

Exfoliated Vermiculite Data

Size designations of expanded/exfoliated vermiculite commonly in use today

Grade Designations				Exfoliated vermiculite from US derived crude vermiculite		Exfoliated vermiculite from “internationally” derived crude vermiculite	
USA Grade # System	International System Grade Names	Typical imperial size range (inch)	US reference code for product made from imported “Internationally” sourced crude vermiculite	Nominal size range of the exfoliated particles (mm)	Nominal size distribution of the exfoliated particles (mm)	Nominal size range of the exfoliated particles (mm)	Nominal size distribution of the exfoliated particles (mm)
#1	Large Grade	5/16” down	A4	1.18 – 9.5	N/A*	3 – 15	60 – 70% + 4.0mm
#2	Medium Grade	5/32” down	A3	0.6 – 4.75	N/A*	2 – 6	60 – 70% + 2.0mm
#3	Fine Grade	0.08” down	A2	0.6 – 2.36	80% + 0.6mm	0.5 – 3	60 – 70% + 1.0mm
#4	Superfine Grade	0.04” down	A1	0.15 – 1.18	80% + 0.3mm	0.5 – 2	60 – 70% + 0.5mm
#5	Micron	0.02” down	A0	Passing 0.6	55% + 0.3mm	0.1 – 1	60 – 70% + 0.25mm

*N/A = Not applicable. US grades #1 & #2 are no longer mined in North America.

TYPICAL CHEMICAL ANALYSIS OF VERMICULITE	
Element	% by weight
SiO ₂	38 – 46
Al ₂ O ₃	10 – 16
MgO	16 – 35
CaO	1 – 5
K ₂ O	1 – 6
Fe ₂ O ₃	6 – 13
TiO ₂	1 – 3
H ₂ O	8 – 16
Others	0.2 – 1.2



TYPICAL PHYSICAL PROPERTIES OF EXFOLIATED VERMICULITE

Color	Light to dark brown
Shape	Accordion shaped granules
Bulk density ¹	64 – 160 kg/m ³ (or 4 – 10 lb/ft ³)
Specific gravity	2.5 – 2.6
Moisture loss at 110°C (230°F)	4 – 10%
pH (in water)	6 – 9
Combustibility	Non-combustible
Moh's Hardness	1 to 2
Sintering temperature	1150 - 1250°C (2100 – 2280°F)
Fusion point	1200 – 1320°C (2200 – 2400°F)
Cation exchange capacity ²	50 – 100 me/100 grams
Specific heat	0.84 – 1.08 kJ/kg.K. (0.2 – 0.26 kcal/kg.K)
Water holding capacity ¹	220 – 325% by weight (20 – 50% by volume)

Notes: ¹Bulk density and water holding capacity vary with different particle sizes.

²The principle exchangeable ions in vermiculite are Mg²⁺ & Ca²⁺, and this is measured with sodium acetate saturation/ammonium acetate substitution methods.

Typical thermal conductivity of exfoliated vermiculite at differing bulk densities

Bulk Density		Thermal Conductivity	
kg/m ³	lb/ft ³	W/m.K	Btu/in/ft ² /°F
56 – 64	3.5 – 4	0.058	0.40
80 – 96	5 – 6	0.064	0.44
160 – 192	10 – 12	0.071	0.49



The Vermiculite Association

TVA is a domestic not for profit corporation incorporated in the state of Pennsylvania, USA.

Please note: This application note has been prepared by The Vermiculite Association, and has been produced in good faith using accurate information as available at the time of writing. The Vermiculite Association, however makes no warranty with respect thereto or in respect to the accuracy of this application note.

2207 Forest Hills Drive, Harrisburg, PA 17112, United States of America
Phone: 717-238-9902 | Email: tva@vermiculite.org | Website: www.vermiculite.org