



MANUALSECTION	ISSUE DATE	AUTHORISED	REPLACES	PAGE
<i>Sundries</i>	<i>May 2005</i>	<i>PM</i>	<i>November 1999</i>	<i>I of 4</i>

## VERMICULITE

**DESCRIPTION:** Exfoliated Vermiculite ore available in three grades.

**PROCESS EXPLANATION:** Vermiculite ore is a naturally occurring mineral. Nuplex import **Palabora** ore which is a very high quality grade. The exfoliation process heats the ore to 600°C. This causes water loss and the expansion of the ore in a plate-like manner. The expansion process increases the particle size 10 times.

<b><u>FEATURES/BENEFITS:</u></b>	<b><u>FEATURES</u></b>	<b><u>BENEFITS</u></b>
	Quality ore	Even grade sizes, little dust
	Heat process	Sterile
	Three grades	Even grade sizes
	Heat resistant, incombustible	Resists heat to 1200°C+
	Light weight	Insulation - sound and heat
	Absorbent	Will absorb up to 350% of its own weight

- USES:**
- Lightweight concrete plaster
  - Sterile, plant, bulb packing material
  - Retains moisture for bulbs, plants
  - High temperature insulation
  - Low temperature insulation, walls, ceilings, self filling
  - Sound dampening
  - Hydroponics growth (medium) (sterile)
  - Model manufacture
  - Inert packaging material (export)
  - Absorbent, spill clean up
  - Bulker in animal foods
  - Fire protection coatings for steel and concrete

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**VERMICULITE** (cont'd)**TYPICAL  
PROPERTIES:**

<b>Chemical composition:</b>	Aluminium and iron magnesium silicates
<b>Colour:</b>	Light to medium brown
<b>Fusion point:</b>	1200 - 1320°C
<b>pH in water:</b>	6-9 (insoluble)
<b>Waterholding capacity:</b>	200 - 350% by weight 20 - 50% by volume
<b>Asbestos content:</b>	Zero in Palabora ore
<b>Free silica:</b>	Less than 1%
<b>Thermal conductivity:</b>	K = 0.43 - 0.45 BTU in/ft <sup>2</sup> h°F

<b><u>GRADES:</u></b>	Fine #2	approx size	2 x 2mm
	Medium #3	approx size	5 x 5mm
	Coarse #4	approx size	10 x 6mm

**STORAGE:**

- Do not stack pallets on top of each other.
- Do not crush. Do not get **wet**.
- Store inside, dry conditions.
- **Do not store or transport with odoriferous materials.** Vermiculite will readily absorb odours from adjacent materials.

**\*\*Caution\*\*****SHELF LIFE:**

Indefinite if stored as above.

**LIGHTWEIGHT  
CONCRETE &  
PLASTER.****MIXING CONCRETE & PLASTER****Hand Mixing**

The appropriate volumes of Vermiculite and plaster are mixed dry, the required quantity of clean water is added until the consistency is suitable for the type of background to be plastered.

**Machine Mixing**

Vermiculite aggregate is moistened but not saturated in the mixer. The required amount of plaster is gradually added to the slowly revolving mix. Mixing is long enough to obtain uniformity of colour and consistency. 3 minutes approximately. Over mixing compacts Vermiculite and reduces volume.

**VERMICULITE** (cont'd)**Lightweight Concrete Mixes** (roof screeds and floor slabs)

Machine mixing - Vermiculite and cement are mixed together thoroughly whilst in the dry state. Water is added and mixed well until a uniform distribution has been achieved - approximately F/2 minutes.

A proprietary concrete additive is recommended when mixing Vermiculite lightweight concrete. This will improve the workability of the mix and also reduce the water/cement ratio. It is advantageous to pre-soak grades 3 and 4 prior to mixing to satisfy the water demand of the Vermiculite.

**APPLICATIONS:****a) Plaster Coats**

Applied by the normal accepted trade practices. Trowelling pressure should however be lighter than normal to reduce the possibility of over-compacting the Vermiculite.

**b) Lightweight Concrete**

Laid in bays using normal methods, and consolidated to the desired depth by trowelling. As an example a 50mm screed should be levelled off to about 56mm and then consolidated to 50mm thickness. The minimum recommended thickness of Vermiculite lightweight concrete is 38mm.

<b><u>Mix by*</u></b> <b><u>Volume</u></b>	<b><u>Density</u></b> <b><u>(kg/Lt)</u></b>	<b><u>Compressive</u></b> <b><u>Strength (Mpa)</u></b>	<b><u>Thermal<sup>#</sup></u></b> <b><u>Conductivity</u></b>
1:8	0.21	1.1	0.7
1:6	0.25	1.5	0.9
1:4	0.3	3.0	1.1
1:3	0.4	4.0	1.6
1:3:2 <sup>!</sup>	0.8	8.0	>2

\* Cement: Vermiculite

# Btu/sq ft/hr/°F/in

! Cement: Vermiculite : Sand

**VERMICULITE** (cont'd)c) **Toppings**

Should consist of Portland cement/sand not stronger than 1:4 by volume. To ensure maximum adhesion between Vermiculite concrete and topping, the topping should be applied whilst the Vermiculite concrete is still green, i.e. within 2 hours of the Vermiculite concrete being placed.

The use of plasticiser is an advantage when mixing sand/cement toppings. The plasticiser should be added to the mixing water, as specified by the plasticiser manufacturer, e.g. Nuplex Araplex 2000.