LIMITED LIABILITY SOCIETY «NANOCOM»

OKPD-2 23.99.19.111

Group I25
(OKS 81.080)

ACCEPTED
General Director
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HIGH-TEMPERATURE HEAT-INSULATING

“NANOKSILEN” MATERIAL

TECHNICAL CONDITIONS (SPESIFICATIONS)

№ TU 23.99.19-002-31800065-2018

Introduced for the first time

DEVELOPED:
NANOCOM LLC

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INTRODUCTION

These technical conditions (hereinafter referred to as TU) apply to the high-temperature heat-insulating material "Nanoksilen" (hereinafter referred to as Nanoksilen, products). Nanoksilen is intended for the manufacture of casting molds, membranes, porous substrates for growing various types of biological tissues for ultrafine filtration of gases and liquids, substrates for gas and hydraulic catalysts, chemical reactions; lining furnaces, tanks for transportation and storage systems of liquid metals; formation of composite continuous polycrystalline fibers of aluminum. It is applied as heat-insulating and heat-shielding material.

Various fibrous and non-fibrous materials are added to Nanoksilen in order to expand the range of physico-chemical properties and performance characteristics.

The final product based on Nanoksilen has the designation "Nanoksilen [density] [X] [composition] [yy] [zz]", in which density is the apparent density of the product in g / cm^3, X is the abbreviated name of the type of component added, composition is chemical designation of the material of the added component, yy - the average value of the geometric factor of the added component in microns, zz - volume fraction of the added component in %.

Examples:

- Nanoksilen 0.5 - Nanoksilen without additives with a density of 0.5 g / cm3;

- Nanoksilen 0.2 V Al_2O_3 15 20 - a product based on Nanoksilen with a density of 0.2 g/cm3 with the addition of aluminum oxide fiber with an average diameter of 15 μm and a content of 20% by volume;

Reference number:

"High-temperature heat-insulating material" Nanoksilen ". Nanoksilen 0.2 V Al_2O_3 15 20. TU 23.99.19-002-31800065-2018 ".

The list of regulatory documents referenced in this Specification is given in Appendix B.

1 TECHNICAL REQUIREMENTS

The product is manufactured in accordance with the requirements of these technical specifications, design documentation and process regulations for the manufacture of these products, approved in the prescribed manner.

1.1 Main features and parameters

1.1.1 The main technical parameters are listed in table 1.

Table 1

Name of the indicator	Norm
Appearance	Matt
Color	From white to grey
The nanofibers diameter, nm	5-10
Porosity adjustable,%	50-90
Apparent density, g/cm^3	0.4-0.2
Heat conductivity, W/(m*K)	From 0.024
Operating temperatures, °C	-273-1650

1.3 Requirements for materials and raw materials

1.3.1 The components (substances) from which products are manufactured must comply with the requirements of the normative documentation applicable to them and be suitable for use.

1.3.2 For the manufacture of Nanoksilen apply nanofibres of mullitokremnezema, boric acid, boron amorphous, clay.

1.4 Marking

1.4.1 For each unit of transport packaging of products must be marked according to GOST 14192.

1.4.2 On delivery, the marking is applied directly to the container and (or) on the label (label) with indelible paint.

Marking must contain the following information:

- trademark or name of the manufacturer;
- symbol of production, brand of Nanoksilen;
- the number of consignment ;
- date of manufacture;
- net weight;
- technical control stamp;
- designation of these technical conditions.

1.4.3 The marking must be made in Russian or another language according to the supply agreement. Marking must be maintained for the entire delivery time until used by the Customer.

1.4.4 Transport marking - in accordance with GOST 14192.

1.5 Packing

1.5.1 All packaging must comply with the requirements of the Technical Regulations of the Customs Union TR TS 005/2011 "About packaging safety".

1.5.2 Products, made of Nanoksilen and its modifications, are supplied under conditions of bulk fixation from impact in a foam filler, or its analogue in a plastic container - bags, containers, barrels, etc. The specific form and mass of deliveries are determined by the contract between the consumer and the manufacturer.

1.5.3 Before use, transport packaging should be checked for purity and the absence of other materials.

1.5.4. It is allowed, by agreement between the manufacturer and the customer, to use other types of containers that ensure the safety of products during transportation and storage.

It is allowed to use imported shipping containers that meet the requirements.

1.5.5 Technical and shipping documentation must be packaged in a plastic bag in accordance with the requirements of the Technical Regulations of the Customs Union TR CU 005/2011 "On packaging safety", or shipped without packaging as agreed with the customer.

2 SAFETY AND ENVIRONMENTAL PROTECTION

2.1 Nanoksilen is non-flammable, odorless, non-toxic.

2.2 When working with Nanoksilen, it is necessary to follow the safety regulations, applicable to working with nano-sized powders and fibers.

2.3 Work with Nanoksilen should be carried out in accordance with the requirements of current safety standards, regulatory and technical documents for products of a particular type, as well as a system of occupational safety standards and approved hygienic standards.

2.4 The product is a substance of low hazard and belong to the 4th hazard class according to GOST 12.1.007.

2.5 Control over the sanitary parameters of production and the environment is carried out in accordance with the sanitary rules SP 1.1.1058.

2.6. Production premises should be equipped with mechanical supply and exhaust ventilation, ensuring the concentration of harmful substances in the air of the working area, not exceeding the maximum permissible according to the hygienic standards of GN 2.2.5.1313. The ventilation system of industrial, warehouse and auxiliary premises must meet the requirements of GOST 12.4.021.

2.7 Production personnel should be provided with special clothing and personal protective equipment in accordance with GOST 12.4.011 and typical industry standards.

2.8 Personnel employed in the production, must undergo preliminary on admission to work and periodic medical examinations in accordance with the order of the Ministry of Health No. 302n from 12.04.2011.

2.9 General requirements for ensuring fire safety in production - in accordance with GOST 12.1.004 and according to the fire safety standards NPB 105.

2.11 Waste disposal - according to sanitary rules and standards SanPiN 2.1.7.1322.

2.12 Under normal environmental conditions, the products do not emit harmful chemicals into the environment in quantities exceeding the maximum permissible concentration (MAC) approved by sanitary authorities.

2.13 After using the products at the consumer enterprise, the packaging in which the products were packaged must be disposed of or disposed of in accordance with the requirements of current sanitary standards and regulations.

3 ACCEPTANCE RULES

3.1 Nanoksilen is accepted by a service of technical control of a manufacturer.

3.2 Acceptance of products is carried out in batches. The party is the amount of products obtained from materials of constant quality, produced by the same technology, accompanied by the single document of quality. The volume must be specified in a regulatory or technical document for products of a particular type.

3.3 The frequency of monitoring the physicochemical properties and the values of standardized quality indicators, ensuring technological and technical efficiency in all fields of application, is established by the manufacturer.

3.4 The quality certificate shall contain:

-trademark or manufacturer's name;

-brand of products;

-batch number and date of manufacture;

-net weight of a batch;

-a stamp of technical control;

-the name of the regulatory or technical document, in accordance with which the product is manufactured (technical specifications).

3.5. The consumer has the right, when accepting a product, to carry out a control check of its quality for all standardized indicators stipulated in the regulatory or technical document.

3.6 If latent defects are detected (a defect not detected by standard methods and means of monitoring or diagnosing, but detected during the manufacturing process / involvement in production), the entire batch is delayed and accepted inappropriate, when Nanoksilen is involved in production, regardless of the input control results.

4 CONTROL METHODS

4.1 Appearance and color are controlled by visual inspection.

4.2 The apparent density of Nanoksilen and its modifications is determined by direct measurement of volume and weight or hydrostatic weighing according to GOST 24468. Means of control are scales, measuring instrument, a container with distilled water.

4.3 The thermal conductivity of Nanoksilen and its modifications is determined by measuring the temperature on different sides of a sample heated on one side in accordance with GOST 23619. Control means is a device for determining of thermal conductivity.

4.4 The strength of Nanoksilen and its modifications is determined by the method of direct loading of the sample to failure according to GOST 13525.1. Control means are machines for mechanical testing.

4.5 The phase composition of Nanoksilen and its modifications is determined by X-ray phase analysis. The control means is an X-ray diffractometer.

4.6 The specific surface area of Nanoksilen and its modifications is determined by gas adsorption. The control means is a specific surface analyzer.

4.7 The Nanoksilen its modifications structure is determined by scanning electron microscopy. The control device is a scanning electron microscope.

5 TRANSPORTATION AND STORAGE

5.1 Products made of Nanoksilen and its modifications, packed in bulk containers, are transported by any type of transport in accordance with the rules for the carriage of goods applicable for different types of transport.

5.2 Products must be protected from precipitation, when transporting. Containers with products must be safe and protected from mechanical damage.

5.3 Products made of Nanoksilen and its modifications are stored in special rooms, in original, tightly closed packaging, prevent leakage into the package of moisture, dirt and corrosive substances.

5.4 Handling and storage of products is carried out in accordance with the requirements of manipulation signs and symbols according to GOST 14192 applied to the packaging.

5.5 If the container is safe and undamaged, the shelf life of products is unlimited.

6 GUARANTEES OF THE MANUFACTURER

6.1 The manufacturer guarantees the conformity of products to the requirements of this technical specification, TU 23.99.19-002-31800065-2018 under the conditions of transportation and storage.

7 RECOMMENDATIONS FOR USE

7.1 The specific value of the Nanoksilen and its modifications content is determined by the consumer according to the results of testing experimental samples.

Appendix A

The list of regulatory documentation

Standard number	Standard name
Order of the Ministry of Healthcare and Social Development of Russia dated April 12, 2011 No. 302n (ed. Dated February 6, 2018) "On approval of the lists of harmful and (or) hazardous production factors and works during which preliminary and periodic medical examinations (surveys) are carried out, and the Procedure for preliminary and periodic medical examinations (examinations) of workers engaged in heavy work and work with harmful and (or) dangerous working conditions "	
GOST 12.1.004-91	Occupational Safety Standards System (OSSS). Fire safety. General requirements (with a change in N 1)
GOST 12.1.018-93	Occupational Safety Standards System (OSSS). Fire and explosion safety of static electricity. General requirements
GOST 12.1.045-84	Occupational Safety Standards System (OSSS). Electrostatic fields. Permissible workplace levels and inspection requirements
GOST 12.4.011-89	Occupational Safety Standards System (OSSS). Means of protection of workers. General requirements and classification
GOST 12.4.021-75	Occupational Safety Standards System (OSSS). Ventilation systems. General requirements
GOST 12.4.121-2015	Occupational Safety Standards System (OSSS). Personal respiratory protection. Filter masks. General technical conditions
GOST 12.4.124-83	Occupational Safety Standards System (OSSS). Remedies against static electricity. General technical requirements
GOST 12.4.253-2013	(EN 166: 2002) Occupational Safety Standards System (OSSS). Personal eye protection. General technical requirements
GOST 17.2.3.01-86	Nature Protection. Atmosphere. The rules of air quality control of populated areas
GOST 17.2.3.02-2014	Rules for determining the allowable emissions of pollutants by industrial enterprises
GOST 13525.1-79	Semi-finished fibrous, paper and cardboard. Methods for determining tensile strength and elongation under tension (with Changes N 1, 2)
GOST 14192-96	Marking of goods (with changes in N 1, 2, 3)
GOST 23619-79	Refractory heat-insulating materials and mullet-silica glass-fiber products. Specifications (with Changes N 1, 2, Amended)
GOST 24468-80	Refractory products. Method for determination of apparent density and total porosity of heat insulating products (with Changes N 1, 2)
GOST 33756-2016	Polymer consumer packaging. General technical conditions
SP 1.1.1058-01	Organization and conduct of production control over the observance of sanitary regulations and the implementation of sanitary and anti-epidemic (preventive) measures
SP 4783-88	Sanitary regulations for the production of synthetic polymeric materials and enterprises for their processing
SP 2.2.2.1327-03	Hygienic requirements for the organization of technological processes of the equipment and working tools production
SanPiN 2.1.6.1032-01	Hygienic requirements for air quality in populated areas
SanPiN 2.1.7.1322-03	Hygienic requirements for the placement and disposal of production and consumption waste

SanPiN 2.2.4.548-96	Hygienic requirements for the microclimate of industrial premises
NPB 105-2003	Definition of categories of premises, buildings and outdoor installations for explosion and fire hazard
GN 2.2.5.1313-03	Maximum permissible concentration (MPC) of harmful substances in the air of the working area
TR TS 005/2011	Technical Regulations of the Customs Union "On packaging safety"