurement of relative humidity in soil and plants | from 5 % to 98 % | ± (1...3) % | |
| 64 | Measurement of temperature of different media by contact method in biochemical analyses of fruits and plants | from - 80 °C to 800 ° C | ± (0,1...5) °C | |
| | Measurement of temperature of different media by non-contact method | | | |

| | | | | |
|---|---|---|---|---|
| 65 | in biochemical analyses of fruits and plants | from - 50°C to 150 ° C | ± (0,1...5)°C | |
| 66 | Measuring the mass of substances and materials as well as test systems ( laboratory animals) in testing laboratories | (2 × 10-6 …50) kg | ± (2×10-8 - 0,3) kg | |
| 67 | Measurement of dosage volume in liquid volume analyses | from 0,01 to 10000 mcl | ± (1,5...3,5) % | |
| 68 | Measuring the density of liquid media when measuring the density of liquid dispersed systems | from 700 to 1840 kg/ m3 | ± 1 kg/m3 | Mixtures in which the main liquid medium contains suspended particles of another substance insoluble in the main medium ( emulsions, various process suspensions, etc.) |
| Chapter 10. Measurement of substances in various media, including biological devices and animal drugs, by methods | | | | |
| 69 | Measurement of pesticide residues in laboratory tests in water, plant, soil objects | (5 × 10-9…80) % (1 …1200) a.m.u. | ± (10...35) % ± (0,1.. .1) a.m.u | chromatography-mas s spectrometry method |
| 70 | Measurement of amino acids and pesticides in laboratory tests in water, plant, soil objects. | (1 × 10-5…80) % | ± (4...25) % | chromatography method |
| 71 | Measurement of metal content in laboratory tests in water, plant, soil objects | (1 × 10-7…90) % | ± (5...25) % | atomic absorption method |
| 72 | Measurement of phosphorus, nitrogen, sulfur content in laboratory tests in water, plant, soil objects | (0,1...80) % | ± (5...20) % | spectrophotometric method |
| | Measurement of nitrogen, sulfur, | | | |

| | | | | |
|---|---|---|---|---|
| 73 | carbonates, calcium bicarbonates, magnesium content in laboratory tests in water, plant, soil objects | (0,1…80) % | ± (2...5) % | titrimetry method |
| 74 | Measurement of soluble solids content of fruits in laboratory tests | (0,1…80) % | ± (5...20) % | refractometry method |
| 75 | Measurement of hydrogen ion concentration in laboratory tests in water, plant, soil objects | (- 4…20) pHr (x) units | ± (0,03...0,3) pHr (x) units | potentiometry method |
| 76 | Measurement of the content of heavy metals, vitamins in laboratory tests in water, plant, soil objects | (0,02…10000,0) mcg /dm3 | ± 20 % | by voltammetry method |
| 77 | Measurement of specific conductivity and degree of salinity in laboratory analyses in water and soil | (0,1×10-4…199,9) mSm/m | ± (0,5…10,0) % | conductometry method |
| 78 | Measurement of vitamins in plant objects in laboratory tests | (0…1) mg/dm3 | ± 10 % | fluorimetry method |
| 79 | Measurement of the content of radioactive elements: cesium, strontium, potassium, iridium during laboratory analyses in water, plant, soil objects | (3…5×104) Bq/kg | ± (10...50) % | radiology method |
| 80 | Measurement of the content of radioactive elements: cesium, strontium, potassium, iridium during laboratory analyses in water, plant, soil objects | (0,1…9,9 ×104) mcSv/h | ± (10...30) % | dosimetry method |
| 81 | Measurements of substances, nitrate, phosphate and sulfate in soils by spectrophotometry | от 0,0 до 100,0 % | ± (0,5 – 1,0) % | |

| | | | | |
|---|---|---|---|---|
| 82 | Measurement of the density of liquid chemical products ( pesticides) when determining the active ingredient of pesticides | (700...1840) kg/m³ | ± 1 kg/m³ | |
| 83 | Measurement of the mass of substances and materials in the determination of nitrate, active ingredient and pesticide residues | (2 ×10-6 ...50) kg | ± (2×10-8-0,3) kg | |
| 84 | Time measurement during pesticide extraction | (1...1 × 106) s | ± (2...10) % | |
| 85 | Measurement of solvent dosing volume in the determination of active ingredient and pesticide residues | (0,01...10000) mcl | ± (1,5...3,5) % | |
| 86 | Measurement of nitrate ion concentration in the determination of nitrates in plant products | from 1.60 to 4.09 pNO3 | No more than ± 5 mv (0,05 pNO3 ) | |
| 87 | Measurement of pesticide mass concentration in soil, grain, pesticides, chemical preparations , fruit and vegetable products for determination of active substance and residual amount of pesticides | (1 × 105...80) % | ± (4...25) % | |
| 88 | Measurement of metal concentrations in soil in heavy metal determination | (1 × 10-7...90) % | ± (5...25) % | |
| 89 | Measurement of pesticide acidity in soil, grain, pesticides, chemical preparations , fruit and vegetable products in determining the active ingredient and | | ± (2...5) % | |

| | | | | |
|---|---|---|---|---|
| | residual amount of pesticides | (0,1...80) % | | |
| Chapter 11. Measurements in agrochemical soil surveying | | | | |
| 90 | Measurement of mobile manganese in soil | from 0,1 to 3,0 mcg/ml | ± 18 % | |
| 91 | Measurement of mobile zinc in soil | from 0,05 to 1,00 mcg/ml | ± 36 % | |
| 92 | Measurement of mobile copper in soil | from 0,2 to 5,0 mcg/ml | ± 16 % | |
| 93 | Measurement of mobile cobalt in soil | from 0,50 to 2,0 mcg/ml | ± 18 % | |
| 94 | Measurement of mobile sulfur in soil | from 0 to 24 mln-1 | from 2,5 mln-1 - ± 35 %;<br>from 2,5 до 5 mln-1 - ± 15 %;<br>over 5 mln-1 - ± 10 % | |
| 95 | Measurement of easily hydrolyzable nitrogen in soil by Tyurin and Kononova | from 0 to 150 mln-1 | ± 15 % | |
| 96 | Measurement of alkaline-hydrolyzable nitrogen in soil by Kornfield | from 0 to 350 mln-1 | ± 15 % | |
| 97 | Measurement of mobile phosphorus compounds | from 0 to 80 mln-1 | under 15 mln-1 - ± 30 %;<br>from 15 to 30 mln-1 - ± 20 %;<br>above 30 mln-1 -± 15 % | by the Machigin method modified by CINAO |
| 98 | Measurement of mobile potassium compounds | from 0 to 400 mln-1 | ± 10 % | by the Machigin method modified by CINAO |
| 99 | Measurement of mobile phosphorus compounds | from 0 to 250 mln-1 | from 50 mln -1 - ± 15 %;<br>above 50 mln -1 - ± 12 % | by the Machigin method modified by CINAO |
| 100 | Measurement of mobile potassium compounds | from 0 to 250 mln-1 | under 100 mln-1 - ± 15 ;<br>above 100 mln-1 - ± 10 % | by the Machigin method modified by CINAO |
| 101 | Measurement of organic matter | from 0 to 15,5 % | from 3 % - ± 20 %;<br>from 3 % to 5 % - ± 15 ;<br>above 15 % - ± 10 % | by the Machigin method modified by CINAO |
| | | | | |

| | | | | |
|---|---|---|---|---|
| 102 | Measuring the pH of soil salt extract | from 1 to 14 pH units | ± 0,1 units | |
| 103 | Measuring the pH of soil salt extract | from 1 to 14 pH units | ± 0,1 units | |
| Chapter 12. Measurements during activities in the field of veterinary medicine | | | | |
| 104 | Measurement of organochlorine pesticides for determination of residual amounts of pollutants in livestock products | from 1 to 14 g/mcl | no more than ± 6 % | |
| 105 | Measurement in determining the amount of maximum permissible concentrations of dioxins and dioxin-like substances ( Polychlorinated biphenyls) in animal products | from 50 to 600 a.m.u. | no more than ± 5 % | |
| 106 | Measuring the volume of liquid dosing for laboratory research when transfusing reagents, reactive chemicals, liquid biological samples | from 0,2 to 5000 mcl | no more than ± 20,0 mcl | |
| 107 | Measurement of pH hydrogen ion activity | from - 1 to 14 pH | ± 2 % | |
| 108 | Measurement of quantitative and qualitative content of active ingredients in veterinary preparations and feed additives | without restrictions | ± 0,3 % | |
| 109 | Measurement of mass fraction of moisture in the determination of physicochemical parameters in veterinary preparations and feed additives | from 650 to 2000 kg/ m3 | no more than ± 20 kg /m3 | |
| | Temperature measurement in the determination of | | | |

| | | | | |
|---|---|---|---|---|
| 110 | physico-chemical indicators, toxic elements, radionuclides, microbiological indicators, mycotoxins, antibiotics, pesticides, radiological indicators, parasitological indicators, oxidative spoilage indicators, nitrates | from - 40 to 400 °C | ± 2,5% | |
| 111 | Measurement of mass in the determination of physico-chemical indicators, toxic elements, radionuclides, microbiological indicators, mycotoxins, antibiotics, pesticides, radiological indicators, parasitological indicators, oxidative spoilage indicators, nitrates | from 0,1 mg to 10 kg | ± 3,0 e | |
| 112 | Measurement of radioactive sources - cesium-137 and strontium-90 in the determination of radionuclides | from 0,03 to 300 mcSv/h | ± 15 % | |
| 113 | Measurement of lead, cadmium, arsenic, mercury, copper, iron, tin in the determination of toxic elements | from 0,0001 to 1,0 mg/dm3 | ± 30 % | |
| 114 | Measurement of density in the determination of physico-chemical parameters | from 650 to 1840 kg/m3 | ± 20 kg/m3 | |
| 115 | Measurement of mass fraction of fat in the determination of physico-chemical parameters | from 0 to 10 % | ± 0,1 % | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| 116 | Measurement of milk solids non-fat (MSNF ) in the determination of physicochemical parameters of milk and dairy products. | from 6 % to 12 % | ± 0,3 % | |
| 117 | Measurement of dosing volume in the determination of physicochemical indicators, toxic elements, radionuclides, microbiological indicators, antibiotics , pesticides, indicators of oxidative spoilage, nitrates, mycotoxins in the study and diagnosis of animal diseases. | from 0,01 mcl to 15 ml | ± 3 % | |
| 118 | Measurement of optical density in the determination of physicochemical indicators, toxic elements, microbiological indicators, mycotoxins, antibiotics in the study and diagnosis of animal diseases | from 0,0001 to 2,000 D | ± 1,0 % | |
| 119 | Measurement of wavelength in the determination of physico-chemical parameters, toxic elements, microbiological parameters, antibiotics, mycotoxins in the study and diagnosis of animal diseases | from 340 to 850 nm | ± 1 nm | |
| 120 | Measurement of light transmission coefficient of light flux density in the determination of physico-chemical parameters, toxic | | ± 0,5 nm | |

| | | | | |
|---|---|---|---|---|
| | elements, microbiological indicators, antibiotics, mycotoxins in the study and diagnosis of animal diseases | from 315 to 990 nm | | |
| 121 | Measurement of light refraction in the medium in the determination of physico-chemical indicators, toxic elements, radionuclides, microbiological indicators, mycotoxins, antibiotics, pesticides, radiological indicators, parasitological indicators, oxidative spoilage indicators, nitrates | from 1,2 to 1,7 nD | ± 1×10-4 | |
| 122 | Measurement of pH in the determination of physicochemical indicators, toxic elements, microbiological indicators, antibiotics, pesticides, oxidative spoilage indicators, nitrates, mycotoxins in the study and diagnosis of animal diseases | from - 1 to 14 pH | ± (0,003 - 0,4) pH | |
| 123 | Temperature measurement to monitor the readings of test and auxiliary equipment | from - 40 °C to 1000 °C | ± (0,1…5)°C | |
| 124 | Mass measurement in sampling and receiving of samples | from 10 g to 10 kg | ± (0,5-3,0)e | |
| 125 | Pressure measurement in autoclaving and sterilization processes | from 0 to 250 kgf/ cm2 | ± 4,0 % | |
| | Temperature measurement for | | | |

| | | | | |
|---|---|---|---|---|
| 126 | monitoring environmental and operating conditions | from 10 °C to 40 °C | ± 2,0 % | |
| 127 | Humidity measurement for environmental and operating conditions monitoring | from 20 % to 90 % | ± 7 % | |
| 128 | Atmospheric pressure measurement for monitoring of environmental and operating conditions | from 610 to 790 mm Hg | ± 0,8 mm Hg | |
| 129 | Measurement of the amount of concentration in the initial sample in chemical analysis of complex mixtures, in mass spectrometric analysis | from 190 to 2500 nm<br>from 0 to 100 T | ± 2,0 nm,<br>± (0,004-5) T | |
| 130 | Measurement of gas impurity concentrations in gas chromatographic analysis | from 0,5 × 10-15 g/ cm3 | ± 6 % | |
| 131 | Measurement of the content of silver, aluminum, arsenic, gold, bismuth, cadmium, cobalt, chromium and other chemical elements by spectrometry in sample composition analysis | from 190 to 800 nm | ± 6 % | |
| 132 | Measurement of the refractive index of an analyzed sample or substance in order to analyze the physical and chemical properties of the substance | from 1,27 to 1,95 ηˌ | ± (2x10-4-5x10-5) ηˌ | |
| | Measuring the concentration of solutions of salts, acids on the basis of measurements of electrical conductivity of solutions in the | | | |

| | | | | |
|---|---|---|---|---|
| 133 | determination of physicochemical indicators, toxic elements, microbiological indicators, antibiotics, pesticides, indicators of oxidative spoilage, nitrates, mycotoxins in the study and diagnosis of animal diseases | from 1,10-4 to 100 cm/m | ± 0,25 % | |
| 134 | Measurement of mass in the diagnosis of parasitic diseases, biochemical blood tests, biochemical studies of pathological animal material, virological diagnostics, bacteriological diagnostics and serological diagnostics of animal diseases | from 1 g to 800 g | ± (0,5-3,0) e | |
| 135 | Measurements of total ß-activity, cesium-137, thorium-232, radium-226, potassium-40 in the determination of radionuclides in animal and bird hair | from 0,03 to 300 mcSv/h | ± 15 % | |
| 136 | Temperature measurement in the diagnosis of parasitic diseases, biochemical blood tests, biochemical examination of animal pathological material, virological diagnostics, bacteriological diagnostics and serological diagnostics of animal diseases | from - 40 °C to 100 ° C | ± 2 °C | |
| | Volume measurement in the diagnosis of parasitic diseases, | | | |

| | | | | |
|---|---|---|---|---|
| 137 | biochemical blood tests, biochemical examination of animal pathological material, virological diagnosis, bacteriological diagnosis and serological diagnosis of animal diseases | from 2×10-4 to 5 cm3 | ± (0,40-12) % | |
| 138 | Measurement of activity, mass and molar fraction of ion concentration in a sample | from 0 to 14 (pX) | ± 0,05 (pX) | |
| 139 | Time measurement in the determination of physico-chemical parameters, toxic elements, radionuclides, microbiological parameters, antibiotics, pesticides, oxidative spoilage indicators, nitrates, mycotoxins in the study and diagnosis of animal diseases | from 0,01 s to 60 min | ± 7,5×104 s | |
| 140 | Measurement of fractions of bulk substances in the determination of physico-chemical parameters, toxic elements, microbiological parameters, antibiotics, pesticides, oxidative spoilage indicators, nitrates, mycotoxins in the study and diagnosis of animal diseases | from 0,04 to 300 mm | ± (0,004 ÷3,00) mm | |
| 141 | Measurement of weights during check weighing, alignment and calibration of laboratory scales | from 1 mg to 15 kg | ± (0,020÷8) mg | |
| | Measurement of ambient dose equivalent rate H*(10) of gamma radiation, | | | |

| | | | | |
|---|---|---|---|---|
| 142 | ambient dose equivalent H*(10) of gamma radiation, beta particle flux density in food products | 0,05 ÷ 3,0 MeV | ± (25+2/P) % | |
| 143 | Measurement of mass in the determination of physico-chemical indicators, toxic elements, radionuclides, microbiological indicators, mycotoxins, antibiotics, pesticides, radiological indicators, parasitological indicators, oxidative spoilage indicators, nitrates | from 0,1 mg to 15 kg | ± 3,0 e | |

Note:

° – degree;

°C –degree Celsius;

г – g-gram;

мг – mg - milligram;

кг/м3 – kg/m3 - kilogram per meter cubic;

кг – kg - kilogram;

с – s- second;

% – per cent;

мкл –mcl- micro liter;

мв –mv -millivolt

мкг/мл – mcg - micrograms per milliliter;

г/с – g/s - grams per second;

а.е.м. –a.m.u. –atomic mass unit

мг/кг – mg/kg - milligram per kilogram;

ед. pH – pH unit;

pX – pX - ion activity index

кг/дм3 – kg/dm3 - kilogram per decimeter cubic;

мСм/м – mSm/m - millisiemens per meter;

мг/дм3 – mg/dm3 - milligram per decimeter cubic meter;

Бк/кг – Bq/kg - Becquerel per kilogram;

ПЦР – PCR - polymerase chain reaction;

мкЗв/ч – mcSv/h - microsievert per hour;

КОЕ/г – CFU/g - colony forming units per gram;
см3 – cm3 centimeter cubic;
кг/м2 – kg/m2 - kilogram per square meter;
м3 – m3 - meter cubic;
мкг/дм3 – mcg/dm3 - micrograms per decimeter cubic meter;
млн-1 – mlm-1 million minus the first degree;
ЦИНАО – CINAO - Central Institute of Agrochemical Service for Agriculture;
ед. – unit:
г/мкл – g/mcl - grams per microliter;
кг/м3 – kg/m3 - kilogram per meter cubic;
e – e - verification division price;
Б – D - optical density;
нм – nm – nanometer;
nD – nD - refractive index;
кгс/см2 – kgf/cm2 - kilogram-force per square centimeter;
мм рт.ст. – mmHg. - millimeter of mercury column;
T – T - solution titer;
г/см3 – g/cm3-grams per centimeter cubic;
η – η -absolute refractive index;
см/м – cm/m - unit of specific electrical conductivity
мин – min-minute;
P – numerical value of the measured ambient dose equivalent rate expressed in mcSv/h;
МэВ – MeV - mega electronvolt;
мкЗв/ч – mcSv/h - microsievert per hour.