

## 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 from four to twenty times its original volume.

This expansion is due to the presence of combined water in the crude perlite rock. When quickly heated to above 870°C (1600°F), 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 excellent insulating properties and light weight of expanded perlite.

Expanded perlite can be manufactured to weight from 30 kg/m<sup>3</sup> (2 lb/ft<sup>3</sup>) to 240 kg/m<sup>3</sup> (15 lb/ft<sup>3</sup>) making it especially suitable for use in insulating applications. High Quality perlite as europerl® is used in the manufacture of cryogenic, low temperature and high temperature insulation, lightweight insulating concrete, insulating board, insulating plasters, masonry wall insulation and as underfloor insulation.



## Cryogenic Applications for Europerl® Insulation

Because of its unique properties, europerl® insulation has found wide acceptance in the insulating of cryogenic and low temperature storage tanks, in shipping containers, cold boxes, test chambers, and in food processing.

Storage temperatures of -100°C (-150°F) and below are considered cryogenic. Storage temperatures of -100°C (-150°F) and above to +4°C (+40°F) are considered low temperature. Super cold or extremely cold cryogenic fluids such as hydrogen and helium are normally stored in spherical, double walled vessels with evacuated annual spaces using evacuated perlite.

## Properties of Europerl® Insulation

Europerl® insulation suitable for nonevacuated cryogenic or low temperature use exhibits low thermal conductivity throughout a range of densities, however, the normal recommended density range is 35 to 60 kg/m<sup>3</sup> (2 to 4 lb/ft<sup>3</sup>). In addition to its excellent thermal properties, perlite insulation is relatively low in cost, easy to handle and install, noncombustible and meets fire regulations, lower insurance rates, does not shrink, swell, warp or slump. Because it is an inorganic material, it is rot and vermin proof. As a result of its closed cell structure, the material does not retain moisture.

## Typical Nonevacuated Installation

There are many different design concepts for low temperature and cryogenic storage vessels. However, most are of double wall construction with the annulus filled with high quality cryogenic perlite as europerl®.

Packaged or bulk europerl® may be used to insulate smaller vessels by pouring or blowing the insulation in place.

Portable europerl® expansion plants are usually used to insulate big storage tanks, cold boxes, ships, and other double wall vessels and pipes. In these applications perlite ore is expanded on-site and the europerl® insulation is conveyed pneumatically into the annulus.



## Specifications

Density (depending on customer specifications):	35 – 60 kg/m <sup>3</sup>
Sieve Analysis:	0 – 1,5 mm
Thermal Conductivity (appr. at mean temperature)*:	
0 °C ( 32 °F)	0,041 W/mK
- 50 °C (- 58 °F)	0,035 W/mK
-100 °C (-150 °F)	0,028 W/mK
-150 °C (-240 °F)	0,021 W/mK
Additional perlite needed on manual filling:	0 – 10 %
Additional perlite needed on pneumatic filling:	5 – 20 %
pH	6 – 8
organic ingredients	< 0,1 %
combustibility	unburnable
melting point	1.400 °C
Chemical Analysis (typical):	
SiO <sub>2</sub>	65 – 75 %
Al <sub>2</sub> O <sub>3</sub>	10 – 15 %
K <sub>2</sub> O	2 – 5 %
Na <sub>2</sub> O	2 – 5 %
Fe <sub>2</sub> O <sub>3</sub>	0 – 2 %
CaO	0 – 2 %
MgO	0 – 2 %
S and SO <sub>2</sub>	0 %
free silica	0 %

\*Thermal conductivity varies with temperature, density, pressure, and conductivity of the gas which fills the annulus or insulation space.