

NEW NOISE INSULATION MATERIAL

Expanded Polystyrene Granules with Heavy Core

Jozef Cipin

Acoutherm Insulation Ltd., 743 Garyray Drive, Weston, Ontario M9L 1R2

SCOPE OF THE INVENTION

The present invention relates to an insulating material which may be used either as loose material or as part of a panel construction, and more particularly to a granular or chip-type insulating material having a sound absorbing and sound isolating high density central core, and a relatively less dense thermally insulating outer coating.

BACKGROUND OF THE INVENTION

Granular-type insulating materials used in providing thermal insulation are well known. Typically, conventional granular insulating materials consist of expanded or foamed light-weight polymers, such as polystyrene. The polymers are formed into approximately spherical granules which have an average diameter of about 1.5 millimetres.

It is known to use conventional polystyrene granules in construction where, for example, the granules are used as thermal insulation which is blown loose into cavities, or are compacted together to form aggregate panels which range in thickness between 0.5 and 6 inches. While expanded polystyrene has low thermal conductivity and provides good thermal insulation, the low density of polystyrene makes conventional granules very poorly suited to absorb sound energy and substantially transparent to sound energy.

A further disadvantage with conventional polystyrene insulating granules exists in that if the granules are exposed to a flame, the polystyrene will readily burn producing noxious fumes and potentially hazardous bi-products on combustion.

Conventional granular insulating materials also suffer the disadvantage that they are highly susceptible to damage by rodents and insects. In particular, mice and rats may easily burrow through and nest in either loose blown granules or aggregate panels made from such granules.

SUMMARY OF THE INVENTION

To overcome at least some of the disadvantages associated with the prior art, the present invention provides for an insulating particulate material which may be used in construction and which has a sound absorbing and/or sound isolating high density core which is surrounded by a relatively less dense thermally insulating outer coating. The insulating outer coating advantageously prevents thermal conduction, while the higher density core absorbs, reflects and/or refracts sound waves to reduce the propagation of sound waves through the granules.

Another object of the invention is to provide a thermally insulating granule having a sound absorbing high density core which may be easily and economically manufactured.

Another object of the invention is to provide an acoustical panel for use as a construction material which is formed from a plurality of thermally insulating granules having a high density core which incorporates rodent and/or insect deterring compounds or compositions.

A further object of the invention is to provide an insulating granule for use as a construction material and which may safely incorporated flame retardant compounds

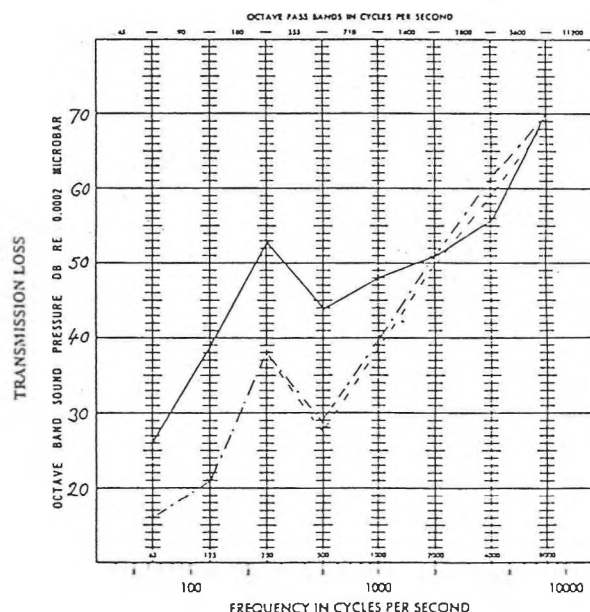
and/or compositions without concern of degradation of such compounds over prolonged periods of time.

The applicant has appreciated that at least some of the foregoing objects may be achieved by providing an insulating granule which includes a sound absorptive central core which has a density of at least 1.0 grams/cm^3 , and an outer less dense thermally insulating coating provided at least partially about the core. The outer coating preferably has an expanded cellular structure and a density of less than 0.75 grams/cm^3 , with the core comprising between about 5 to 80% of the granule by volume, and more preferably about 10 to 40% by volume.

The granules may be either generally spherical or have an amorphous shape and have an average diameter of between about 0.5 to 30mm. More preferably, the outer coating is provided evenly about the core with the ratio of average cross-sectional diameter of the core to that of the overall granule diameter being selected at between about 5:6 and 1:6, and more preferably between about 1:2 to 1:4.

PRELIMINARY RESULTS:

Measurement of panel 25" x 25" made of frame from 2 1/2" metal stud with 1/2" gypsum board on each side. There is to compare: empty panel - - - panel filled with fiberglass - - - Panel filled with exp. Ps granuls with heavy core - - - Density approx. 300 kg/m^3 or 18.7 lbs/ft^3 .



Reference: Patent Application