NEOPORM
foam glass and the materials on its base

Contents:

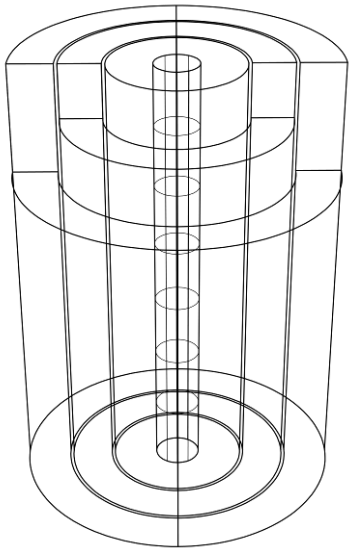
1. Terms and definitions

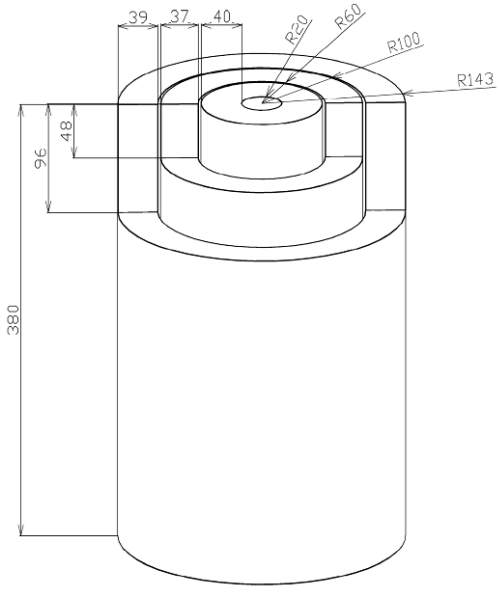
GLASS is an amorphous material, produced by overcooling of hot melt and, with viscosity increased, is getting the properties of a solid body.

FOAMGLASS is a cellular material, representing a heterogeneous system of gaseous and "solid" phases, where the "solid" phase is a fully amorphous glass, that forms polyadric cells (pores) with the walls about some microns thick.

THERMAL INSULATION FOAM GLASS – is a closed-cell material, impermeable of water and gases. It is characterized by specific gas content (which differs from atmospheric air), low middle density (up to 200 kg/m^3), minimum thermal conductivity coefficient (0,04 – 0,05 W/m·K) and practically zero water absorption.

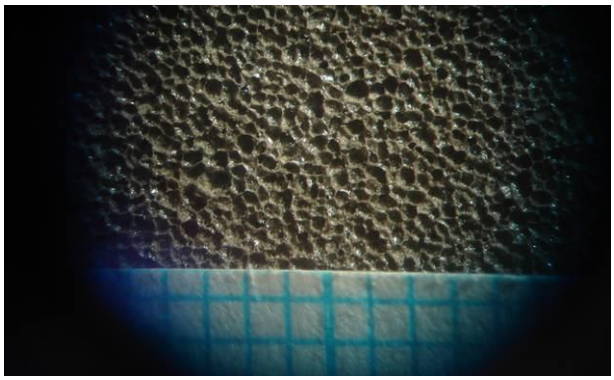
The foam glass «NEOPORM» is a new kind of high quality thermal insulation, which unlike analogous products, has minimal-sized cells of foam and, therefore, unprecedented high strength accompanied by minimum density and low response of thermal conductivity coefficient toward the rising of temperature. It is developed and patented by the "STES-Vladimir" company (Russia).

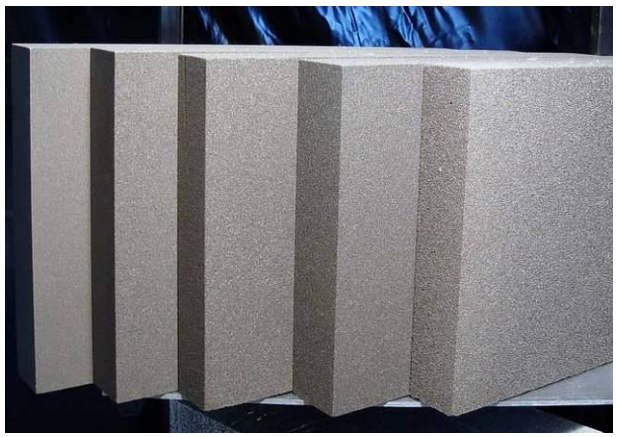




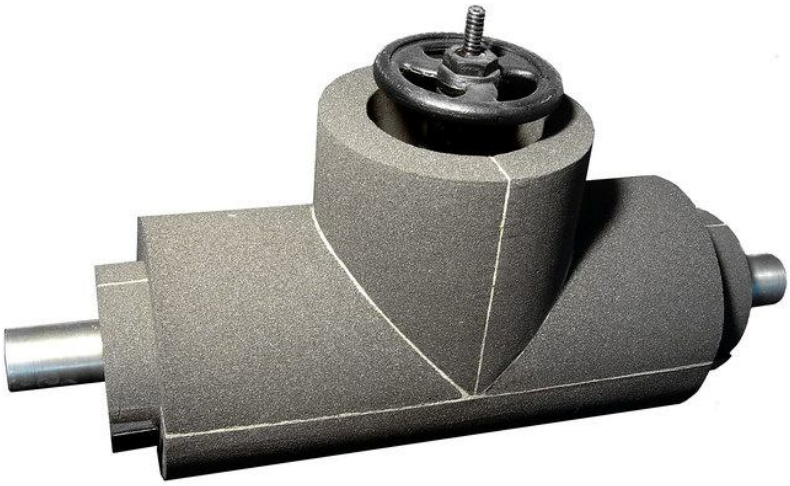
2. Items of products

Bloc foam glass (BCG) with the middle density from 90 to 200 kg/m^3 and compressive strength from 10 to 50 kg/cm^2. The thermal conductivity coefficient of bloc foam glass «NEOPORM» is 0,042 – 0,050 W/(m·K), i.e. 10 - 15 times lower than with effective ceramic bricks masonry. Now the water absorption of the foam glass "NEOPORM" does not exceed 1%, i.e. it practically does not absorb water and is not getting "colder" with water, unlike the majority of other porous materials.





Thermal insulation shells of pipelines and technological equipment (TIS). The thermal properties of these foam glass items fully correspond to those of bloc foam-glass. As a specific feature one may regard very low reduction of thermal insulating properties at high temperature. This, along with practical zero absorption of any liquids and exceptional chemical stability, gives significant advantages in comparison to any existing materials that are now used for thermal insulation of pipelines.



Calibrated granulated foam glass (CGCG) is a material looking like porous spherical granules with vitrified surface. It is produced as fractions in size ranging from 300 μ up to 15 mm. Depending on future application the granules may have bulk density from 150 up to1200 kg/m^3.

NEOPORMCONCRETE is a light-weight concrete on the base of the CGCG "Neoporm". Depending on future application, either by semi-dry pressing or pouring, it is possible to get thermal insulation light-weight concretes and concretes for constructional purposes with the middle density of 350 – 1200 kg/m^3 (compression strength limits are 20 – 160 kg/cm^2 correspondingly) and thermal conductivity coefficient beginning from 0,078 W/(m·K)

3. Review of properties

The unique feature of the "Neoporm" foam glass is a combination of mostly desired properties in one product:

- ✓ thermal efficiency: thermal conductivity coefficient from – 0,039W/(m·K);
- ✓ water impermeability (water absorption not more than 1% by volume);
- ✓ high strength (compression strength limit from 7 to 50 kg/cm^2);
- ✓ application in the temperature range from -260°C to +480°C;
- ✓ high sound absorption (not less than 56 dB);
- ✓ «non-shrinkage» of the material through many years in use;
- ✓ low density of the material (from 90 kg/m^3);
- ✓ chemical stability;
- ✓ vapor impermeability;
- ✓ non-inflammability;
- ✓ rodent and insect stability;
- ✓ dimensional stability;
- ✓ light handling.

It is important to say that durability of foam glass is practically unlimited. The same durability have both bearing structures and foamg lass thermal insulation, which is quite different from the now used thermal insulation materials (both polymeric and fibrous), whose durability seldom reaches 20 - 25 years.

You can find some materials that do not concede to foam glass in any properties mentioned above. But what principally differs foam glass is that it has **the whole complex of properties** needed by the customer.

4. Application fields

- thermal insulation of roofs (inverted roofs as well), floors;
- thermal insulation of outer walls;
- thermal insulation of chimneys and pipelines;
- thermal insulation of "hot" and "cold" pipelines;
- thermal insulation of power engineering equipment;
- high efficiency loose fill on roofs;
- high efficiency aggregate material in concretes and concrete items;
- warm roofing and flooring;
- fabrication of warm wall masonry blocs.

Together with the Central Research Institute of industrial buildings there has been created an album of project solutions on applications of thermal insulation on the base of the "Neoporm" foam glass in commercial and industrial buildings. The album has been certified in the Federal certification center of the Rosstroj (RF.)

Together with the Research Institute "Pipeline construction" OAO "Transneft" (Moscow) there have been developed Technical Conditions of application of the "Neoporm" foam glass insulation on pipelines of gas and oil industry.

5. Additional information

Glass is a chemically and biologically inert material. On the one hand, this made it utterly popular as a universal packing material and a very durable building material. On the other hand, as it is not soluble with water and any other aggressive media, and as it can resist microorganisms, glass cullet can survive unchanged for hundreds and even thousands of years. Glass does not catch fire, you cannot get rid of it with incinerators. Glass does not solve in water and does not decay. When thrown away to dump, it may litter soil for ever without shrinking in the course of years.

The production of "NEOPORM" foam glass allows to do without premelting of glass and make use of different glass cullet, whose effective utilization by other means is impossible. The production of foam glass is ecologically pure and by itself helps to solve ecological problems as it uses waste glass.

The "NEOPORM" foam glass has steadily been produced by the "STES-Vladimir" Company in small portions since 2002. During this period of time its production process is fully developed, the properties are studied; the documentation for its industrial and construction usage is accomplished.

While studying the properties of the "NEOPORM" foam glass the "STES-Vladimir" Company has collaborated with the leading research institutions of the branch. The supreme quality and unique properties of the material were confirmed by **the Central Research Institute of Building Physics RAASN, VNIIGAS, FGUP "NIKIMT", PI-2, NII Mosstroj, the Institute of Glass "GIS", IC FGU VNIIPO, CNIIPROMZDANIJ, VNIIST**.

The "NEOPORM" foam glass is the only home-made foam glass, whose properties have been fully confirmed in the course of independent research.

The "STES-Vladimir" Company several times has successfully participated in the branch-oriented exhibitions and has won the First grade diploma of the Contest of constructional innovations "The Russian House of Future – 2007".

"STES-Vladimir" Company
600031, Vladimir, Dobroselskaja st. 216
tel.: +7(4922) 21-44-14, fax: 21-01-42
e-mail: a.zinovyev@a-stess.com, www.a-stess.com