Title: FLUIDAL HEAT AND SOUND INSULATION MATERIAL COMPRISING EXPANDED GLASS BEADS AND APPLICABLE ON DESIRED SURFACES

Abstract: The invention relates to insulation (seal) material, which is applied especially with the purpose of heat and sound insulation on wall, roof etc. interior and exterior surfaces found in house, hotel, factory, animal housing and farms, and holiday villages etc. enclosed spaces and machines that are desired to have such kind of insulation, which comprises hollow or air filled expanded glass beads, which can be applied on all kinds of desired surfaces by being conserved in fluidal form, and which can also be produced in colour.
FLUIDAL HEAT AND SOUND INSULATION MATERIAL COMPRISING EXPANDED GLASS BEADS AND APPLICABLE ON DESIRED SURFACES

DESCRIPTION

The Related Art

The invention relates to insulation (seal) material applied especially with the purpose of heat and sound insulation on wall, roof etc. interior and exterior surfaces found in house, hotel, factory, animal housing and farms, and holiday villages etc. enclosed spaces and machines which are desired to have such kind of insulation.

The invention particularly relates to insulation material, which comprises hollow or air filled expanded glass beads, can be applied on all kinds of desired surfaces by being conserved in fluidal form, and can also be produced in colour.

The Prior Art

Heat and sound insulation, especially heat insulation has always been an important problem for human to solve. Various embodiments and methods had been used and are still being used with this purpose.

Heat and sound insulation is commonly obtained via complete air gap or vacuum left between two surfaces. The most fundamental embodiment operating with this principle is brick. Tens, even hundreds of air channels are opened inside a wall formed of bricks, which comprise channels due to its structure. With the same logic, hollow blocks are used as embedded inside concrete found at ceilings and floors.

However, a brick wall enclosed only by plaster is not adequate for insulation. Therefore, bricks comprising plates made of polystyrene have been formed and started to be used. The utility model with no TR 2005 03979 can be given as an example to this. In this document, brick is disclosed as having rows of air channels at the back of its surfaces one facing outside and the other inside and an insulation plate housing between these (as the intermediate layer of the brick).

The plates are commonly used by being covered on surfaces such as wall or ceiling. However, additional plasters have to be made below and above these plates and wall plugs in various forms have to be used in order to attach the plates. This is a method, which is quite labouring, has high error margin, and causes loss of labour and time and thus cost.
Moreover, again painting has to be made over said last plaster. If it is applied later on over an exterior or interior face, which is already painted, painting cost occurs again.

When the usage of expanded glass beads is analyzed, the European patent application with publication no EP1983034 is encountered. This document discloses coating, which is used for mechanical protection and thermal insulation of pipes and equipments, and which is formed of two layers. Among the layers, the one preferably left at the inner side is a polyurethane layer, whereas the one left at the outer side is formed of a silicone rubber comprising glass beads.

However, as it is mentioned, the insulation material disclosed in the application is not in fluidal form and is not used in insulation of surface of closed spaces. Moreover, it does not comprise inorganic materials or additives which improve technical properties.

As a result of all of these drawbacks, need has occurred for insulation material, which has fluidal form, can be applied easily on surfaces, self-coloured, and has high technical quality.

**Brief Description of the Invention**

The invention is formed by being inspired from the prior art and aims to solve the above said problems.

The primary purpose of the invention is to form an insulation material which can easily be applied on interior and exterior surfaces of structures desired to have heat and sound insulation.

The purpose of the invention is to break thermal bridges via the hollow or air filled expanded glass beads it comprises, and thus provide heat insulation and also provide fire insulation via the glass material. Additionally, via the expanded beads, the material is lighter and the load it applies on the structure is reduced. Contrary to the prior materials, the invention adds 1 kg load per meter square.

A purpose of the invention is to be easily applied on all kinds of desired surfaces by amateur people by being formed in fluidal form. For this purpose, it is ready just after being taken out of its case and it does not require an additional preparation. In addition to this, especially in multi-residence buildings, in cases where all the building can not be insulated, the person who wants to insulate his/her house can use this material only for his/her own house.
The invention also aims to provide a long-lasting usage, since it adheres very well on concrete, steel etc. surfaces and it is durable against all kinds of bad weather conditions.

Another purpose of the invention is to provide an insulation material, which does not require additional painting on the structures it is applied, via the colouring agent it comprises.

Another purpose of the invention is to form an insulation material which does not prevent breathing and thus provides comfortable use.

The structural and characteristic features of the invention and all advantages will be understood better in detailed descriptions with the figures given below and with reference to the figures, and therefore, the assessment should be made taking into account said figures and detailed explanations.

**Detailed Description of the Invention**

The invention is a surface coating material applied with the purpose of heat and sound insulation on wall, roof etc. interior and exterior surfaces found in house, hotel, factory etc. enclosed spaces and machines which are desired to such kind of insulation, and it comprises:

- water,
- hollow expanded glass beads providing heat, sound, and fire insulation,
- at least one binding agent providing adherence on said surface,
- inorganic material or materials, which increase adhesion (adherence) values and durability and provide protection against solar rays, and
- at least one additive keeping it ready to use for a long time.

The invention also comprises at least one colouring agent providing colourizing of the coating material in order not to need painting on the material especially when it is used on buildings.

**Preferred contents of the invention:**

In this detailed description, the preferred embodiments of the insulation material, which is the subject of the invention, will only be disclosed for better understanding of the subject, and will not form any limiting effect.

The invention is an insulation material formed in fluidal form basically comprising glass beads, which have air inside, and which are homogeneously distributed inside a binder. In
this way, it can easily be applied on the surface desired to be insulated. Sizes of said beads vary between 0.1 to 0.5 mm.

As the binding agent comprised by the invention, at least one material selected from the group comprising styrene acrylic and acrylic emulsion or any combination thereof is used.

As the inorganic material, at least one agent selected from the group comprising perlite, calcite, mica, and talk or any combination thereof is added. Inorganic materials basically increase the adhesion property on the surface applied and provide the invention with a decorative appearance. In addition to these, they increase durability and increase performance. Inorganic materials also prevent the colour from fading due to solar rays when colouring agent is used.

The colouring agent is formed of at least one material selected from the group comprising colouring pigment and titanium dioxide or any combination thereof.

The invention comprises the materials formed of at least one of the agents selected from the group comprising softener providing the invention maintain fluidal for long time inside the casing it is kept, wetting agent and antifreeze, antifoaming agent preventing formation of air bubbles, water repellent, which prevents the material from water absorption but does not prevent breathing of the surface and provides discharging of the moisture left at the wall and prevents holding of the water which may be formed on the material, thickener, film dispersing agent providing easy application and dispersion of the material, film strengthening increasing durability of the material against external factors, anticoagulant, and antibacterial or any combination thereof as said additive.

Preferred general formula of the invention comprises (by mass);
- 15 - 30% water,
- 5 - 70% hollow expanded glass beads,
- 13 - 30% binding agent,
- 20 - 55% inorganic material,
- 0.2 - 0.3% softener,
- 0.25 - 0.35% antibacterial agent,
- 0.2 - 0.4% antifoam agent,
- 0.3 - 0.5% thickener agent,
- 0.2 - 0.4% wetting agent,
- 0.1 - 0.3% film dispersing agent,
- 1 - 7% water repellent agent,
- 0.5 - 3% film strengthening agent,
- 0.2 - 0.4% anti-coagulant agent, and
- 1 - 2% anti-freeze agent.

In addition to these, the preferred formulation comprises 2 - 15% titanium dioxide and 0.1 - 0.2% deacidifier agent by mass.

For the materials disclosed under the title of said additives and for the colourizing pigment, selection can be made among the agents which are known to have these properties in the related art.

Preferred formulation example of the invention comprises (by mass);
- 15% water,
- 32% glass beads,
- 15% binding agent,
- 15% calcite,
- 2% mica,
- 10% expanded perlite,
- 0.25% softener (e.g. sodium hexa meta phosphate),
- 0.35% antibacterial agent (e.g. biocides),
- 0.30% antifoam agent,
- 0.40% thickener agent (e.g. carboxymethyl cellulose),
- 0.25% wetting agent,
- 0.15% film dispersing agent,
- 2.40% water repellent agent (e.g. silicone),
- 0.50% film strengthening agent (e.g. aluminium stearate),
- 0.30% anti-coagulant agent (e.g. zinc stearate),
- 1% anti-freeze agent (e.g. mono ethylene glycol - MEG),
- 0.10% deacidifier (e.g. ammonia) and
- 5% titanium dioxide.

If the material of the invention is desired to be colourful, 0.1 - 10% by mass colourizing pigment is added according to the type of the colour. In this case, 100% total ratio can be achieved by reducing backfill material equal to the pigment amount added.
While preparing the invention, first water and additives are mixed. While mixing operation continues, calcite, mica, titanium dioxide, beads, binder, water repellent, and colouring agent are added respectively. After obtaining the final product, it is conserved by being stored in suitable casings.
CLAIMS

1. The invention is surface coating material applied with the purpose of heat and sound insulation on wall, roof etc. interior and exterior surfaces found in house, hotel, factory etc. enclosed spaces and machines which are desired to such kind of insulation, and it is characterized in that; it comprises:
   - water,
   - hollow expanded glass beads providing heat, sound, and fire insulation,
   - at least one binding agent providing adherence on said surface,
   - inorganic material or materials, which increase adhesion (adherence) values and durability and provide protection against solar rays, and
   - at least one additive keeping it ready to use for a long time.

2. Surface coating material according to Claim 1, and it is characterized in that; it also comprises at least one colouring agent providing colouring of the coating material.

3. Surface coating material according to Claim 1 or 2, and it is characterized in that; it comprises (by mass):
   - 15 - 30% water,
   - 5 - 70% hollow expanded glass beads,
   - 13 - 30% binding agent,
   - 20 - 55% inorganic material,
   - 0.2 - 0.3% softener,
   - 0.25 - 0.35% antibacterial agent,
   - 0.2 - 0.4% antifoam agent,
   - 0.3 - 0.5% thickener agent,
   - 0.2 - 0.4% wetting agent,
   - 0.1 - 0.3% film dispersing agent,
   - 1 - 7% water repellent agent,
   - 0.5 - 3% film strengthening agent,
   - 0.2 - 0.4% anticoagulant agent, and
   - 1 - 2% anti-freeze agent.

4. Surface coating material according to any one of the previous claims, and it is characterized in that; it also comprises 2 - 15% by mass titanium dioxide.
5. Surface coating material according to any one of the previous claims, and it is characterized in that; it also comprises 0.1 - 0.2% by mass deacidifier.

6. Surface coating material according to any one of the previous claims, and it is characterized in that; it also comprises 0.1 - 10% by mass colouring pigment according to the type of the colour to colourize the material.

7. Surface coating material according to any one of the previous claims, and it is characterized in that; said binding agent is at least one agent selected from the group comprising styrene acrylic and acrylic emulsion or any combination thereof.

8. Surface coating material according to any one of the previous claims, and it is characterized in that; said glass bead is between 0.1 - 0.5 mm.

9. Surface coating material according to any one of the previous claims, and it is characterized in that; said inorganic material is at least one material selected from the group comprising perlite, calcite, mica, and talc or any combination thereof.

10. Surface coating material according to any one of the previous claims, and it is characterized in that; said additive is at least one agent selected from the group comprising softener, antifoam, thickener, wetting agent, film dispersing agent, water repellent, film strengthening, anticoagulant, antifreeze, deacidifier, and antibacterial agent or any combination thereof.

11. Surface coating material according to any one of the previous claims, and it is characterized in that; said colouring agent is at least one agent selected from the group comprising colouring pigment and titanium dioxide or a combination thereof.