TECHNOLOGICAL REGULATIONS

for design and production of works on the device and operation of a coating based on a flame retardant composition "Bronya-Fire Protection"

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Область применения Document scope

This technological regulation applies to the design of fire protection and performance of work on the installation of a fire-retardant coating on load-bearing metal building structures c using a fire-retardant composition
"BRONYA OGNEZASHCHITA" is an integral part of fire protection projects and work production.

The coating technology was developed by NPO BRONYA LLC. Any deviations from the requirements of this technological regulation are not allowed without the consent of the developer. The manufacturer of the compound is not responsible for defects in the coating resulting from violations of these technological regulations and uncoordinated deviations.

1 Description of the flame retardant composition and coating на его based on it

The flame retardant composition "BRONYA OGNEZASHCHITA" is a viscous liquid of white color. colors.

Fire-resistant система coating system на based on the composition " BRONYA OGNEZASHCHITA " (hereinafter
coating) is a system consisting of a primer, a fire-resistant coating and an additional (protective, decorative)one a layer to be applied if necessary.

Recommendations for the use of primers and protective and decorative materials are given in the table. A. 1 and A. 2 (Appendix A) of these regulations. Use of materials not listed in the table. A. 1 and A. 2 (Appendix A), allowed only after consultation with technical specialists OOO NPO
"BRONYA".

The coating is designed for use in all types of atmospheres according to GOST 15150.

Operation of the coating is possible both without a protective layer (only внутри indoors), так and with a protective layer (open outdoors or in indoor).

Service life of the coating (without protective layer) inside the premises при at ambient environment temperatures from - -40 to + 50 ° C is not less than 30 years.

Service life with a protective layer in the open air of a moderate macroclimatic area of UHL 4 according to method 1 (GOST 9.401) – not less than 30 years;

Service life with a protective layer in the open air of the cold macroclimatic area of UHL 1 (HL1) according to method 6 (GOST 9.401) – not less than 10 years;

Recommendations for the operation of the coating in aggressive environments are issued LLC NPO BRONYA. Group Coverage group in accordance with GOST 9.032 - special (5/3).

The color of the flame retardant coating is white, the shade is not normalized, the composition is not tinted. Additional (protective, decorative)color layer - not regulated.

Group of flame-retardant efficiency according to GOST R 53295-2 – ;

The fire resistance limit provided by the coating according to GOST 30247-R15...R 120.

Flame retardant properties of the coating meet the requirements of GOST R 53295 "Fire-retardant products for steel structures. General requirements. Method for determining fire-retardant efficiency", GOST 30247.1 " Construction structures. Methods of fire resistance testing. Load-bearing and enclosing structures".

The coating is certified in the SSPB system , GOST R.

Consumption of the composition for obtaining слоя a coating layer, толщиной 1 mm thick , without taking into account technological losses,

— 1.5 kg /m^2.

Recommended losses in the calculation of practical consumption are 15-35 35 %.

Нанесение Coating — installed with airless spray units (please check brands and models check with with specialists dealerships of dealerships or the manufacturer 's factory) or manually (with a brush).

2 Guidelines for designing fire protection of metal building structures

2.1 Work on the preparation of draft measures to ensure fire safety includes: в "List of types of work on engineering surveys, по preparation of project documentation, поconstruction, reconstruction, major repairs of capital construction которые facilities that affect the safety объектов of capital construction facilities (Order Ministry of 30 декабря 2009 Regional Development No. 624 of December 30 , 2009)".

2.2 Design and production of works on fire protection of structures should be carried out by organizations that have a license for these types of activities (GOST R 53295).

2.3 The initial data for the development of a project for fire protection of load-bearing metal structures of a building are:

- description and justification of the adopted constructive and space - planning decisions (drawings and assortment of metal load-bearing building structures, slabs, beams, trusses coatings and etc.) with an indication of the construction of structures, providing total sustainability and the geometric resistance of the building during the fire, the fire resistance and class constructive fire hazard of building structures contained in Section 9, item G, and for a linear object in section 8, paragraph D of the project documentation "Activities for the provision of fire safety" (resolution of the Government Of the Russian Federation No. 87 of February 16 2008, 2008 "On the composition of sections of project documentation and requirements for their content");

- floor plans, floor plans of floors, coverings, roof coverings , etc .

2.4 Procedure for developing a design solution for fire protection:

2.4.1 According to the table. 21 of the Technical Regulations on fire safety requirements to determine the required fire resistance limit for building structures (Federal Law No. 123-FZ of 22.07.08).

- Calculate the value of the reduced thickness of the metal of building structures. The calculation is performed as the ratio of the cross-sectional area to the cross-sectional area of the structure (mm2) to the perimeter of the heated surface (mm).

- Calculate the thickness of the flame retardant coating to achieve the required fire resistance limit.. The calculation is made on the basis of the data given in Table B. 1 (Appendix B), depending on the thickness of the specified metal thickness.

- According to Tables A. 1 and A. 2 (Appendix A), the grades of materials for laying the soil and protective and decorative coatings are determined.

- Calculation results Formalize the calculation results in the text (according to GOST 21.513) part of the Fire Protection Project.

- The Fire protection project, as a rule, should contain:

- information about the object (list of types of protected structures, required fire resistance limits, applicable standards). OZM, calculations, drawings, necessary certificates, etc.);

- information about the area of protected structures.

- information about working conditions (air temperature, relative humidity, restrictions on the production of works in accordance with their conditions);

- information about the equipment used, the means of cleaning, auxiliary tools, materials, etc.;

- calculation of the consumption of materials in accordance with the requirements of section 1 of these rules. - work schedule;

- measures for security measures of security c , taking into account the specifics of the object;

- organization of quality control control of the performed works, the order of acceptance of the performed works.

3 Device technology Coating device technology

3.1 Priming

3.1.1 Priming of unpainted metal structures should be carried out in accordance with the technical documentation of the manufacturer of the soil and the requirements SNiP 2.03.11.

Before priming, it is necessary to ensure that the degree of cleaning of the surface of steel structures from oxides is not lower than 2 according to GOST 9.402 (Sa 2.5 according to ISO 8501-1).

Primed structures are ready for applying a fire-resistant coating when the degree of drying of the soil is not lower than 5 (the paper does not stick to the coating and does not leave a trace from the load weighing 2 kg) according to GOST 19007.

3.1.2 The coating can be applied to the previously primed surface of a metal structure. In this case , you should:

- documented (according to the act выполненных of work performed) identify the brand of soil (the soil must comply with Annex A) and evaluate the possibility of using this material in a system with a fire-resistant coating in accordance with Table. A. 1 (Appendix A).

- visually assess the condition of the primer coating. Damages and / or defects according to GOST 28246 are not allowed;

- determine the degree высыхания of soil drying - not less than 5 according to GOST 19007;

- determine толщину the soil thickness. The thickness must meet the requirements specified in the table. A. 1 (Annex A) of these regulations. The permissible deviation the thickness of the soil thickness is not more than 10%. Measurements Make measurements at least at one randomly selected point per 100 м^{m2}.

- determine the adhesion of the soil to the surface of the metal structure. Adhesion should be no more than 2 points according to the method of lattice incisions according to GOST 15140. Measure produce at least at least в one randomly selected point per 100 m$^{2.}$.

If you have any doubts about the quality of the previously primed surface , you should seek за technical advice from LLC НПО NPO BRONYA.

3.1.3 If defects are detected, repair the primer coating by completely cleaning the surface in the recovery areas (defective areas) to metal and applying soil on these areas to the standard thickness according to clauses 3.1.1. and 3.1.2. of these regulations.

3.2 Applying a flame retardant coating

3.2.1 Entrance control

Fire-retardant composition is accepted for entrance control in the presence of the following documents::

- copies of certificates of conformity;

- passports quality certificates;

- commodity - transport bill of lading.

- This is also checked at the entrance control:

- integrity package integrity;

- availability of markings.

- Term expiration date of the composition. The use of an expired expired formula is not allowed.

In case of violation of the integrity of the package, remove all non-conforming product units.

Dispose of containers whose integrity has been violated по in accordance with item. 8.3 of these regulations.

The name and batch numbers must correspond to the numbers specified in the accompanying documents.

Selectively (usually 5 % of packing places) check the appearance of the composition. The appearance of the train must comply with the requirements of paragraph 1 of these regulations. A list of possible defects in the flame retardant composition and corrective measures are given in Table B. 1 (Appendix B).

3.2.2 Production of works

3.2.2.1 Work on the application of the composition should be carried out under the following conditions::

- temperature air temperature — +5 ÷ +35 ° C;

- relative humidity humidity - no more than 80 %.

- the difference between the temperature of the air temperature and the dew point point is greater than 3 ° C;

- атмосферные no atmospheric precipitation .

- state of the atmosphere - according to GOST 17.2.3.02.

3.2.2.2 Before applying:

- the composition is delivered in a ready -to -use form.

- open the package, make sure that there are no defects in the composition listed in Table B. 1 (Appendix B);

- составмix the mixture with an electric mixer with насадкой a turbulent nozzle типа for 3 minutes...5 minutes until a uniform consistency and complete disappearance of sediment. Check the presence of sediment visually. When mixing and, in the future, it is necessary to avoid getting construction debris and foreign impurities into containers with fire-retardant composition;

Attention! Dilution of the composition (if necessary) is allowed only after consultation with technical specialists LLC NGOs
"BRONYA".

In such cases, it is allowed to use distilled water as a diluent (in an amount not exceeding 5 % by weight). The water temperature should not be lower than + 10 ° C, water should be added slowly, mixing thoroughly.

FORBIDDEN! Use as a diluent white spirit, turpentine, nefras, alcohols, acetone, ketones and mixed solvents based on them.

FORBIDDEN! Store the composition in an open container during the work process for more than 8 hours.

- make sure that there is no contamination (traces of dust, dirt, grease and old paintwork). on the primed surface of a metal structure. Remove dirt if necessary. Depending on the type of contamination, it is necessary to mechanically clean the surface, degrease with acetone and remove dust with compressed air or wipe with a damp cloth;

- from an airless spray (как system (usually of the piston type) with an operating pressure of more than 180 atmospheres, remove coarse and fine filters, install сопло an airless spray nozzle that meets the условиям application conditions (taking into account the geometric dimensions and accessibility обрабатываемой of the structure to be processed). The choice of nozzle is specified by representatives of NPO Bronya LLC.

3.2.2.3 Applying a flame retardant coating

The flame retardant compound is applied in layers (interoperation control according to clause 4.2 of these regulations). on the soil dried to degree 5 according to GOST 19007 грунт or the previous coating layer dried to degree 3.

The thickness of the first " wet " layer should not exceed **300-400 microns. Maximum thickness of the " wet " layer**, applied in one technological cycle

the passageway is **700-1000 microns.**

After drying толщина , the dry layer thickness is 55...65 % of толщины the wet layer thickness

of the layer.

Время Inter-layer drying time for the first layer at температуре an air temperature above +20 ° C and

relative humidity of less than 65 % does not exceed 6 hours and, as a rule, is 5 ÷ 6 hours.

The inter-layer drying time for the first layer at an air temperature of +20 ° C and a relative humidity of 80% is 6-24 hours.

If the air temperature is below +10 ° C (regardless of humidity), the inter-layer drying time should be increased.

In any case, the next layer should be applied when the degree of drying of the previous coating layer is at least 2 (according to GOST 19007).

Attention! In the case of work at elevated temperatures (+27 ÷ +35 ° C), in order to avoid the formation of coating defects (drips, surges), the recommended thickness of the " wet " layer applied in one technological pass is not more than 300 microns.

The list of coating defects, their causes and methods of elimination are given in Table B. 2 (Appendix B).

Maintenance of the tools and equipment used should be performed at the end of each shift. After finishing the work, wash the equipment with a solvent or white spirit.

Brief instructions for applying a flame retardant coating are given in Appendix D.

3.3 Applying additional (protective, decorative)coatings coatings

3.3.1 Protective (decorative) coating should be applied to the flame retardant coating after it has dried to a degree of 2 (according to GOST 19007). Application technology - in accordance with the technical documentation of the material manufacturer.

3.3.2 Thickness of the dry layer of additional (protective, decorative) coating — in accordance with Table A. 2 (Appendix A).

4 Control производства of work production

4.1 Before starting work and after a break, it is necessary to monitor the temperature, humidity and dew point. For an example of determining the dew point, see Appendix D.

Work should проводить only be carried out if the specified parameters comply with clause 3.2.2.1 of these regulations. If the условий application conditions do not meet the requirements of p. 3.2.2.1 . it is necessary to adjust the atmospheric conditions of work by installing sheds, greenhouses, etc.

4.2.2 In the course of production of works to control:

- uniformity of coverage - visually. Control is carried out by a worker (foreman) during the work process.

- consumption of fire-retardant composition by the thickness of the wet layer. Control the thickness of the wet layer with a thickness gauge-comb type "Elcometer", "Constant" or similar with the appropriate measurement range.

Control is performed by a worker (master) during процессе производства the production process.

4.3 At the end of the work (24 hours after the last layer of fire-resistant coating is applied), visual inspection should be carried out.:

- External appearance-the coating is smooth, without cracks and flakes, without foreign spots, foreign inclusions and other damages (GOST 9.032);

- color - uniform, opacity - 100 %.

- inclusions - not more than 25 pcs/^{m2}, size not more than 0.5 mm, distance between inclusions not less than 30 mm. Control with a линейки drawing ruler according to GOST 17435 and a magnifying glass LI-3-1 according to GOST 25706;

- shagreen - minor damage is allowed. Control by comparison with a sample or profilografoprofilometer (type-I according to GOST 19300) or other devices of a similar type.

- drips are not allowed.

- undulation - no more than 1.5 mm. Control поверочной линейкой длиной with a 500 mm long calibration ruler мм,, which is applied with an edge on проверяемую the surface to be checked. C Using a different ruler or the probe measures the maximum distance between the surface and the ruler. Set the ruler in such a way that the проверяемой поверхности была greatest undulation is determined on the surface to be checked.

A complete set of physical and mechanical properties of the coating occurs в within 7 days. During 30 days from the moment of application, when pressing on the coating with a force of 5 kg/^{cm2}, dents may form.

The thickness of the dry coating layer (in accordance with the design, on each type of structure) should be measured with a magnetic or electromagnetic thickness gauge. Measurements should be made for every 100 м^{m2} of surface area. Permissible deviation from the design thickness

coverage — no more than 20 %. When measuring, take into account the average thickness of the previously applied soil.

The results контроля of work control should be drawn up in accordance with RD 11-0202

"Requirements for the composition and procedure for maintaining executive documentation during construction, reconstruction, and major repairs of capital construction facilities and requirements for certificates of inspection of works, structures, and sections сетей of engineering and technical support networks".

The results of monitoring the production of works and the quality of the formed coating should contain the following information::

- climatic conditions during the period of the work period;
- brands and information about the input control of the materials used;
- information about equipment, technological equipment and monitoring devices.
- information about personnel information;
- the quality of the formed coating according to the main indicators;
- parameters process parameters.

The list defects of coating defects, the causes of their causes and methods of elimination are given in Table B. 2 (Appendix B).

5 Assessment of the state of the fire-resistant coating

Throughout the entire service life, it is necessary to evaluate the quality of the fire-resistant coating. Special attention should be paid to areas where the surface color changes, cracks form, or the coating flakes off.

Damaged areas of the coating must be repaired without fail, having previously identified and eliminated the causes that led to violations of its integrity. Removal of damaged areas of the coating should be carried out by mechanical means. Prepare the surface cleaned of the coating in accordance with clause 3.1. Apply a fire-resistant coating in accordance with clause 3.2.2.3.

Inspection of the condition of the flame retardant coating and responsibility for compliance with the operating conditions, in accordance with the manufacturer's technological regulations, is assigned to the operating organization.

The results of the survey are drawn up by an act of checking the condition and operating conditions of the fire-resistant coating. Acts are completed in the log of inspection of the condition of the fire-resistant coating with an indication of the terms and responsible for eliminating the identified shortcomings.

The recommended frequency of checking the condition of the fire-resistant coating is at least once every five years.

6 Transportation and storage

The composition should be transported and stored in its original packaging at an air temperature of 0 ÷ +35 ° C in conditions that exclude direct contact with water and aggressive substances on the container, contact with fire sources and heating elements.

Attention! Short-term or complete cooling of the composition to a temperature below 0 ° C is not allowed.

During transportation and storage, do not place more than 3 buckets of the composition in height on top of each other.

Attention! During the work process, it is forbidden to store the composition in an open container for more than 8 hours.

Гарантийный The guaranteed shelf life of the composition is 12 months from the date of manufacture.

The list of defects in the composition that have occurred as a result of violations of transportation and storage conditions, and corrective measures are given in Table B. 1 (Appendix B).

7 Требования Security requirements

7.1 The composition contains an organic solvent. The composition is highly flammable! Do not allow storage or use near open sources of fire.

7.2 The composition is intended for professional use only. Personnel who have completed a special training course and are certified for these types of work in accordance with the current rules are allowed to work on the coating device.

When applying the composition and during the formation of a coating based on it, solvent vapors are released into the air.

Work related to the use of the compound should be carried out in accordance with the requirements of GOST 12.3.016 and SNiP 12-04 " Labor safety in construction. Part 2. Construction production" and the safety regulations applicable at the site.

7.3 When working on the coating device, you should use personal protective equipment:

- special clothing and footwear;
- respirators with a filter A1;
- gloves.
- open glasses with side protection.

If попадании состава на the product comes into contact with exposed areas of the skin, it is necessary to wash it off with water and lubricate the skin with vaseline or a protective skin cream.

If the product comes into contact with your eyes, wash them thoroughly with water and, if necessary, consult a doctor.

To prevent diseases and irritations кожных of the skin of the face and hands , it is recommended to use protective dermatological products.

7.4 Avoid ingestion of the composition and any other related materials inside the body.

7.5 Следует Avoid contact продуктов of food and средств personal care products with the coating components.

7.6 In order to ensure fire and explosion safety when working on the coating device, it is forbidden to:

- smoke and carry out welding operations in the places where coating works are carried out;
- perform work on устройствythe coating device in places возможного where an open flame may occur.

8 Требования по охране Environmental protection requirements среды

8.1 The coating does not have a harmful effect on the environment during operation.

8.2 Мероприятия Environmental охране окружающей protection measures should be implemented in accordance with GOST 17.2.3.02.

8.3 Construction waste should be sorted and stored with construction waste. When the composition is spilled, the place of spillage should be covered with sand and collected by improvised means in a container or bag, then disposed of in accordance with GOST 30773 " Resource conservation. Waste management. Stages of the technological cycle. Basic provisions " dispose of it and damaged containers by burying them in the ground or dumping them in a landfill (OECD code D_1), conditional index-Z.

8.4 After finishing the work, wash the equipment with a solvent or white spirit. Dispose of the solvent after washing according to clause 8.3.

APPENDIX A

Primers and protective and decorative materials recommended for use in the system with a fire-resistant coating based on "BRONYA OGNEZASHCHITA"

Table A. 1 - List марок of soil grades compatible with flame retardant composition " FIRE PROTECTION BRONYA"

Name of the material	**Regulatory document** (manufacturer)	**Thickness of a dry layer of soil, microns**
GF-021 red-brown	GOST 25129	50 ... 80 or according to the technical documentation of the manufacturer
FL-03K, FL-03ZH	GOST 9109	
EP-0010, EP-0020	GOST 28379	
Teknolak Primer 0168-0000	AO JSC TEKNOS	
ROSTEX (ROSTEX)	TIKKURILA (TIKKURILA)	
Stelpaint-PU-Zink	Steelpaint GmbH (Steelpaint GmbH)	
Stelpaint-PU-Mica HS"	Steelpaint GmbH (Steelpaint GmbH)	
Stelpaint-PU-Mica UV	Steelpaint ГмбХ GmbH GmbH)	
VDLA-1222R	TU 2310-012-51309101-03 OOO "Palitra Rusi"	
VD-KCH-124	LLC "Chekhov paints"	
HS-010	TU 6-21-51-9090	
Tsinol	TU 2313-012-12288779-9999	
Primastik UN+	JOTUN (JOTUN)	
PRIMASTIK OFF WHITE +	JOTUN (JOTUN)	
Pilot QD Primer	JOTUN (JOTUN)	
Interzinc 22	International (International PC	
Agrozinc EP	Avenarius Agro Agro Agro)	
Agrozinc HC Primer	Avenarius Agro Agro Agro)	
"Note: Праймер BS primer "	TU 2312-029-53945212-20102010	
" APPROX PLATINUM" Primer "	TU 2312-017-53945212-07 as c amended. №1	
INERT MASTIC MYOX	TEKNOS	
HEMPAQUICK PRIMER 13300	Hempel	
DUROGLASS FF 4416	MPM	
CORRODED	OOO " Zavod Paints QUILL"	
Metallgard UR - 060	JSC "Keton"	
grunt-enamel URF-1101	TU Y 24.3.00204234-007-2004	
Materials that meet the requirements Standard LS LS 148-06 part 2 of Linde AG	Sika Korrosioneschutz GmbH International; Hempel; Steelpaint; Carboline;	

Table A. 2-List of brands of protective and decorative materials compatible with the flame retardant composition "BRONYA OGNEZASHCHITA"

Name of the material	**Regulatory document** (manufacturer)	**Thickness of a dry layer of a protective and decorative covering, microns**
XB-16, XB-16R	TU 6-10-1301-8383	not less than 40 in two layers or according to the technical documentation of the manufacturer
XB-785	GOST 7313-7575	
Temachlor 40	TIKKURILA (TIKKURILA)	
Pilot II	JOTUN (JOTUN)	
Hardtop XP	JOTUN (JOTUN)	
Hardtop AS	JOTUN (JOTUN)	
Alkyd-urethane enamel "Express "	TU 2312-031-54651722-20022002 OOO " Plant " Kraski KVIL "	
EP-5285	TU 95-2184-9090	
PF-115	GOST 6465-7676	
enamel EPU-71	TU 24.3-30553286-044-202	
Teknodur 0050	TEKNOS	
AK-1530 Raznotsvet	OOO Raznotsvet LLC	
NOTE: PLATINUM	TU 2312-017-53945212-07 with change. №1	
"Note: Contactor BSM "	TU 2312-030-53945212-20102010	
"Note: Contactor M "	TU 2312-028-53945212-20092009	
Materials that meet the requirements of requirements Стандарта LS 148-0606 Part 2 of Linde AG	Sika Korrosioneschutz GmbH International standard; Hempel; Steelpaint; Carboline;	

Tables A. 1 and A. 2 show the most frequently used primers and protective and decorative materials, the compatibility of which is confirmed by the laboratory of NPO BRONYA LLC.

It is possible to use other brands of priming and protective and decorative materials. In this case, it is necessary to consult with the technical specialists of NPO BRONYA LLC.

It is allowed to tin the material with water-based acrylic tinting pastes, but not more than 1% of the total volume. Please check the choice of tinting pastes with the technical specialists of NPO BRONYA LLC.

Attention! Information about new brands of recommended primers and protective and decorative materials is constantly updated. Up-to-date information is available on the website http://www.nano34.ru/.

APPENDIX B

Dependence of the thickness of the dry layer of the BRONYA FIRE PROTECTION coating on the required fire resistance limit and the reduced metal thickness

Table B. 1-Dependence of the thickness of the BRONYA FIRE PROTECTION coating (mm) on the required fire resistance limit (**R**) and the reduced metal thickness (**PTM)**

Reduced thickness of steel structure, mm	**The limit of fire resistance, min**							
	45		60		90		120	
	thickness, mm	flow rate, kg/m2	thickness, mm	flow rate, kg/m2	thickness, mm	flow rate, kg/m2	thickness, mm	flow kg/m2
2,4	1,2	1,69	1,53	2,15	-	-	-	-
2,6	1,21	1,8	1,56	2,29	-	-	-	-
2,8	1,18	1,74	1,51	of 2.22	-	-	-	-
3	1,14	1,69	1,47	of 2.16	-	-	-	-
3,2	1,11	1,64	1,42	of 2.09	-	-	-	-
3,4	of 1.07	1,59	1,38	2,03	2	2,82	-	-
3,6	1,04	1,53	1,34	of 1.96	2,26	3,33	-	-
3,8	1	1,48	1,29	1,9	2,21	3,27	-	-
4	0,97	1,43	1,25	1,83	of 2.17	3,2	-	-
4,2	0,93	of 1.37	1,2	1,77	2,12	3,14	-	-
4,4	0,9	1,32	1,16	1,7	2,08	3,07	-	-
4,6	0,86	1,27	1,11	1,64	of 2.03	3,01	-	-
4,8	0,83	1,21	1,07	of 1.57	1,99	2,94	-	-
5	0,79	1,16	1,03	of 1.51	to 1.94	2,87	-	-
5,2	0,76	1,11	0,98	of 1.44	1,9	2,81	-	-
5,4	0,72	1,06	0,94	1,38	1,85	of 2.74	-	-
5,6	0,69	1	0,89	1,31	of 1.81	2,68	-	-
5,8	0,62	0,87	0,8	of 1.14	to 1.76	to 2.61	-	-
6	0,65	0,95	0,85	1,25	1,72	2,54	-	-
6,2	0,65	0,95	0,85	1,25	1,67	of 2.48	-	-
6,4	0,65	0,95	0,85	1,25	1,63	2,41	-	-
6,6	0,65	0,95	0,85	1,25	1,58	of 2.35	-	-
6,8	0,65	0,95	0,85	1,25	1,54	2,28	-	-
7	0,65	0,95	0,85	1,25	1,49	of 2.22	-	-

7,2 and more	0,65	0,95	0,85	1,25	1,3	1,83	2,3	3,2

The table shows the thickness of the fire-resistant coating without taking into account the soil and the protective and decorative layer.

** If the specified metal thickness exceeds 12.3 mm, the coating thickness value is assumed to be equal to the value corresponding to the толщине specified metal thickness of 12.3 mm.

The coating thickness for the values of the given metal thickness that are not specified in the table is calculated by linear interpolation.

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APPENDIX B

Corrective actions

Table B. 1 - Defects in the composition, causes of their occurrence, recommendations for elimination.

Defect	Reasons	Corrective actions
Delamination	Long -term storage	Mix with an electric mixer with насадкойа turbulent nozzle типа or an improvised tool until smooth.
Образование Surface film formation (drying)	Violation of the tightness of the package, storage in an open container, expiration date expiration of the storage period.	Remove the surface film and edges near the container walls, mix well. If неэффективности mixing is ineffective, dispose of it.
Curdling (the composition becomes similar to cottage cheese)	Long -term storage (more than 1 month) at temperatures below-5 ° C.	Mix with an electric mixer fitted with a turbulent nozzle типа не for at least 10 minutes. If mixing is ineffective, dispose of it.

Table B. 2 - Defects in fire-resistant coatings, causes of their occurrence, recommendations for elimination.

Defect	Reasons	Corrective actions
Streaks and swells	The viscosity is below normal	Use materials with a normal viscosity. Reduce the thickness of the layer applied in one pass.
	Слишком толстый The flame retardant layer is too thick The flame retardant layer is too thick of the composition	Reduce fuel consumption состава
	The distance from the sprayer to the surface to be painted is less than normal, the sprayer is incorrectly oriented relative to the surface of the structure.	Keep the spray gun perpendicular to the surface to be painted at a distance of 200-400 mm.
	Slow movement of the sprayer on the relative to the surface of the structure.	Speed up the movement of the sprayer.
	Слишком высокая The material temperature is too high .	Reduce the temperature of the material.
	Remove drips and swellings with a spatula until the layer begins to dry. After the film dries, the defective areas must be cleaned and re-coated.	
Shagreen	Poor диспергирование particle dispersion caused by low pressure at the outlet the nozzle outlet.	Adjust the pressure.
	Low температура air temperature во during material application.	Stop working until the permissible temperature is set.
	Increased вязкость material viscosity.	Dilute the material with a solvent according to p. 3.2.2.2 of this regulation to the relevant norm.
	The distance from the sprayer to the surface of the structure is less than normal.	Keep the spray gun at the correct distance.

Defect	Reasons	Corrective actions
	Слишком быстрое Solvent evaporation is too fast.	Apply the solvent in accordance with the regulatory documentation.
	Remove the coating and нанести reapply.	
Peeling, peeling off	Unsatisfactory surface preparation. Not compatible with the primer coating.	Carefully monitor the surface preparation and application of each coating layer. Use the recommended primers and materials for additional layers.
	Contamination of the intermediate слоя coating layer.	
	Applying the material to over-dried underlying layers.	Поверхность Sand the surface. Observe the drying time of layers.
	Application at low temperature and high humidity.	Stop working until acceptable temperatures and humidity are established.
	Remove the coating and нанести reapply.	
Dry jet (coating roughness)	Слишком большое The distance from the sprayer to the surface of the structure is too large.	Keep the spray gun at the correct distance from the surface of the structure.
	Слишком большой The spray angle is too large .	Keep the spray под gun at the appropriate angle. gun at the desired angle.
	The solvent evaporates too quickly.	Use the recommended solvent.
	Слишком высокая The air temperature is too high .	Stop working until the permissible temperature is set.
	Remove the coating and нанести reapply.	
Interlayer permeability	Penetration of color pigments from the previous layer to the next.	Use the recommended primers and materials for additional layers.
Swelling of the coating	Applying a compound containing an active solvent to a material that is incompatible with it.	
	Applying the compound to недостаточно the previous layer of coating that has not dried sufficiently.	Maintain the required время inter-layer drying time.
	Слишком The air temperature is too high or too low.	Stop painting until the permissible temperature is established.
	Remove the coating and нанести reapply.	
Craters and pores	Пористость Soil porosity of the previous слоя coating layer.	Monitor training surface preparation and application of each coating layer.
	The coating is applied at elevated air temperature or on a contaminated surface.	Comply with the requirements of these regulations.
	Вязкость The material's viscosity is higher than normal.	Dilute the material to normal.

	The presence в краске of water, oils, and air bubbles in the paint.	Perform a breakdown of the train.
Defect	**Reasons**	**Corrective actions**
	Remove the coating and нанести reapply.	
Bubbles	Use of diluents not specified in the documentation.	Use the diluent specified in the documentation.
	Insufficient cleaning of the surface from soluble salt, moisture, oils, etc. pollutants.	Thoroughly wash or degrease the surface.
	Contamination of the composition with water or mineral oils.	Replace the composition.
	Presence в составе of air bubbles in the composition .	Replace the composition.
	Remove the coating, rinse and dry the surface, заново and reapply the coating.	
"Fish eyes"	Application of the product on a surface contaminated with oil, moisture and other pollutants.	Control подготовки of surface preparation.
	Incompatibility of materials in системе the coating system.	Correct choice of coating system.
	Contamination of the composition with oils or water.	Replace the composition.
	Remove the coating, clean the surface, заново and reapply the coating.	
Cracking	Applying the composition with an uneven по layer thickness	Apply the composition evenly over the thickness
	Applying the composition по over the previous layer that has not been dried.	Observe сроки the drying time of layers.
	Remove the coating and reapply заново	
Wrinkling	Increased температура surface temperature of the structure.	Stop working until the permissible temperature is set.
	Applying too thick a layer of the product.	Apply a layer of the required thickness.
	Applying the composition по over the previous layer that has not been dried.	Observe сроки the drying time of layers.
	Remove the coating and нанести reapply.	
Film weediness Weediness of the film	Contamination of the composition with mechanical impurities.	Replace the composition.
	Clean the coating and apply an additional layer of the compound.	
Uneven gloss, different shades of color	Application of the composition at low temperature and high humidity.	Work should be stopped until acceptable temperatures and humidity are established.
	Presence in the composition of water.	Replace the composition.
	Poor mixing before application.	Тщательно Mix thoroughly.

	Clean the coating and apply an additional layer of the compound.

APPENDIX D

Table d. 1-Dew point temperature as a function of temperature and relative humidity.

Темпера-тура Air temperature, °C	Temperature point dew in °C at relative humidity of air, %:													
	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%
30	10,5	12,9	14,9	16,8	18,4	20	21,4	22,7	23,9	25,1	26,2	27,2	28,2	29,1
29	of 9.7	12	14	15,9	17,5	19	20,4	21,7	23	24,1	25,2	26,2	27,2	28,1
28	8,8	11,1	13,1	15	16,6	18,1	19,5	20,8	22	23,2	24,2	25,2	26,2	27,1
27	8	10,2	12,2	14,1	15,7	17,2	18,6	19,9	21,1	22,2	23,3	24,3	25,2	26,1
26	7,1	9,4	11,4	13,2	14,8	16,3	17,6	18,9	20,1	21,2	22,3	23,3	24,2	25,1
25	6,2	8,5	10,5	12,2	13,9	15,3	16,7	18	19,1	20,3	21,3	22,3	23,2	24,1
24	5,4	7,6	9,8	11,3	12,9	14,4	15,8	17	18,2	19,3	20,3	21,3	22,3	23,1
23	4,5	6,7	8,7	10,4	12	13,5	14,8	16,1	17,2	18,3	19,4	20,3	21,3	22,2
22	3,6	5,9	7,8	9,5	11,1	12,5	13,9	15,1	16,3	17,4	18,4	19,4	20,3	21.3
21	2,8	5	6,9	8,6	10,2	11,6	12,9	14,2	15,3	16,4	17,4	18,4	19,3	20,2
20	1,9	4,1	6	7,7	9,3	10,7	12	13,2	14,4	15,4	16,4	17,4	18,3	19,2
19	1	3,2	5,1	6,8	8,3	9,8	11,1	12,3	13,4	14,5	15,5	16,4	17,3	18,2
18	0,2	2,3	4,2	5,9	7,4	8,8	10,1	11,3	12,5	13,5	14,5	15,4	16,3	17,2
17	-0,6	1,4	3,3	5	6,5	7,9	9,2	10,4	11,5	12,5	13,5	14,5	15,3	16,2
16	-1,4	0,5	2,4	4,1	5,6	7	8,2	9,4	10,5	11,6	12,6	13,5	14,4	15,2
15	-2,2	-0,3	1,5	3,2	4,7	6,1	7,3	8,5	9,6	10,6	11,6	12,5	13,4	14,2
14	-The 2.9	-1	0,6	2,3	3,7	5,1	6,4	7,5	8,6	9,8	10,6	11,5	12,4	13,2
13	-3,7	-1,9	-0,1	1,3	2,8	4,2	5,5	6,6	7,7	8,7	9,6	10,5	11,4	12,2
12	-4,5	-2,6	-1	0,4	1,9	3,2	4,5	5,7	6,7	7,7	8,7	9,6	10,4	11,2
11	-5,2	-3,4	-1,8	-0,4	1	2,3	3,5	4,7	5,8	6,7	7,7	8,6	9,4	10,2
10	-6	-4,2	-2,6	-1,2	0,1	1,4	2,6	3,7	4,8	5,8	6,7	7,6	8,4	9,2

APPENDIX D

Quick instructions for applying a fire-resistant coating на based on the composition " FIRE PROTECTION BRONYA"

Fire retardant composition "BRONYA OGNEZASHCHITA"	is a viscous liquid of white color
Условия Application conditions	- температура air temperature - +5 ÷ +35 ° C; - Relative влажность humidity - not more than 80 %; - the difference between температурой the air temperature and точкой the dew **point is more than 3 than 3 °** - C. atmospheric precipitation - no.
Method of applying	- Graco the Graco airless spray systems. - unit by hand (brush).
Подготовка Surface preparation	The metal surface must be primed, dried and cleaned. The degree of soil drying is not lower than 5 according to GOST 19007. The primed surface must be free of traces of dust, dirt, grease and old paint coatings. Remove dirt if necessary. Depending on the type of contamination, it is necessary to mechanically clean the surface, degrease with acetone and remove dust with compressed air or wipe with a damp cloth.
Before applying:	- the product is delivered in ready -to -use ; - mix with an electric mixer with a turbulent nozzle for 3 minutes...5 minutes until a uniform consistency and complete disappearance of sediment.
Dilution of the formulation	The composition is delivered in ready -to -use. in the form. **Attention!** Dilution of the composition (if necessary) is allowed only after consultation with the technical specialists of NPO BRONYA LLC. In such cases, it is allowed to use as a diluent: distilled water (in an amount not exceeding 5 % by weight). The water temperature should not be lower than + 10 ° C, water should be added slowly, mixing thoroughly. **FORBIDDEN!** Use as a diluent white spirit, turpentine, nefras, alcohols, acetone, ketones and mixed solvents based on them. **FORBIDDEN!** Store the composition in an open container during the work process for more than 8 hours.
Applying the composition	**The thickness of the first " wet " layer** не should not exceed 300 300-400 400 microns. **The maximum thickness of the " wet " layer**applied in one technological pass is 700-1000 microns. After drying, the dry layer thickness is 55 ... 65 % of the wet layer thickness. **Attention!** In the case of work at elevated temperatures (+27 ÷ +35 ° C), in order to avoid the formation of coating defects (drips, surges), the recommended thickness of the " wet " layer applied in one technological pass is not more than 400 microns.

<table>
<tr><td>The inter-layer drying</td><td>- time of the first layer is 5-6 hours (at an air temperature of more than +20 ° C and relative humidity of less than 65 %).
- the first layer lasts 20-24 hours (at an air temperature of +10-20 ° C and a relative humidity of 65-80%).
When температуре the air temperature is below +10 ° C, regardless of relative humidity, the inter-layer drying time increases.</td></tr>
<tr><td>The drying time of the coating before applying the protective and decorative material</td><td>is usually составляет it is 3-7 7 days (depending on the thickness of the fire-resistant coating and climatic conditions).
Attention! Protective (decorative)equipment the coating should be applied to the
flame retardant coating after it has dried to a degree of 2 (the paper does not stick to the coating) according to GOST 19007.</td></tr>
<tr><td>Расход Composition consumption 1.5 kg /m2 (excluding technological losses)</td><td>
<table>
<tr><th>Группы Flame retardant efficiency groups</th><th>V
45 min</th><th>IV
60 min</th><th>III
90 min</th><th>II
120 min</th></tr>
<tr><td>Reduced metal thickness, mm</td><td>3,4</td><td>3,4</td><td>3,4</td><td>7,2</td></tr>
<tr><td>Total thickness dry layer thickness, mm</td><td>1,07</td><td>1,38</td><td>2</td><td>2,3</td></tr>
<tr><td>Расход Composition consumption, kg /m2</td><td>1.59</td><td>2.03</td><td>2.82</td><td>3.2</td></tr>
<tr><td>Number of layers (airless spray method) the thickness of the first " wet "layer is 300-400 microns and the maximum thickness of the subsequent " wet " layer is 1000 microns</td><td>2</td><td>3</td><td>3</td><td>4 - 5</td></tr>
</table>
</td></tr>
<tr><td>After finishing the work (24 hours after applying the last layer of the compound).
Monitor it visually.</td><td>Внешний Appearance -the coating is smooth, without cracks and flakes, without foreign stains and other damage.
The color of the coating is white, uniform, and the opacity is 100 %.
Inclusions-no more than 25 pieces/m2, size no more than 0.5 mm
. Shagreen - допускается minor is allowed. Drips
are not allowed.</td></tr>
<tr><td>Full set physical and mechanical properties of the coating</td><td>7 days
B Within 30 days from the moment of application, when pressing on the coating with a force of 5 kg /cm2, dents are allowed.</td></tr>
<tr><td>The warranty period of storage and условия transportation conditions</td><td>is 12 months from the date of manufacture.
The air temperature is 0 ...+35 ° C. Avoid ingress of water and aggressive substances on the container, contact with fire sources and heating elements.
Attention! Short-term or complete cooling of the composition to a temperature below 0 ° C is not allowed.</td></tr>
</table>