PERLITE PRODUCT GUIDE 7/85

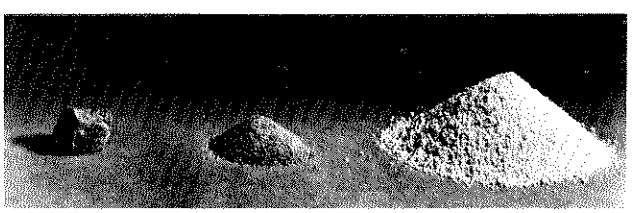
LIGHTWEIGHT FILLERS FOR GLASS REINFORCED POLYESTER

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 light weight and other exceptional 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.



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.

Expanded perlite can be manufactured to weigh from 2 lb/ft^3 (32 kg/m^3) to 15 lb/ft^3 (240 kg/m^3) making it adaptable for numerous uses, including filtration, horticultural applications, insulation, inert carriers and a multitude of filler applications.

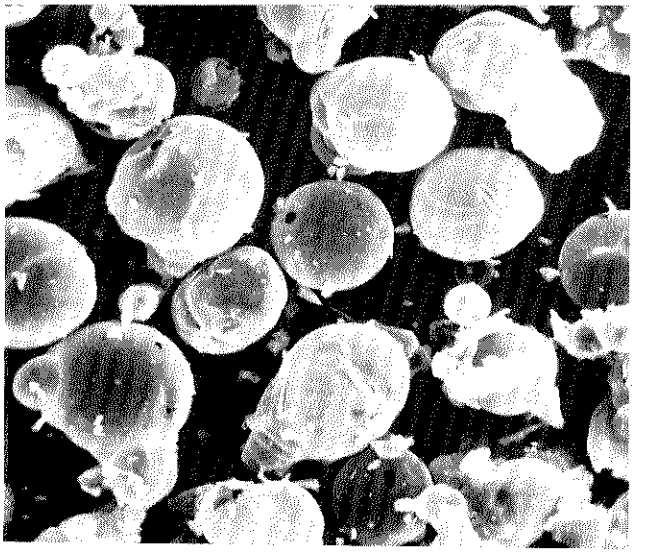
TYPICAL CHEMICAL ANALYSES*

Silicon	33.8
Aluminum	7.2
Potassium	3.5
Sodium	3.4
Iron	0.6
Calcium	0.6
Magnesium	0.2
Traces	0.2
Oxygen (by difference)	47.5
Net Total	97.0
Bound Water	3.0
Total, %	100.0

*All analyses are shown in elemental form even though the actual forms present are mixed glassy silicates. More specific information can be obtained from the ore supplier.

Perlite as a Filler for Glass Reinforced Polyester

Lightweight perlite bubble fillers for glass reinforced polyester are specially graded and treated perlites of low density composed of tiny bubbles of encapsulated air which are manufactured under stringent quality control conditions.



Photomicrograph of lightweight perlite filler.

TYPICAL PHYSICAL PROPERTIES

Bulk Density, lb/ft^3	6-11
kg/m^3	96-180
Alkalinity ASTM D-3100	.030-.035
Oil Absorption (ASTM D-1483)*	180-190
Surface pH	7.0-7.5
Thermal Conductivity, $Btu \cdot in/h \cdot ft^2 \cdot °F$	.35-.40
$W/m \cdot K$	.050-.057
Color	White
Average Particle Size, Microns	40-80
Effective Density, lb/ft^3	12-20
kg/m^3	192-320

*Lbs (kgs) of oil per 100 lbs (kgs) of filler

Because of their unique multicellular structure, lightweight perlite fillers can provide many advantages in glass reinforced polyester applications.

Advantages

1. Inexpensive bulk filler because of its low density.
2. White color is uniform and has little or no effect on color of finished product.
3. Particle shape promotes good bonding between perlite and polyesters.
4. Particle size and shape may enhance some properties such as impact resistance, tensile strength, etc.
5. Reduces cost of raw materials while improving workability.
6. Enhances fire resistance when used with other fire retardant materials.
7. Perlite fillers are generally inert and perlite is listed in the U.S. Food Chemicals Codex.

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