

PERLITE FOR UNDERFLOOR INSULATION

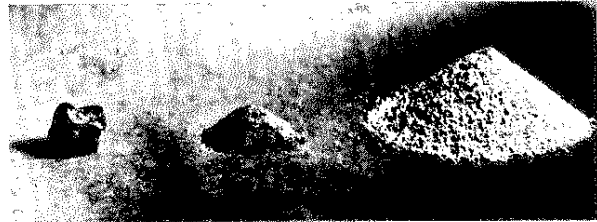
What is Perlite?

Perlite is not a trade name but a generic term for naturally occurring siliceous volcanic rock. The distinguishing feature which sets perlite apart from other volcanic glasses is that when heated to a suitable point in its softening range, it expands four to twenty times its original volume.

This expansion is due to the presence of two to six percent combined water in the crude perlite rock. When quickly heated to above 1600°F (870°C) the crude rock pops in a manner similar to popcorn as the combined water vaporizes and creates countless tiny bubbles in the heat softened glassy particles. It is these tiny glass-sealed bubbles which account for the amazing physical properties of expanded perlite.

The expansion process also creates one of perlite's most distinguishing characteristics: its white color. While the crude perlite rock may range from transparent to light gray to glossy black, the color of expanded perlite ranges from snowy white to grayish white.

Expanded perlite can be manufactured to weigh from 2 lb/ft³ (32 kg/m³) to 15 lb/ft³ (240 kg/m³) making it especially suitable for use in insulation applications. Perlite is used in the manufacture of lightweight perlite concrete, insulating board, insulating plasters, cryogenic insulation, masonry wall insulation and as underfloor insulation.



Crude Perlite

Crushed Crude Perlite

Expanded Perlite

Three stages of perlite production shown above illustrate the great increase in volume after furnacing. The same weight of perlite, 1 oz (28 gm) is shown in each photo.

Why Perlite Insulation?

Perlite underfloor insulation is an inorganic product that does not rot, support combustion nor provide a habitat for rodents. Because of its neutral pH, the product does not foster corrosion in piping and electrical wiring that may be in the underfloor area.

When used for underfloor insulation, a water repellent, dust suppressed perlite specially produced for this application is used.

Perlite Underfloor Insulation Specifications

Water repellent, dust suppressed perlite under-floor insulation is produced in accordance with ASTM C549-81, Type IV (water repellent and dust suppressed). Other specifications are outlined below.

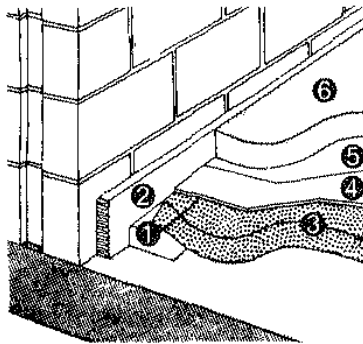
Density	4.5 to 6.25 lb/ft ³ (70-100 kg/m ³)
Sieve analysis (U.S. Standard)	10-20% plus 16 mesh (1.18 mm) 90% plus 100 mesh (0.150 mm)
Thermal Conductivity (Varies with Density)	0.27-0.33 Btu·in/h·ft ² ·°F 0.039-0.047 W/m·K

Underfloor Applications

Perlite underfloor insulation may be used under floating concrete floors, asphalt floors and floating board floors. It is especially useful when used to level floors and greatly reduces sound transmission from floor to floor, from floors to walls and from underfloor piping systems.

Floating Floors

Perlite underfloor insulation is most frequently used under floating concrete floors. In this application, perlite insulation is poured on the original floor surface, screeded to proper depth, covered with corrugated cardboard or lightweight boards, and a layer of oil paper. Oil paper must be used if a concrete floating floor is to be poured. A plastic film is used beneath the perlite to prevent seepage of material between cracks in floors and walls. Poured concrete floors, asphalt floors or wood floors can be laid over the insulation in a conventional manner.

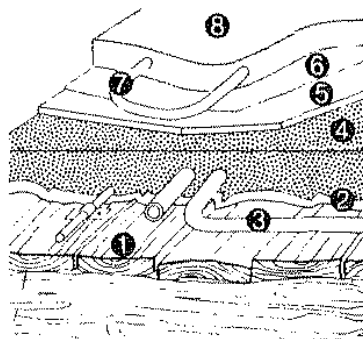


1. Plastic Film
2. Expansion Strip
3. Perlite Insulation
4. One Sided Corrugated Cardboard
5. Oil Paper
6. Floor

This system is particularly useful when under-floor heating is employed as the insulation is dimensionally stable under varying temperatures and is not combustible. Perlite under-floor insulation as thick as 12 inches (30 cm) has been applied, but 2-4 inches (6-10 cm) is the normal. Underfloor insulation over 4 inches (10cm) should be compacted. A unique feature of perlite insulation is that particles will interlock when pressed together and settling or volume changes will not take place.

Leveling of Floors

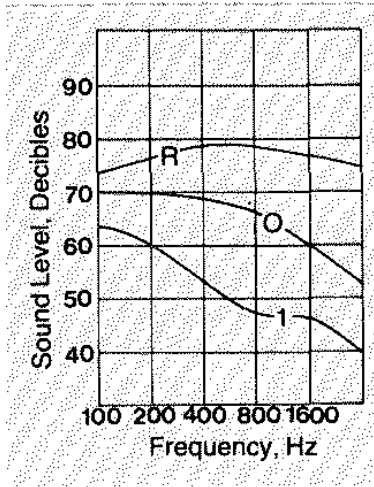
A special property of perlite is its ability to flow around any roughness, unevenness or exposed installations on the base floor. This enables the easy and rapid installation of level floors. In addition, because perlite underfloor insulation is water repellent, it will not absorb water should there be a plumbing leak. This characteristic of perlite underfloor insulation will limit damage to a local area. As perlite is inorganic with a neutral pH, it will not corrode piping or electrical or communications conduits beneath the floor.



1. Wooden Floor
2. Plastic Film
3. Piping and Conduits
4. Perlite Insulation
5. One Sided Corrugated Cardboard
6. Oil Paper
7. Floorheating System
8. Floor

Sound Insulation

An area of increasing importance today is sound insulation. In construction there are three concerns: low sound transmission in construction components, low transmission between floors and walls and low transmission of sound from footsteps. Perlite underfloor insulation performs in much the same manner as multi-wall systems with bulk insulation to achieve reductions in sound transmission.



Curve R - Steel reinforced concrete floor

Curve 1 - Same as R with 10 inches (25 mm) of perlite underfloor insulation on top, then one layer of corrugated cardboard with oil paper on top.

Curve 0 - Minimum standard - German Industry Standard DIN-4109

With perlite underfloor insulation systems, sound transmission from floors to walls is reduced by using expansion strips at the intersection of floors and walls. Sound transmission from plumbing systems is also reduced when piping is surrounded by perlite insulation within the floor.



Perlite Institute, Inc.

4305 North Sixth Street, Suite A, Harrisburg, PA 17110

717.238.9723 / fax 717.238.9985 / www.perlite.org

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