

Interstate standard GOST 13078-81
 "Glass liquid sodium. Specifications"
 (App. Resolution of the State Standard of the USSR of April 29, 1981 N 1868)

Introduced January 1, 1982
 Instead of GOST 13078-67

1. Specifications
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This standard applies to liquid sodium glass, used in the soap, grease, chemical, machinery, textile, paper industry, including for the production of cardboard packaging, in the steel industry,

for welding materials, as a binder in the manufacture of molds and cores in foundries production as flotation reagent in mineral processing and other purposes.

1. Specifications

1.1. Sodium water glass must be manufactured in accordance with the requirements of this standard and technological regulations, approved in the established order.

1.2. The solution is prepared by dissolving the autoclave and non-autoclave glassy sodium silicate.

1.3. (Excluded, Edit. Of N 2).

1.4. On physical and chemical parameters of liquid glass must comply with the requirements and standards set forth in the table.

Indicator	Norm for liquid glass								
	A	B	Foundry, greases	Catalysts, adsorbents, electrodes	For chemical industry	for construction and flotation	for adhesives	impregnation	
Appearance	The thick liquid is yellow or gray in color without mechanical impurities and inclusions visible to the naked eye			The thick liquid is yellow or gray in color without mechanical impurities and inclusions visible to the naked eye		The thick liquid is yellow or gray in color			
mass fraction of silicon dioxide	22,7-29,6	24,3-31,9	29,5-36,0	24,8-34,3	24,1-35,0	24,8-36,7		24,8-34,0	27,2-29,3
Mass fraction of iron oxide and aluminum oxide, %	0,25	0,25	0,25	0,25	0,20	0,90		0,30	0,25
Iron oxide	No regulated			-	0,5	No regulated			
Mass fraction of potassium oxide	0,20	0,20	0,20	0,12	0,05	0,20		0,20	0,20

Mass fraction of sulfur trioxide	0,15	0,15	0,15	0,07	0,07	0,15	0,15	0,15
Mass fraction of sodium oxide	9,3-12,8	8,7-12,2	10,9-13,8	9,0-12,9	8,7-13,3	8,1-13,3	8,0-12,2	7,9-8,8
silicate module	2,3-2,6	2,6-3,0	2,6-3,0	2,7-2,9	2,6-3,0	2,7-3,3	2,7-3,4	3,4-3,6
density	1,36-1,45	1,36-1,45	1,47-1,52	1,36-1,50	1,36-1,50	1,36-1,50	1,36-1,40	1,35-1,40
Note. Allowed to precipitate during storage.								

(Note. Allowed to precipitate during storage.)

(Changed edition, Change. Of N 2).

1.5. Mass fraction of water-insoluble substances for the CMC should not exceed 0.2%.

1.6. At the request of the consumer is allowed to produce water glass foundry with silicate module 2.31 - 2.60 and a density of 1.47 - 1.52 g / cm³, for the manufacture of the electrode - with a silicate module of 2.8 - 3.0.

(Changed edition, Change. Of N 2).

1.7. For welding materials waterglass density should be 1.47 - 1.52 g / cm³.

2. Acceptance rules

2.1. Liquid glass is accepted in batches. Party consider any number of uniform in its quality product performance, drawn up as a single document containing:

- Manufacturer's name, his trademark;
- Product name and his appearance;
- The batch number;
- Date of manufacture;
- Gross and net weight;
- The results of tests carried out;
- The designation of this standard.

Each rail car is considered the party. (Changed edition, Change. Of N 1).

2.2. In each batch waterglass determine density, the mass fraction of silicon dioxide and sodium oxide, silicate

module. Determination of the remaining indicators manufacturer conducts periodic customer's request.

2.3. To check the quality of water glass to meet the requirements of this standard and carry out Acceptance

Periodic tests, which were taken from different places party barrels 10%, but at least three barrels, and from each tank

combined sample taken not less than 2 dm³.

2.4. If test results are unsatisfactory at least one of the indicators to repeat tested at twice the sample or composite sample taken from the same batch.

repeated test results apply to the entire batch.

3. Test Methods

3.1. Sample selection

3.1.1. For the tests, except for the definition of water-insoluble substances, of each barrel, a selected at 2.3, using dry clean brass, copper or glass tubes with a diameter of 15 - 20 mm, or by samplers

made of a material that does not react with the product, taken from the upper, middle and lower levels of the three point

sample and combined in the combined sample, of not less than 2 dm³.

3.1.2. From the tank is taken out of the three places samples of equal volumes of at least 2 dm³.

Samples were combined, carefully stirred.

3.1.3. The combined sample was divided into two portions and placed in clean, dry cans with tight-fitting lids. On

banks adhesive label indicating the product name, lot number and sampling date. One bank is used for analysis, the second stored for at least 3 months. The sample for analysis shall be 1 dm³.

3.1.4. Determination of water-insoluble substances for detergents is carried out on two samples taken from

upper and middle layers of the container after standing for 24 hours, of not less than 1 dm³.

3.2. Exterior glass is determined visually.

3.3. Determination of the mass fraction of silicon dioxide (gravimetric method)

3.3.1. The essence of the method

The method is based on the decomposition of sodium silicate by dissolving in hot water, double dehydration silicic acid

hydrochloric acid medium, separation and calcination of the precipitate of silicic acid in distilled water, silicon tetrafluoride.

3.3.2. Apparatus, reagents, solutions

Laboratory muffle furnace at a temperature 1000 - 1100 ° C.

Crucibles with lids platinum according to GOST 6563, crucibles N 100-7 and N 100-8, 101 N or N cover -7 101 -8.

Cups according to GOST 9147, N 4.

Sulphuric acid in accordance with GOST 4204, chemically pure diluted (1: 1).

Hydrofluoric acid (hydrofluoric) in accordance with GOST 10484, chemically pure

Ammonia water according to GOST 3760, chemically pure

Silver nitrate according to GOST 1277, 1% solution.

Rectified ethyl alcohol Technical GOST 8300 1, the highest grade.

Methyl orange on the normative and technical documentation (NTD); preparing a solution according to GOST 4919.1.

Distilled water in accordance with GOST 6709.

(Changed edition, Change. Of N 1).

3.3.3. Carrying out the test

A portion of the liquid glass mass of 1.5 - 2 g is placed on a watch glass or in the weighing bottle and weighed with an accuracy of no more than

0.0002 g weighed portion repeatedly washed with hot water in a porcelain cup. The resulting solution of 100 - 120 cm³ added

while stirring with a glass rod 2 - 3 drops of methyl orange and hydrochloric acid solution until the redness and excess 3 - 4

cm³. The dish was placed in a boiling water bath with stirring and evaporated to near dryness. The resulting solid residue

salts, gently rubbing with a glass rod to a powder. The mixture is heated in a water bath until disappearance of the odor of hydrogen chloride. The completeness of removal of hydrogen chloride can also be checked with the help of sticks

moistened with ammonia. For a more complete dehydration of the silica cup in a water bath kept 2 more hours.

The dried precipitate is moistened and cooled 3 - 4 cm³ of hydrochloric acid, and covering with a watch glass dish, incubated

15 - 20 min and poured into a cup of 70 - 75 cm³ of hot water. The solution with the precipitate was stirred with a glass rod, give

the residue dissolved in a cup (not more than 10 min). The liquid is then decanted to the filter "white ribbon". The precipitate was washed three or four

times by decantation small portions of hot water, it is transferred to a filter and washing continued until a complete removal

lavage chlorine ion (test with silver nitrate).

The silicic acid was recovered again by evaporating the resulting filtrate together with the washings in the same

porcelain dish on a boiling water bath to near dryness, and repeated with all the previous operations, except

washing with decantation.

Both filters with precipitation silicic acid is dried to slightly damp, carefully wrapped inside

filter edges, closing them precipitate and tightly laid up in a cone and precalcined crucible weighed.

The contents of the crucible and ashed cautiously calcined in an electric furnace at laboratory temperature 1000 - 1100 ° C.

Cooled in a desiccator, the crucible with the residue weighed and repeated calcination to constant weight.

The calcined precipitate is treated with a few drops of dilute sulfuric acid and 5 - 7 cm³ hydrofluoric acid. The resulting mixture was evaporated to dryness air bath. Then dry salt residue calcined at progressively

temperature is raised to 1000 - 1100 ° C in a muffle furnace for 15 - 20 min. After cooling in a desiccator, with the remainder of the crucible

weighed.

3.3.4. Processing of results

The weight proportion of silica (X) as a percentage calculated by the formula

$$X = \frac{(m_1 - m_2) \times 100}{m},$$

where m - the mass of the crucible with the residue of silica to test for purity,

m - mass of the crucible with the residue after testing for purity, g;

m - mass of sample liquid glass city

For the result of the analysis taking the arithmetic mean of two parallel determinations permitted discrepancy between

which must not exceed 0.3%.

3.4. Determination of the mass fraction of silicon dioxide (accelerated method).

The weight proportion of silicon dioxide H₁ calculated as follows:

$$X = \frac{M \times X}{1 \cdot K},$$

where M - silicate module;

X - mass fraction of sodium oxide,%;

K - the ratio of the molecular weight of the alkali oxide to molecular weight of silica, equal to a sodium waterglass

1.0323.

If there is disagreement on the method of section 3.3 is used.

(Changed edition, Change. Of N 1, 2).

3.4.1. (Excluded, Edit. Of N 1).

3.5. Determination of the mass fraction of aluminum oxide and iron oxide

3.5.1. The essence of the method

The method is based on the formation of trilonate iron and aluminum under conditions of excess Trilon B Trilon B Excess

zinc sulphate solution is titrated in the presence of acetate buffer solution with indicator xylene orange.

3.5.2. Equipment, reagents and solutions

Cups platinum according to GOST 6563, N 118-3.

Spatulas platinum according to GOST 6563, N 209-11.

Hydrofluoric acid in accordance with GOST 10484, chemically pure

Sulphuric acid in accordance with GOST 4204, chemically pure

Acetic acid, 61 according to GOST.

Hydrochloric acid in accordance with GOST 3118, chemically pure

Ammonia water according to GOST 3760, reagent grade, 25 and 10% solutions.

Hydroxylamine hydrochloride according to GOST 5456, 10% solution.

Ammonium acetate according to GOST 3117.

Indicators: Congo red by NTD, Eriochrome Black T, preparing a solution - according to GOST 4919.1; xylene orange; preparing a solution - according to GOST 4919.1.

Acid Chrome Dark Blue, was prepared as follows: 0.15 g of the indicator is dissolved in 5 cm³ of ammonia buffer

solution is added 20 cm³ of ethanol and stirred.

Zinc sulphate according to GOST 4174, 0.025 mol / dm³ solution.

Zinc in accordance with GOST 3640.

Distilled water in accordance with GOST 6709.

Trilon B (ethylenediaminetetraacetic acid disodium salt) according to GOST 10652, 0.025 mol / dm³ solution.

Acetate buffer solution at pH 5.2 - 5.8; prepared as follows: 100 g ammonium acetate dissolved in 300 - 400 cm³ of water (for better dissolution, the solution is heated), filtered, and added to 10 cm³ of acetic acid, diluted

water to 1 dm³ and stirred.

Ammonia buffer solution having a pH of 9.5 - 10.0; prepared as follows: 54 g of ammonium chloride dissolved in 200 cm³

water, the resulting solution was added 350 cm³ of 25% ammonia water and the solution volume was adjusted to 1 dm³.

(Changed edition, Change. Of N 1, 2).

3.5.3. Preparation of volumetric solutions - according to GOST 10398.

0.025 mol / dm³ Trilon B solution is prepared as follows: 9.31 g of Trilon B is dissolved in water and bring the volume of water

1 dm³.

The solution was stored in a plastic or glass, waxed inside vessels.

Similarly, 0.025 mol / dm³ solution of zinc salt (for setting corrections to the concentration of Trilon B solution); prepared as follows:

follows: 1.6345 g of zinc, steel knife on freshly purified oxide immediately weighed with an accuracy of less than 0.0002 g,

placed in a porcelain dish and dissolved by heating on a steam bath in a mixture of 100 cm³ of water and 15 cm³ of concentrated

nitric acid, covered with a watch glass dish, then thoroughly rinsed with water glass, collecting it in the same cup, and evaporated

solution to 3 - 4 cm³. The residue from the cup quantitatively transferred by washing the walls of the cup with water in a volumetric flask and 1 dm³

solution volume is brought up to the mark; solution fit within one month.

Amendment to 0.025 mol / dm³ solution of Trilon B is determined by the solution of the zinc salt in the following manner: 25

cm³ precisely 0.025 mol / dm³ solution of zinc salt added 5 cm³ ammoniacal buffer solution, 0.1 g of a mixture of the indicator

eryochrome black or T 10 - 12 drops acid chrome dark blue solution and 70 cm³ of water.

The solution was stirred and titrated from a burette solution of Trilon B to move purple red color to blue (when

applying a black T) eryochrom or crimson in the immutable blue (using acid chrome dark blue).

Amendment to 0.025 mol / dm³ solution of Trilon B (R) calculated as follows:

$$K = \frac{25}{V},$$

where V - volume of 0.025 mol / dm³ solution of Trilon B spent on titration cm³.

0.025 mol / dm³ solution of zinc sulfate; prepared as follows: 7.2 g of zinc sulfate was dissolved in water and

water solution volume was adjusted to 1 dm³.

Amendment to the concentration of the solution is determined as follows: 25 cm³ of zinc sulphate solution is placed in a flask

titration, is added to 70 cm³ of water and 5 cm³ of ammonia buffer solution, 0.1 g of a mixture eryochrom black display and T

titrated with 0.025 mol / dm³ solution of Trilon B to move to the blue violet color.

Amendment to 0.025 mol / dm³ solution of zinc sulfate (K₁) calculated as follows:

$$K_1 = \frac{V \times K}{25},$$

where V - volume of 0.025 mol / dm³ solution of Trilon B spent on titration cm³;

K - an amendment to a concentration of 0.025 mol / dm³ solution of Trilon B.

Amendment to the concentration of Trilon B solution when used for aluminum are as follows: 10 cm³ Trilon B is placed in the titration flask, acidified with a few drops of hydrochloric acid are added to 70 cm³ of water and

heated to 50 ° C. Dip the paper in a solution of Congo and aqueous ammonia is added drop by drop to the redness of the paper. Then

added 20 cm³ of acetate buffer solution, heated to boiling, add 10 drops of xylenol orange solution and titrate with 0.025 mol / dm³ solution of zinc sulphate to move the yellow color of the solution in violet-red.

Amendment to the concentration (K₂) 0.025 mol / dm³ solution of Trilon B is calculated by the formula

$$K_2 = \frac{V \times K}{10},$$

where V - volume of 0.025 mol / dm³ solution of zinc sulphate, the spent for titration, cm³;

K - an amendment to a concentration of 0.025 mol / dm³ sulfuric acid solution 1 zinc.

3.5.4. Preparation of test solution

About 4 g of water glass is weighed with an accuracy of less than 0.0002 g in a platinum dish. parallel wires

control experiment purity reagents. Weigh wetted 1 - 2 cm³ of water was added 2 cm³ of sulfuric acid, 7 - 10 cm³

hydrofluoric acid and conducting a thorough mixing. The mixture was first evaporated on a water bath until

removing hydrofluoric acid and then transferred to an air bath and heated to release copious fumes of sulfuric

acid. When the contents of the cup will become a syrupy mass, hardens upon cooling, heating was stopped.

Thereafter poured into the cup 10 - 15 cm³ of water, 3 - 4 cm³ of hydrochloric acid, and stirring with a glass rod completely dissolved

salt residue with gentle heating on a water bath. The solution was transferred into a volumetric flask of 100 cm³, rinsed

cup at least three times with hot water and merging water each time into the same flask. Then the contents of the flask was cooled to room temperature, topped up with water to the mark and mixed.

3.5.3, 3.5.4. (Changed edition, Change. Of N 1).

3.5.5. Carrying out the test

50 cm³ of a solution prepared by p.3.5.4, pipetted into a conical flask of 250 cm³ 15 cm³ added Trilon B solution is lowered Congo paper, add 30 - 35 cm³ of water, heated to 50 ° C, was added dropwise 25%

aqueous ammonia to redness paper, and then 10% aqueous ammonia solution until a bright red color paper. Then

is added 20 cm³ of acetate buffer solution, 10 cm³ of solution of hydroxylamine hydrochloride and refluxed 1 - 2 min. After that

immediately titrated with a solution of zinc sulphate with xylenol orange indicator, which drops 10 pre was added to the solution. Titration is continued until the yellow color of the solution transition to violet-red. Celebrating volume

solution of zinc sulphate spent on titration. In processing the results take into account the result of the control experiment.

3.5.6. Processing of results

Weight fraction sum of iron oxide and aluminum oxide (H₂) is calculated as a percentage by the formula

$$X = \frac{(V_2 - V_1) \times K \times 0.001275 \times V_3 \times 100}{V_4 \times m},$$

where V - volume of 0.025 mol / dm³ solution of zinc sulphate,
1 spent on back titration, cm³;

V - volume of 0.025 mol / dm³ solution of zinc sulphate,
2 spent on titration of blank test, cm³;

K - an amendment to a concentration of 0.025 mol / dm³ solution
zinc sulfate;

V - the volume of the aliquot portion of the solution cm³;
4

0.001275 - the amount of aluminum oxide, corresponding to 1 cm³ exactly
0.025 mol / dm³ solution of Trilon B, g;

V - total volume of the sample solution, cm³;
3

m - mass of sample, g

The result should be the arithmetic mean of the results of two parallel determinations permitted differences between them should not exceed 0.05%.

(Changed edition, Change. Of N 1).

3.6. Determination of the mass fraction of iron oxide

3.6.1. The essence of the method

The method is based on the formation of iron sulfosalicylate colored in ammoniacal medium yellow (pH 8 - 11.5), and subsequent determination of its photolorimetry method.

3.6.2. Apparatus, reagents, solutions

Photolorimeter any type.

Hydrochloric acid in accordance with GOST 3118.

Ammonia water according to GOST 3760, 10% solution.

Sulfosalicylic acid in accordance with GOST 4478, 20% solution.

Methyl red on the normative and technical documentation, preparation of the solution - according to GOST 4919.1.

Ammonium chloride according to GOST 3773, 1 mol / dm³ solution; prepared as follows: 53, 50 g of ammonium chloride dissolved in 1 dm³ of water and, if necessary, filtered.

Ammonium nitrate is in accordance with GOST 22867, 2% solution.

Alum ferric TU 6-09-5359.

Preparation of standard solutions of ferric alum.

A solution containing 1 mg / cm³ Fe₂O₃; prepared as follows: 6.0397 g of ferric alum dissolved in 100 cm³ of distilled water acidified with 9 cm³ of hydrochloric acid and diluted with water to 1 dm³. The titer of the solution is adjusted gravimetric method.

For this purpose, three with 300 cm³ glass is metered from a burette 10, 20, 30 cm³ of standard solution was diluted to 120

- 150 cm³ of water, heated to boiling and precipitated iron hydroxide with ammonia in the presence of methyl red. obtained

the precipitate is filtered white tape and washed with hot 2% solution of ammonium nitrate, which is added

a few drops of ammonia. The filter with the precipitate is placed in a pre-calcined and weighed platinum crucible, and ashed

calcined to constant weight at 800 ° C. Cooled in a desiccator, the crucible with calcined sludge was weighed and calculated

Empirical titer (T_{emp}) solution of the formula

$$T = \frac{m}{EMF \cdot V},$$

where m - mass of the calcined iron oxide mg;

V - the volume of solution taken deposition cm³.

Solution B containing 0.1 mg / cm³ Fe₂O₃, water prepared by diluting solution A 100 cm³ in a volumetric flask of 1 dm³.

The solution, containing 0.01 mg / cm³ Fe₂O₃, prepared by diluting 100 cm³ of water B solution in a volumetric flask of 1 dm³.

3.6.3. Construction of the calibration curve

Prepare reference solutions. To do this in 100 cm³ flasks metered capacity burette 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

cm³ solution B. To each flask add 10 cm³ of 1N. ammonium chloride solution, 15 cm³ of a 20% solution of sulfosalicylic

acid and is poured dropwise a 10% ammonia solution until a stable yellow color and additionally 3 cm³. solutions

stirred and the volume is brought to the mark with water.

At the same time prepare the zero solution containing Fe₂O₃. The second calibration curve is constructed similarly to the first,

but taking in solution containing 0.01 mg / cm³ Fe₂O₃.

The value of the optical density of the reference solution is measured at photoelectrocolorimeter using a blue filter

(Wavelength 450 nm) in cuvettes with a thickness of 30 mm light absorbing layer. The data obtained are building the calibration curve.

The magnitude of optical density was plotted on the ordinate, and the values corresponding to these quantities in mg Fe₂O₃ - by abscissa.

For the construction of each point of the calibration curve calculate the arithmetic mean of the optical density

three parallel determinations.

The calibration curve is checked at least once every 3 months, as well as when replacing reagents or photoelectrocolorimeter.

3.6.4. analysis

Volumetric flask of 100 cm³ 25 cm³ transfer capacity of the test solution prepared by p.3.5.4, poured in 10 cm³

1 mol / dm³ solution of ammonium chloride, 15 cm³ of a 20% solution of sulfosalicylic acid and ammonia initially to a steady

Yellow coloring and additionally 3 cm³, then diluted with water to the mark. At the same time prepare the zero solution is not containing Fe₂O₃.

3.6.5. Processing of results

According to the optical density value obtained by using the calibration curve, find the content of Fe₂O₃ in test solution.

The weight proportion of iron oxide (H₃) as a percentage calculated by the formula

$$X = \frac{m \times V \times 100}{3 \times m \times 1000 \times V},$$

where m - Fe₂O₃ content found on the calibration curve, mg;

m - mass of the sample, g;

V - total volume, cm³;

V - volume of the aliquot part of the solution taken for 1 fotokolorimetrirovaniya cm³.

If necessary, the determination result is corrected for the iron oxide content determined control experience.

For the result of the analysis taking the arithmetic mean of two parallel determinations permitted discrepancy between which shall not exceed 0.01%.

3.7. Determination of the mass fraction of calcium oxide by complexometric

3.7.1. The essence of the method

The method is based on direct titration Trilon B calcium cation in an alkaline environment at pH 12 with indicator chrome dark blue.

3.7.2. Reagents and solutions

Sodium sulfide (sulfide) in accordance with GOST 2053, 2% solution (freshly prepared).

Sodium hydroxide (hydroxide) in accordance with GOST 4328, 2N. solution.

Refined sugar in accordance with GOST 22, 2% solution.

Distilled water in accordance with GOST 6709.

Congo red indicator on the specification.

Acid chrome dark blue; prepared by p.3.5.2.

Trilon B, 0.025 mol / dm³ solution; prepared by p.3.5.3. Amendment to the concentration of Trilon B calcium oxide is determined by p.3.5.3.

(Changed edition, Change. Of N 1).

3.7.3. Carrying out the test

Preparation for the determination of calcium oxide solution is carried out by p.3.5.4. The resulting solution was transferred quantitatively

conical flask of 250 cm³ was added 2 cm³ of solution of sugar, water was added to a volume of 85 - 90 cm³, and lowered

indicator paper "Congo", neutralized with 2 mol / dm³ solution of sodium hydroxide to redness paper added 2 cm³

sodium sulfide stirred give 5 cm³ of sodium hydroxide solution, the solution is kept 1 - 2 minutes, add 8 - 10

acid solution drops chrome dark blue and titrated (with continuous stirring) Trilon B solution prior to the transfer

crimson color of the solution in the immutable blue.

3.7.4. Processing of results

The weight proportion of calcium oxide (H₄) as a percentage calculated by the formula

$$X = \frac{(V - V_2) \times K \times 0.0014 \times V_3 \times 100}{4 \times m \times V_4},$$

where V - volume of 0.025 mol / dm³ solution of Trilon B spent on titration cm³;

K - an amendment to a concentration of 0.025 mol / dm³ Trilon B ;.

V₂ - volume of 0.025 mol / dm³ solution of Trilon B spent on the control titration experiment cm³;

0.0014 - the amount of CaO corresponding to 1 cm³ precisely 0.025 mol / dm³ Trilon B solution, in grams;

V₃ - total volume of the sample solution, cm³;

V₄ - volume of an aliquot of the sample solution, cm³;

m - mass of sample, g

For the result of the analysis taking the arithmetic mean of two parallel determinations permitted discrepancy between which shall not exceed 0.05%.

3.8. Determination of the mass fraction of sulfur trioxide gravimetric method

3.8.1. The essence of the method

The method is based on determining the total amount by weight of sulfur trioxide in the form of barium sulphate.

3.8.2. Equipment, reagents and solutions

Platinum crucibles with lids in accordance with GOST 6563 N 100-8 and N 101 -8.

Laboratory muffle furnace at a temperature of 900 - 950 ° C.

Barium chloride according to GOST 4108, 0.5 mol / dm³ solution.

Sulphuric acid in accordance with GOST 4204, diluted (1: 1).

Hydrochloric acid in accordance with GOST 3118, 2 mol / dm³ solution.

Hydrofluoric acid in accordance with GOST 10484.

Silver nitrate according to GOST 1277, 1% aqueous solution.

Methyl orange for NTD; preparing a solution according to GOST 4919.1.

Rectified ethyl alcohol Technical GOST 18300, the highest grade.

Distilled water in accordance with GOST 6709.

3.8.3. Preparation of test solution

Method 1.

Use the filtrate from the silicic acid isolated by paragraph 3.3.3.

Method 2.

About 1 g of water glass is placed on a watch glass and weighed with an accuracy of less than 0.0002 g weighed portion of wash 75 -

100 cm³ of hot water in a glass of 250 cm³ capacity and boiled for 10 min. Then 3 - 4 drops of methyl orange and

acidified with hydrochloric acid to transfer the yellow solution was bright pink. Heated contents of the beaker 10 - 15 minutes, after

"Blue ribbon" which formed precipitate of silicic acid is filtered on a filter.

The precipitate was washed with hot water until the washing waters in chlorine ion (test with silver nitrate).

3.8.4. Carrying out the test

A solution obtained by method 1 or 2 is heated to boiling and to it is poured 4 - 5 drops of hydrochloric acid and stirring 20 cm³ hot solution of barium chloride. The solution with the precipitate is left in a boiling water bath for 2 hours (covering glass watch-glass) 1 and 2 hours at room temperature. Barium sulfate precipitate is filtered through a double filter

"Blue ribbon" and washed with hot water until the washing waters into a chlorine ion (test with silver nitrate).

The filter with the precipitate is placed in a pre-calcined and weighed platinum crucible, carefully dried, ashed,

calcined in a muffle furnace of 30 - 40 minutes at a temperature of 800 - 850 ° C and after cooling the crucible in a desiccator with sediment

weighed. Calcining is repeated until a constant weight.

To check the purity of the obtained precipitate (if the solution has been prepared by the method 2), it was treated with 1 - 2 drops

solution of sulfuric acid and 5 - 6 drops of hydrofluoric acid. The resulting mixture was evaporated to dryness air bath.

Solids calcined in a muffle furnace over 30 - 40 minutes at a temperature of 800 - 850 ° C and after cooling the crucible in a desiccator

with barium sulfate precipitate weighed.

3.8.5. Processing of results

Mass fraction of sulfur trioxide (H₅) as a percentage calculated by the formula

$$X = \frac{m \times 0.343 \times 100}{5m},$$

where m - mass of sample liquid glass, g;

m - mass of the precipitate of barium sulphate, g;

1

0.343 - mass conversion ratio of barium sulfate to sulfur anhydride.

For the result of the analysis taking the arithmetic mean of the results of two parallel determinations permitted

differences between them should not exceed 0.05%.

3.9. Determination of the mass fraction of sodium oxide by acidimetric

3.9.1. The essence of the method

The method is based on solution acidimetric titration using methyl orange.

3.9.2. Reagents, solutions

Hydrochloric acid in accordance with GOST 3118, 0.1 mol / dm³ solution.

Rectified ethyl alcohol Technical GOST 18300, the highest grade.

Distilled water in accordance with GOST 6709.

Methyl orange for NTD; preparing a solution - according to GOST 4919.1.

(Changed edition, Change. Of N 1).

3.9.3. Carrying out the test

A portion of the liquid glass mass of about 0.5 g is placed on a watch glass and weighed with an accuracy of less than 0.0002 g

Weigh washed 75 - 100 cm³ of hot water in a conical flask of 250 cm³ capacity and refluxed with stirring for

20 minutes. The solution was cooled and titrated with a solution of hydrochloric acid in the presence of 3 - 4 drops of methyl orange to the transition

pale yellow color to pink.

3.9.4. Processing of results

The weight proportion of sodium oxide (H₆) as a percentage calculated by the formula

$$V \times 0,0031 \times 100$$

$$X = \frac{m}{6V},$$

where V - volume of exactly 0.1 mol / dm³ solution of hydrochloric acid, spent on titration cm³;

m - mass of sample liquid glass, g;

0.0031 - the amount of sodium oxide, corresponding to 1 cm³ exactly

0.1 mol / dm³ hydrochloric acid solution of

For the result of the analysis taking the arithmetic mean of two parallel determinations permitted discrepancy between

which must not exceed 0.4%.

3:10. Determination of silicate module

Silicate module - the ratio of the silica moles to the number of moles of sodium oxide.

Lime module (H₇) calculated as follows:

$$X = \frac{1}{7} \frac{X}{6} \times 1.0323,$$

where X - mass fraction of silica pp.3.3, 3.4;

1

X - mass fraction of sodium oxide by p.3.9;

6

1.0323 - molecular weight ratio of sodium oxide to a molecular weight silica.

3.10.1. Determination of silicate module accelerated method

The method is based on a serial titration of hydrochloric acid, and the liquid sodium glass solution sodium hydroxide to obtain a colorless solution.

3.10.1.1. Apparatus, reagents, solutions

Laboratory balance GOST 24104 *.

Conical flasks with a capacity of 250 cm³ and 2000, according to GOST 1770.

Volumetric flasks with a capacity of 1000 cm³ in accordance with GOST 1770.

Dimensional cylinder capacity of 1000 cm³ and 100 in accordance with GOST 1770.

Laboratory glass dropper with a capacity of 50 cm³ in accordance with GOST 25336.

Funnel glass with a diameter 56-100 mm in accordance with GOST 25336.

Burette capacity of 2 or 5 cm³ for NTD.

Pipette 2 cm³ capacity for NTD.

Laboratory filter paper according to GOST 12026.

Hydrochloric acid in accordance with GOST 3118, a solution of 0.5 mol / dm³.

Sodium hydroxide (hydroxide) according to GOST 4328, a solution of 0.5 mol / dm³.

Sodium fluoride according to GOST 4463, ch.da

Potassium chloride according to GOST 4234, ch.da

The mixed acid-base indicator is prepared by mixing equal volumes of 0.2% alcoholic solution and methyl red 0.1% alcohol solution Methylene blue cooked at low heat (GOST 4919.1, Standard 4919.2).

Distilled water in accordance with GOST 6709.

3.10.1.2. Preparation of sodium fluoride and potassium chloride solutions

60 g of sodium fluoride and 100 g of potassium chloride were weighed with an accuracy of 0.5 g, was transferred to a conical flask

capacity of 2000 cm³, was added from a graduated cylinder of 1000 cm³ with distilled water. After settling the solution daily filtered.

3.10.1.1, 3.10.1.2. (Changed edition, Change. Of N 1, 2).

3.10.1.3. Carrying out the test

In a conical flask of 250 cm³ was pipetted administered 5 to 7 drops of test solution and waterglass added from a measuring cylinder, 70 - 80 cm³ of distilled water, and 5 - 7 drops of acid-base mixed solution

indicator. The test solution was titrated with hydrochloric acid 0.5 mol / dm³ using a burette with a scale of 0.01

2 cm³ capacity and 5 cm³ to change greenish blue color to the violet (V).

Is then added from a measuring cylinder of 50 cm³ of the solution mixture of sodium fluoride and potassium chloride, whereupon

from the burette with a scale of 0.1 cm³ capacity of 25 cm³ of hydrochloric acid 0.5 mol / dm³ to change teal

color purple in a stable (V₁).

Excess acid is titrated with 0.5 mol / dm³ of sodium hydroxide until a transition violet greenish Blue (V₂).

(Changed edition, Change. Of N 2).

3.10.1.4. Processing of results

Silicate modulus (M) is calculated by the formula

$$M = \frac{(V_1 - V_2)}{2 \cdot V}$$

where V - volume of hydrochloric acid used in the titration, cm³;

V₁ - volume of hydrochloric acid added cm³;

V₂ - volume of sodium hydroxide solution used in the titration, cm³.

Spend at least two parallel tests.

The result should be the arithmetic mean of the results of parallel determinations permitted differences between them should not exceed 1%.

(Introduced additionally, Edit. Of N 1).

3.11. Determination of density hydrometer

3.11.1. Equipment

Set hydrometer density from 0.70 to 1.84 g / cm³ with an accuracy of less than 0.001 g / cm³.

Thermometer 3-B2 in accordance with GOST 28498.

The cylinder capacity of 500 cm³ in accordance with GOST 1770.

(Changed edition, Change. Of N 1).

3.11.2. Carrying out the test

A sample of waterglass about 500 cm³ in volume brought to a temperature (20 ± 0,5) ° C. Poured into a graduated cylinder

thermometer. Slowly immersed in a solution selected from a set hydrometer. Check that the temperature of the liquid glass from

19,5 to 20,5 ° C and the thermometer is removed. When the hydrometer reaches equilibrium position, gently press on him and waiting for him

return to the equilibrium position. Hydrometer, immersed in the liquid, must not touch the walls of the cylinder for which the diameter

the cylinder must be at least 3 - 4 cm larger than the diameter hydrometer.

The density is determined by the hydrometer scale at the upper meniscus of the liquid.

3.12. Determination of the density pycnometer

3.12.1. Equipment, reagents

The pycnometer according to GOST 22524, with a capacity of 50 cm³.

Water bath or thermostat.

Rectified ethyl alcohol Technical GOST 18300, the highest grade.

Acetone in accordance with GOST 2603.

Distilled water in accordance with GOST 6709.

(Changed edition, Change. Of N 1).

3.12.2. Carrying out the test

Pycnometer with the plug washed with water, washed with inner walls alcohol or acetone, allowed to dry and weighed

error less than 0.0002, the Open plug, fill the pycnometer up to the mark on the upper meniscus recently boiled water

to a temperature (20 + - 0,5) ° C was placed in a water bath or thermostat adjusted to a temperature (20 + - 0,5) ° C, aged

not less than 10 minutes, the temperature had reached equilibrium and the pycnometer is removed by holding the top. align volume

water exactly to the mark, stoppered, wipe the outside and weighed with an accuracy of less than 0.0002 g

Pycnometer freed from contents, rinsed with an alcohol or acetone, and allowed to dry at fill to the mark

upper meniscus liquid glass, previously adjusted to a temperature (20 + - 0,5) ° C, avoiding air bubbles particularly when the solution has a high viscosity. Place the pycnometer with the test sample in a water bath or thermostat,

adjusted to a temperature (20 + - 0,5) ° C, held for at least 10 minutes, taken out, wiped out, align volume

water glass right on the label on the upper meniscus, tightly stoppered and weighed with an accuracy of less than 0.0002 g

3.12.3. Processing of results

waterglass density (ρ) in g / cm³ was calculated by the formula

$$\rho = \frac{(M - m_2) \times \rho_1}{m - m_1},$$

where m_2 - mass of pycnometer with liquid glass, g;

m_1

m_1 - mass of pycnometer with water, g;

m

m - mass of the empty pycnometer, g;

ρ_1 - density of water at 20 ° C equal to 0.9982 g / cm³.

ρ

Measurement error shall not exceed 0.001 g / cm³.

3.13. Determination of the mass fraction of water-insoluble substances

3.13.1. Equipment, reagents

Drying cabinet.

Water jet pump.

Filter crucibles in accordance with GOST 25336.

Distilled water in accordance with GOST 6709.

3.13.2. Testing

A portion of the liquid glass mass of 20 g is weighed with an accuracy of less than 0.01 g in 500 cm³ glass and dissolved at

stirring in 300 cm³ of water under heating. The solution was filtered using a water jet pump through the filter crucible,

previously dried to constant weight and weighed with an accuracy of less than 0.0002, the insoluble residue on

washed with 50 cm³ of hot water and dried in an oven at 105 - 110 ° C and weighed to constant weight error less than 0.0002 g after cooling in a desiccator.

3.13.3. Processing of results

The weight proportion of water-insoluble substances (H_8) is determined by the formula

$$X = \frac{(M_1 - m_1) \times 100}{8m_2},$$

where m - mass of the test sample, g;
 m_1 - mass of the crucible with the residue, g;
 m_2 - mass of the empty crucible of

For the result of the analysis taking the arithmetic mean of two parallel determinations permitted discrepancy between which shall not exceed 0.05%.

4. Packing, marking, transportation and storage

4.1. Liquid glass is poured into steel barrels types I and II according to GOST 6247 with a capacity of 250 dm³ and cans I and II

types with a capacity of 0.5 to 6 dm³ according to GOST 6128.

Banks with liquid glass with a net mass of 5 kg or less is packed in wooden crates to GOST 2991, GOST 13358 or

plywood boxes in accordance with GOST 5959.

In coordination with the consumer packaging in wooden barrels according to GOST 8777 with a capacity of 100 - 150 dm³ and rail and road tankers.

4.2. Transport marking - according to GOST 14192 with the application of data characterizing the product:

- Name of manufacturer, his trademark;
- Product name and type;
- The batch number;
- The date of manufacture;
- Gross and net weight;
- Designation of the present standard.

4.3. Liquid glass is transported by all modes of transport in accordance with goods transportation rules, operating in kind of transport.

By Rail liquid glass is transported in bulk in railway tanks.

When transporting the barrels should be installed so as to prevent their displacement and rolling.

4.1 - 4.3. (Changed edition, Change. Of N 1).

4.4. Liquid glass should be stored in tightly closed containers indoors.

During transportation and storage of liquid glass at temperatures below freezing prior to use the temperature

adjusted to the temperature of the production premises.

When storing drums set only in one layer.

5. Manufacturer's warranty

5.1. The manufacturer guarantees the liquid glass requirements of this standard, subject to conditions transportation and storage.

5.2. Warranty period of storage of liquid glass - one year from the date of manufacture. After the warranty period of storage product before use must be checked for compliance with this standard.

* On July 1, 2002 enacted GOST 24104-2001.