



Alex Stewart International

CERTIFICATE OF ANALYSIS

Ref. No. UJ27350

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ORIGINAL

This is to certify that, at the request of Messrs. **ALMAZ FERTILIZERS LLC**, we have performed analysis of the under mentioned commodity:

PRODUCER:

ORIGIN:

PRODUCT NAME

IUPAC NAME

CAS

PLACE OF SAMPLING:

LLC «ALMAZ FERTILIZERS»

RUSSIAN FEDERATION

POTASSIUM SULPHATE

POTASSIUM SULFATE

7778-80-5

**ALMAZ FERTILIZERS LLC, HOUSE 7, STREET
PROMYSHLENNAYA, CITY LERMONTOV,
STAVROPOL TERRITORY, RUSSIAN
FEDERATION**

MARKING OF THE SAMPLE:

LABEL STATING

- THE DATE OF SAMPLING (28.10.21)
- MATERIAL NAME (POTASSIUM
SULPHATE)
- PLACE OF SAMPLING

SEAL NUMBER 71882422

DATE OF SAMPLING:

OCTOBER 28, 2021

DATE OF RECEIPT OF SAMPLES:

NOVEMBER 01, 2021

DATE OF THE ANALYSIS:

02.11.2021-02.12.2021

DATE OF ISSUE:

DECEMBER 02, 2021

LABORATORY DETAILS:

- NAME

**SCIENTIFIC-TESTING LABORATORY OF ASI
UKRAINE LLC (Alex Stewart International)
128, MYKOLAIIVSKA DOROHA, ODESA, 65013,
UKRAINE**

- ADDRESS

- DETAILS OF ACCREDITATION

**ACCREDITED BY NATIONAL ACCREDITATION
AGENCY OF UKRAINE IN COMPLIANCE TO
EN ISO/IEC 17025:2019
ACCREDITATION REGISTERED 31.05.2021,
ACCREDITATION NUMBER 201682
VALID TILL 16.06.2024**

This certificate is issued pursuant to an inspection carried out within the scope of the principals instructions and with the due care and skill conformity with the Quality Standards of Alex Stewart International (ASI Ukraine LLC).

This certificate is governed by the General Terms and Conditions appearing on the reverse.

Claims in respect of this certificate will be considered only if based upon gross failure to take due care proven by the principal. This certificate is not intended to relieve the parties to any relevant sales contract from their contractual obligations.



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CHEMICAL COMPOSITION ANALYSIS REPORT

Laboratory analyses were performed for a provided sample according to requirements and following results were obtained:

Parameter	Test method	Actual results
Mass share of base material (K_2SO_4), %	GOST 20851.3	98,90
Mass share of potassium in terms of K_2O , %	GOST 20851.3 (ISO17319)	52,00
Mass share of Sulphur (S), %	GOST EN 15749	17,80
Mass share of chlorides (Cl), %	GOST EN 16195-2016	<0,01
Mass share of sodium (Na), %	ICP-MS/ ICP-AES	<2,00
Exponent of hydrogen ion activity in 0,1% solution in terms of pH	GOST 24596.5 (ISO 6353-1)	6,4
Mass share of water insoluble residue, %	GOST 3771-2013 (ISO 18645)	< 0,0001
Mass share of moisture, %	GOST 20851.4 (ISO 8189:1992)	0,06
Mass share of Arsenic (As), mg/kg	ICP-MS/ ICP-AES	<1,0
Mass share of Lead (Pb), mg/kg	AAS	1,6
Mass share of Cadmium (Cd), mg/kg	AAS	<0,1
Mass share of Mercury (Hg), mg/kg	AAS	<0,5
Mass share of Chromium (Cr), mg/kg	ICP-MS/ ICP-AES	<0,2
Mass share of Copper (Cu), mg/kg	ICP-MS/ ICP-AES	0,5
Mass share of Zinc (Zn), mg/kg	ICP-MS/ ICP-AES	0,52
Mass share of Nickel (Ni), mg/kg	ICP-MS/ ICP-AES	<0,2
Mass share of Selenium (Se)	ICP-MS/ ICP-AES	< 1,0
Specific activity of natural radionuclides, Bq/kg	GOST 53745-2009	103

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EQUIPMENT USED:

- Analytical scales Sartorius MSA 225S-100-DI, verified 11.20, valid till 11.2021
- Atomic Absorption spectrometer Hitachi Z-5300, verified 03.2021, valid 03.2022
- Mercury analyzer Lumex-Marketing RA-915, verified 03.2021, valid 03.2022
- Ionometer produced by Izmeritelnaya Technika LLC, I-160MI, verified 12.2020 valid till 12.2021
- Spectrophotometer LEKI SS 2107 UV, verified 03.2021 valid till 03.2022
- ICP spectrometer Shimadzu, ICPE 9000, verified 03.2021, valid till 03.2022.
- Universal spectrometer "Gamma-plus", Model 9826-B-G, verified 05.2021, valid till 05.2022.

BRIEF DESCRIPTION OF METHODS USED:

Mass Share of base material – titration method

About 2 g of a finely ground preparation is placed in a conical flask and dissolved in 5 cm³ of pre-boiled water. Then 5 g of sodium chloride is added to the solution. After dissolution the content of the flask is cooled in a cooling mixture (ice with sodium chloride). The cooled solution is titrated at 0 ° C with sodium hydroxide solution to a slightly pink color, using phenolphthalein as an indicator.

Mass share of potassium in terms of K₂O – gravimetric method.

25 cm³ of analyzed solution is taken with adding water up to 30 cm³ and 1-2 drops of methyl red solution and a solution of 10% acetic acid until the color turns red. If the solution immediately turns red when the indicator is added, it is neutralized with a sodium hydroxide solution of 0.1 mol / dm³ concentration until the color of the solution turns yellow, and then a solution of acetic acid with a volume fraction of 10% is added until the red color is restored. The solution is heated in a water bath up to 50 ± 10 ° C. After heating 10 cm³ of sodium tetraphenylborate solution is added immediately. After 5 minutes it is quickly cooled in a crystallizer with cold water or in running water to a temperature below 20 ° C and left for 10 minutes. Then solution is filtered. The remains is dried in an oven at 120 ° C for 60 minutes and then cooled for 45 minutes. Then it is weighed and calculated.

Mass share of sulphur – gravimetric method.

25 cm³ of analyzed solution is taken with adding water up to 30 cm³ and 1-2 drops of methyl red solution and a solution of 10% acetic acid until the color turns red. If the solution immediately turns red when the indicator is added, it is neutralized with a sodium hydroxide solution of 0.1 mol / dm³ concentration until the color of the solution turns yellow, and then a solution of acetic acid with a volume fraction of 10% is added until the red color is restored. The solution is heated in a water bath up to 50 ± 10 ° C. After heating 10 cm³ of sodium tetraphenylborate solution is added immediately. After 5 minutes it is quickly cooled in a crystallizer with cold water or in running water to a temperature below 20 ° C and left for 10 minutes. Then solution is filtered. The remains is dried in an oven at 120 ° C for 60 minutes and then cooled for 45 minutes. Then it is weighed and calculated.

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Mass Share of Chlorine - photometric method.

25.0 cm³ neutral test solution is placed in a conical flask, added 1.0 cm³ of 10% solution of hydrochloric acid and 3.0 cm³ of starch solution, then it is mixed thoroughly for 1 min. Then it is added 3.0 cm³ barium chloride solution. After 40 minutes, the optical density of the analyzed solution is measured in relation to the control solution, prepared simultaneously. According to the obtained value of optical density, using the graph, the mass of sulfate ions in the analyzed solution is found in milligrams.

Exponent of hydrogen ion activity in 0,1% solution in terms of pH – Ionometric method.

100 cm³ volumetric flask is added 50 ml of distilled water and placed a sample of diammonium phosphate weighing 1.3 g with the weighing result recorded to the third decimal place.

The contents of the flasks are mixed manually using a glass rod and rotating the flasks or shaker for 1-2 minutes. The volume in the flasks is filled up to the mark with distilled water and mixed again.

When using a pH meter that is not provided with a thermal compensation system, the flasks are heated on a hotplate to 20 ± 2 °C.

In a clean dry glass, it is taken about 50 or 100 cm³ of the resulting solution. The ionomer electrodes are rinsed with the same solution or suspension, and then the ends of the electrodes are immersed into the beaker by at least 15 mm and the pH value is measured after 1-2 minutes.

Mass Share of insoluble residue – gravimetric method.

20 g of the substance dissolve in 100 cm of hot water. Then It is covered with a watch glass and kept in a water bath for 1 hour. Then the dried to constant weight and weighed solution is filtered through filter crucible. The filter residue is washed with 100 cm³ of hot water and dried in desiccator at 105-110 °C til constant weight.

Mass Share of moisture – gravimetric method.

2-5 g of fertilizer is placed in a weighing bottle or cuvette, previously dried to constant weight, and weighed. A bottle or cuvette with fertilizer is placed in a thermostat and dried with the lid open for 3 hours with temperature of 60-65 °C. Then the bottle or cuvette is closed and cooled in a desiccator, keeping for at least 30 minutes before weighing.

Determination of specific activity of natural radionuclides.

For determination of natural radionuclides alpha- and beta-spectrometer used.

Measuring of alpha- and beta emissions, specific to each isotope, is carried out on named spectrometer, emissions. Results are controlled by measuring emission from control standard emitting material, with level from 100 to 100 Bq.

DATED: DECEMBER 02, 2021
ISSUED BY AN INDEPENDENT INSPECTION COMPANY
ALEX STEWART INTERNATIONAL

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