"APPROVED"
Commercial director of LLC "SPA "Bronya"
(*Signature*) Boyarintseva V.N.
July 8, 2013

OKP 22 1600

TECHNICAL SPECIFICATION

BRONYA liquid ceramic heat insulation

TU 2216-006-09560516-2013

Issued by LLC "SPA "Bronya"

Stamp:
Federal agency for technical regulation and metrology
Branch of FBI "CCM for Moscow region"
in Orekhovo-Zuevo
Catalogue sheet No. 005581 of July 8, 2013 registered.

Volgograd, 2013

This Technical Specification is applied to **Bronya** liquid ceramic heat insulation in the form of a liquid water-dispersion composition mixture consisting of styrol-acryl polymers, coloring, fire-retarding and inhibiting additives and ceramic filler of vacuumized microspheres.

Bronya liquid polymer heat insulation is intended for industrial and domestic application for heat and corrosion-proof insulation of pipelines, air ducts, processing equipment, tanks, vessels, construction structures, etc. of any configuration of metal, plastic, concrete, brick and other materials at the operating temperature from -60 °C to +200 °C (in peak, short-time mode up to +260 °C).

Bronya liquid heat insulation is manufactured in the following modifications:

1. **Bronya Classic** – intended for industrial and domestic application as heat insulation for metal, plastic, concrete, etc. surfaces (prefinished) with the operating temperature from -60 °C to +200 °C (in peak, short-time period up to +260 °C).
2. **Bronya Facade** – intended for industrial, constructional and domestic application as heat insulation of outer and inner surfaces of buildings and structures of concrete, brick, wood, etc. with the operating temperature from -60 °C to +120 °C.
3. **Bronya Anticor** – intended for industrial and domestic application as heat insulation of metal surfaces with the operating temperature from -60 °C to +150 °C without the necessity of prefinishing.
4. **Bronya Winter** – intended for industrial application on prefinished outer surfaces with the operating temperature from -60 °C to +90 °C.
5. **Bronya Vulcan** – intended for industrial application as heat insulation of metal and other surfaces with the operating temperature from -60 °C to +450 °C.
6. **Bronya Classic NG** – intended for industrial and domestic application as non-combustible heat insulation of prefinished metal, plastic, concrete and other surfaces with the operating temperature from -60 °C to +180 °C. It contains a specialized complex fire-retarding additive making the modification non-combustible.
7. **Bronya Facade NG** – intended for industrial, constructional and domestic application as non-combustible heat insulation of outer and inner surfaces of buildings and structures of concrete, brick, wood, etc. with the operating temperature from -60 °C to +100 °C. It contains a specialized complex fire-retarding additive making the modification non-combustible.
8. **Bronya Light** – intended for industrial application as heat insulation of metal and other surfaces with the operating temperature from -60 °C to +150 °C.

An example of reference identification for Bronya liquid ceramic heat insulation when ordering and in other documents:
"**Bronya** liquid ceramic heat insulation" TU.

1. TECHNICAL REQUIREMENTS

1.1. **Bronya** liquid ceramic heat insulation is manufactured according to the requirements of this Technical Specification observing the technical regulations and formula approved according to the established procedure.

1.2. TECHNICAL DATA

1.2.1. Physical and mechanical parameters of **Bronya** liquid ceramic heat insulation should meet the requirements and parameters specified in Table 1 below.

Table 1

Pos.	Parameter	Normal value	Test method
1	Appearance of composition	White	Item 4.3 of the Technical

		suspension*	Specification
2	Appearance of coating	Even homogenous semi-smooth matte film	Item 4.3 of the Technical Specification
3	Mass fraction of nonvolatile substances in composition, %, min.	54	GOST 17537
4	Adhesion to steel, MPa, min.	1.0	GOST 15140-78
5	Heat conductivity, W/m, °C	0.001	Method of Volgograd University of Architecture and Civil Engineering
6	Heat absorption, W/m, °C	1.6	Method of Volgograd University of Architecture and Civil Engineering
7	Heat loss, W/m, °C	1.38	Method of Volgograd University of Architecture and Civil Engineering
8	Resistance of coating against water static exposure at 20 °C within 24 hours	No changes	GOST 9.403-80 method A
9	Adhesion of coating upon the tearing force - to a concrete surface, MPa - to a brick surface, MPa - to steel, points	 1.28 2.00 1.2	 GOST 28574-90 GOST 28574-90 GOST 15140-78
10	Resistance of coating to exposure of +200 °C within 1.5 hour	No yellowing, cracking, peeling, blistering	GOST R 51691-2000
11	Linear elongation, %	65	GOST 11262-80
12	Frost resistance of coating – 10 cycles: - appearance - adhesion of coating to concrete, MPa	 No changes 2.3	 GOST 28574-90
13	Adhesion of coating, points	1	GOST 15140-78
14	Compression strength	2.1	Isostatic conditions (QCM 14.1.5)
15	Vapor permeability for the following modifications, Mg/m h Pa: - Bronya Classic - Bronya Anticor - Bronya Vulcan - Bronya Classic NG - Bronya Light	0.001	GOST 25898-83
16	Vapor permeability for the following modifications, Mg/m h Pa: - Bronya Facade - Bronya Winter - Bronya Facade NG	0.033	GOST 25898-83
17	Flammability group for the following modifications: - Bronya Classic - Bronya Facade	G1	GOST 30244-94

	- Bronya Anticor - Bronya Winter - Bronya Vulcan - Bronya Light		
18	Flammability group for the following modifications: - Bronya Classic NG - Bronya Facade NG	NG	GOST 30244-94
19	Flame spread index	0	GOST 12.1.044-89, item 4.19

Note: * the material can have other colors (color is indicated on the packing).

1.2.2. Production control should be arranged according to the requirements of SP 1.1.1058-01. Sampling and control should be carried out once within a production cycle of 500 000 liters of the material but not less than once a year.

1.3. MARKING

1.3.1. Marking of the product should meet the requirements of GOST 9980.4, GOST 14192 and include the following details:

- name, make of the product;
- name of the manufacturer or its trademark, legal address;
- batch number;
- manufacturing date;
- identification number of this Technical Specification;
- intended application and its method;
- information about certification.

Batch number and manufacturing date can be written by hand neatly and legible.

The methods for marking, label fixing as well as marking paint – according to GOST 14192.

1.3.2. Transport marking should comply with GOST 14192 including manipulation signs "This side up", "Temperature limit" (lower temperature limit 0 °C).

The cargo is not dangerous and not classified according to GOST 19433.

1.4. PACKING

Packing according to GOST 9980.3

1.4.1. **Bronya** liquid polymer heat insulation should be packed in polyethylene or metal hermetic tanks of 5l, 10l and 20l.

2. SAFETY REQUIREMENTS

2.1. **Bronya** liquid polymer heat insulation does not evolve harmful substances in the concentrations dangerous for human health at the operating and storage temperatures.

2.2. **Bronya** liquid polymer heat insulation is manufactured on the water-dispersion base, due to which it is fire safe during manufacturing, storage and application.

2.3. Control over the harmful substances concentration in the air of production premises working area should be arranged according to GOST 12.1.005 and GN 2.2.5.1313-03.

2.4. Requirements of SP 4783-88 "Sanitary rules for manufacturing of synthetic polymer materials and enterprises processing them", SP 2.2.2.1327-03, GOST 12.2.003, SanPiN 2.2.3.1385-03 should be met during manufacturing of **Bronya** liquid polymer heat insulation. Production control should be provided and arranged according to SP 1.1.1058-01.

2.5. All involved personnel should be provided with special clothing and individual safety equipment according to GOST 12.4.011, rubber gloves according to GOST 20010, breathing masks according to GOST 12.4.041 and protective goggles according to GOST R 12.4.013.
2.6. After skin contact with **Bronya** liquid polymer heat insulation: wash skin with water and soap before drying. After eye contact: rinse eyes with flowing water.
2.7. Involved personnel should undergo medical check-up according to orders of Public Health and Medical Industry Ministry of the Russian Federation No.90 of March 14, 1996 and Ministry of Public Health and Social Development of the Russian Federation No. 83 of August 16, 2004.

2.8. ENVIRONMENT PROTECTION
2.8.1. The whole range of environment protection measures including those according to GOST 17.2.3.02 should be provided during manufacturing of **Bronya** liquid polymer heat insulation.
2.8.2. Permanent control over the maximum allowable emission according to GOST 17.2.3.02 should be provided to ensure safe atmosphere air.
2.8.3. Manufacturing of **Bronya** liquid polymer heat insulation is wasteless.
2.8.4. Water mist, foam, dry chemical agents, carbon dioxide and other fire-suppression materials can be used for fire fighting.

Note: The periods for control over the working area air should comply with R 2.2.2006-05 "Guidelines for hygienic examination of working area and labour process factors. Criteria and classification of labour conditions".

3. ACCEPTANCE PROCEDURE

3.1. **Bronya** liquid polymer heat insulation should be accepted in batches according to the requirements of this Technical Specification.
A batch means a quantity of the product manufactured in one technological mode on the equipment of the same type, from one batch of raw material, accepted simultaneously and covered with one quality document. The batch volume should be agreed with a client.
3.2. Each batch should be dispatched with a certificate stating:
- name of the manufacturer or its trademark, legal address;
- name of the product;
- batch number;
- manufacturing date;
- identification number of this Technical Specification;
- intended application and its method;
- information about certification.

3.3. Acceptance and periodical tests are carried out to ensure the quality of **Bronya** liquid polymer heat insulation and its compliance with the requirements of this Technical Specification. Acceptance tests are carried out for each manufactured batch of the material. The tests are carried out by the manufacturer. Quality certificate confirming compliance with the specified parameters should be issued for each particular batch.
Periodical tests should be carried out in respect of parameters 3,6-19 of Table 1 during acceptance of each new party of raw materials or once within a production cycle of 500 000 liters but not less than once a year.
3.3. Sampling should be carried out according to GOST 99890.2.
In order to ensure the quality of the product batch, three samples from the upper, middle and lower parts of the vessel for product manufacturing or storage should be taken with a sampler after thorough stirring. Taken samples should be combined and thoroughly stirred. Then a sample of the mixture of the volume not less than 250 cm^3 should be taken and placed in a clean

polyethylene or glass vessel. The vessel should be tightly closed with a lid, labeled with a tag identifying name of the product, batch number, sampling date and names of the employees who took the sample.

3.4. Should the test results be not satisfactory, the repeated tests with the double amount of samples are carried out. The results of the repeated tests are applied to the whole batch and deemed final.

4. CONTROL METHODS

4.1. Sampling should be carried out according to GOST 9980.2.

4.2. Preparation of samples.

4.3. Sampling and control should be carried out once within a production cycle of 500 000 liters of the material but not less than once a year.

4.3.1. Color, appearance and adhesion should be defined on plates of 08KP or 08PS steel according to GOST 8832-76, section 3.

4.4. Appearance of the composition and coating should be defined visually at natural or artificial diffused light on metal plates with the dimensions of 90x120 mm at coating thickness of 0.4 mm. Drying time – 24 hours.

4.5. Mass fraction of nonvolatile substances should be defined according to GOST 17537.

4.6. Adhesion to steel should be defined according to GOST 15140-78.

4.7. Coating density according to GOST 18995.1-73.

4.8. Hydrogen ion exponent (pH) of the composition according to GOST 28196-89.

4.9. Time of drying to grade 3 at the temperature (20+/-2) °C according to GOST 19007-73.

4.10. Covering power of the dried coating according to GOST 8784-75.

4.11. Resistance of the coating against water static and 5% NaOH solution exposure (20+/-2) °C within 24 hours according to GOST 9.403-80, method A.

4.12. Nominal light-resistance of the coating, 24 hours according to GOST 21903-76, method 2.

4.13. Resistance against exposure of varying temperatures according to GOST 27037-86.

4.14. Heat resistance of the coating (at the temperature of 200 °C within 8 hours) according to GOST 2678-94 and GOST 28574-90.

4.15. Tensile strength according to GOST 18299-72.

4.16. Elongation at fracture according to GOST 18299-72.

4.17. Combustion products toxicity according to GOST 12.1.044-89.

4.18. Flame spread index according to GOST 12.1.044-89 item 4.19.

4.19. Ignitability group according to GOST 30402-96.

4.20. Flammability group according to GOST 30244-94.

4.21. Smoke emission index according to GOST 12.01.044-89.

4.22. Heat conductivity index should be defined using the method of Volgograd University of Architecture and Civil Engineering (Volgograd, 2011).

5. TRANSPORTATION AND STORAGE

5.1. **Bronya** liquid polymer heat insulation is allowed for transportation by all means of transport ensuring safety of package according to the rules for cargo transportation applied for the particular means of transport.

5.2. **Bronya** liquid polymer heat insulation should be stored and transported at a temperature above +3 °C.

6. GUIDELINES FOR APPLICATION

6.1. **Bronya** liquid polymer heat insulation is delivered ready for application and should be used as a heat insulation coating. The material should be prepared immediately before application (thoroughly stirred etc.) according to the manual.

6.2. The surface to be coated should be clean, degreased with white-spirit or a solvent, de-dusted, have no corrosion spots and a temperature from +10 °C to +150 °C. Should the material be applied to concrete surfaces (reinforced concrete slabs, plaster, brick, concrete blocks, etc), the surface must be treated (impregnated) with the acryl deep penetrating primer for concrete surfaces – "concrete-contact" type or similar hereto. Primer consumption is 100 to 250 ml for 1 m2 surface in accordance with the surface type.

6.3. The operating temperature is from -60 °C to +200 °C (in accordance with the modification).

6.4. It is recommended to use an airless sprayer for application of the material on large areas. Small areas in domestic conditions and sections with a complicated configuration should be covered with a paintbrush.

6.5. Consumption rate of the material if applied in one layer (one 0.5 mm layer) is minimum 0.5 l per square meter (in accordance with surface type and application method).

6.6. It is preferable to apply the product outdoors and indoors in places with good forced or natural ventilation. Breathing masks, goggles and safety gloves should be used only in industrial conditions if a sprayer is used.

7. MANUFACTURER'S GUARANTEE

7.1. The manufacturer guarantees the compliance of **Bronya** liquid polymer heat insulation with the requirements of this Technical Specification provided that storage, transportation and application requirements are met.

7.2. Guaranteed storage life of **Bronya** liquid polymer heat insulation is 12 months from the manufacturing date.

Appendix A

List of regulatory-technical documents referred to in this Technical Specification

GOST 12.1.005-88 with alt.1	SSBT. General sanitary-hygienic requirements to working area air
GOST 12.1.007-76 with alt. 1-2	SSBT. Harmful substances. Classification and general safety requirements
GOST 12.2.003-91	SSBT. Industrial equipment. General safety requirements
GOST 12.4.011-89	SSBT. Safety equipment for the involved personnel. General requirements and classification
GOST 12.4.121-83 with alt. 1	SSBT. Industrial filtering gas masks. Technical specifications
GOST 17.2.3.02-78	Environment protection. Atmosphere. Rules for definition of allowable emission of harmful substances for industrial enterprises
GOST 17.2.4.02-81	Environment protection. Atmosphere. General requirements for methods of identification of polluting substances
GOST 19433-88 with alt. 1	Dangerous cargoes. Classification and marking
GOST 20010-93	Technical rubber gloves. Technical specifications
SP 1.1.1058-01	Arrangement and realization of industrial supervision of observance of sanitary rules and carrying out of sanitary and anti-epidemiology (preventing) measures
SP 2.2.2.1327-03	Hygienic requirements to the arrangement of engineering processes, industrial equipment and working tool
SP 2.1.7.1386-03	Sanitary rules for determination of danger class of toxic wastes of production and consumption
GN 2.2.5.1313-03	Maximal allowable concentrations of harmful substances in the working area air
SNiP 41-01-2003	Heating, ventilation and air conditioning
Order of MPH of the USSR No. 3936-85	Control over the content of harmful substances in the working area air
Order of MPH and MI of the RF No.90 of March 14, 1996	"On the order for conducting of preliminary and periodical medical examination of employees and medical regulations for admittance to the profession"
Order of MPH and SD of the RF No. 83 of August 16, 2004	"The list of harmful and (or) dangerous industrial factors in terms of which carrying out preliminary and periodical medical examinations (check-up) should be conducted
GOST 9.403-80	ESZKS. Paint coatings. Method of test for resistance against static exposure of liquids
GOST 9980.2-86	Paints and lacquers. Sampling for tests
GOST 9980.3-86	Paints and lacquers. Packing
GOST 9980.4-2002	Paints and lacquers
GOST 9980.5-86	Paints and lacquers. Transportation and storage
GOST 14192-96	Cargo marking
GOST 15140-78	Paints and lacquers. Method for adhesion determination
GOST 17537-72	Paints and lacquers. Method for determination of mass fraction of volatile

	and nonvolatile, solid and film forming substances
SNiP 2.04.14-88	Heat insulation of equipment and pipelines
SNiP II-3-79	Construction heat engineering
GOST 7076-99	Construction materials and articles. Method for determination of heat conductivity and thermal resistance in the steady-state heat mode.
GOST 30732-2001	Steel pipes and shaped parts with heat insulation of polyurethane foam in polyethylene casing. Technical specifications
GOST 14705-83	Domestic submergible electric water heaters. General technical specifications
GOST 30244-94	Construction materials. Methods for flammability testing
GOST 30402-96	Construction materials. Methods for ignitability testing
GOST 12.1.044-89	Fire and explosion safety of substances and materials. The list of parameters and methods for their determination
SNiP 21-01-97	Fire safety of buildings and structures
NPB 244-97	Construction materials. Decorative finishing and facing materials. Materials for floor covering. Roofing, waterproofing and heat insulation materials. Indexes of fire safety
GOST 28196-89	Water dispersion paints. Technical specifications
GOST 19007-73	Paints and lacquers. Method for determination of drying time and grade
GOST 8784-75	Paints and lacquers. Methods for determination of covering capacity
GOST 21903-76	Paints and lacquers. Methods for determination of nominal light resistance
GOST 27037-86	Paints and lacquers. Method for determination of resistance to exposure of varying temperatures
GOST 18299-72	Paints and lacquers. Method for determination of tensile strength, relative elongation at fracture and elasticity modulus

PRODUCT CATALOGUE SHEET

CSM code	01	145	KGS (OKS) group	02	L27	Registration number	03	005581

OKP code	11	22 1600
Product name and designation	12	BRONYA liquid ceramic heat insulation

Designation of state standard	13				
Designation of regulatory or technical document	14	TU 2216-006-09560516-2013			
Name of regulatory or technical document	15	BRONYA liquid ceramic heat insulation			
Technical Specification					
Manufacturer's code acc.to OKPO and bar code	16	09560516			
Manufacturer's name	17	LLC "SPA "Bronya"			
Manufacturer's address (postal code, region, city, street, house)	18	400005			
Volgograd, Batalionnaya St., 13A					
Telephone	19		Telefax	20	
Other communication means	21				
Name of the original holder	23	LLC "SPA "Bronya"			
Address of the original holder (postal code, region, city, street, house)	24	400005			
Volgograd, Batalionnaya St., 13A					
Date of product manufacturing start	25	_____ 201			
Date when the regulatory or technical document comes into effect	26	_____ 201			
Certification necessity	27				

DESCRIPTION OF THE PRODUCT

Bronya liquid ceramic heat insulation is a liquid water-dispersion composition mixture consisting of styrol-acryl polymers, coloring, fire-retarding and inhibiting additives and ceramic filler of vacuumized microspheres.

Bronya liquid polymer heat insulation is intended for industrial and domestic application for heat and corrosion-proof insulation of pipelines, air ducts, processing equipment, tanks, vessels, construction structures, etc of any configuration of metal, plastic, concrete, brick and other materials at the operating temperature from -60 °C to +200 °C (in peak, short-time mode up to +260 °C).

Bronya liquid polymer heat insulation is manufactured in the following modifications:

Bronya Classic – intended for industrial and domestic application as heat insulation for metal, plastic, concrete, etc. surfaces (prefinished) with the operating temperature from -60 °C to +200 °C (in peak, short-time mode up to +260 °C).

Bronya Facade – intended for industrial, constructional and domestic application as heat insulation of outer and inner surfaces of buildings and structures of concrete, brick, wood, etc. with the operating temperature from -60 °C to +120 °C.

Bronya Anticor – intended for industrial and domestic application as heat insulation of metal surfaces with the operating temperature from -60 °C to +150 °C without the necessity of prefinishing.

Bronya Vulcan – intended for industrial application as heat insulation of metal and other surfaces with the operating temperature from -60 °C to +450 °C.

Bronya Classic NG – intended for industrial and domestic application as non-combustible heat insulation of prefinished metal, plastic, concrete and other surfaces with the operating temperature from -60 °C to +180 °C. It contains a specialized complex fire-retarding additive making the modification non-combustible.

Bronya Facade NG – intended for industrial, constructional and domestic application as a non-combustible heat insulation of outer and inner surfaces of buildings and structures of concrete, brick, wood, etc. with the operating temperature from -60 °C to +100 °C. It contains a specialized complex fire-retarding additive making the modification non-combustible.

Bronya Light – intended for industrial application as heat insulation of metal and other surfaces with the operating temperature from -60 °C to +150 °C.

Guaranteed storage life of **Bronya** liquid polymer heat insulation is 12 months from the manufacturing date.

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		Name	Signature	Date	Telephone
Submitted	04				
Filled	05	E.M.Semenova	(*Signature*)	July 8, 2013	8 (496) 412-04-17
Registered	06	E.M.Semenova	(*Signature*)	July 8, 2013	8 (496) 412-04-17
Entered into the catalogue	07				