

VERMICULITE



Indian Minerals Yearbook 2014 (Part- III : Mineral Reviews)

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VERMICULITE

(FINAL RELEASE)

**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

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48 Vermiculite

Vermiculite is a term applied commercially to micaceous minerals (essentially hydrated silicates of Al, Mg and Fe), usually alteration products of biotite or phlogopite micas, formed by the removal of much alkalies and addition of water. Vermiculite differs from mica in its characteristic property, i. e., exfoliation. Crude vermiculite is always exfoliated before use.

RESOURCES

The total resources of vermiculite as on 1.4.2010 as per UNFC system are placed at 2.5 million tonnes of which about 68% are placed under reserves category. and balance 32% are placed under remaining resources category. Resources are located in Tamil Nadu (75%), Andhra Pradesh (14%), Karnataka (8%), Rajasthan (2%) and Jharkhand (1%). Minor resources are located in Gujarat, Madhya Pradesh and West Bengal (Table-1).

PRODUCTION, STOCKS & PRICES

Production of vermiculite at 10,176 tonnes in 2013-14 increased by 28% as compared to that in the

previous year. There were 8 reporting mines in both years. Besides, production of vermiculite was reported as associated mineral by seven mines in 2013-14 as against six mines in previous year. About 39% of the total production was reported as an associated mineral of apatite, felspar, mica & quartz mines in Andhra Pradesh. The share of public sector was 22% as compared to 17 % in the preceding year.

Andhra Pradesh was the leading producer of vermiculite in 2013-14, which accounted for 78% of the total output and remaining 22% was from Tamil Nadu (Tables- 2 to 4).

Mine-head closing stocks of vermiculite for the year 2013-14 were 12,867 tonnes as against 10,131 tonnes in the previous year (Table- 5).

The average daily employment of labour during the year was 103 as against 73 in the preceding year.

Domestic prices of vermiculite are furnished in the General Review on 'Prices'.

Table – 2 : Principal Producers of Vermiculite, 2013-14

Name & address of producer	Location of mine	
	State	District
Dugar Insulations India (P) Ltd, Dugar Towers, 7 th Floor, 34 (123) Marshalls Road, Egmore, Chennai- 600 008.	Andhra Pradesh	Nellore
Tamil Nadu Minerals Ltd, 31, Kamarajar Salai, Chepauk, Chennai- 600 005, Tamil Nadu.	Tamil Nadu	Vellore
M.Hemanth Kumar* H.No.3-6-601, G5, 1 st Floor, Sri Vyshnavi Residency, Street No. 8, Himayath Nagar, Hyderabad- 500 029, Andhra Pradesh.	Andhra Pradesh	Nellore
K. Sai Charan*, East Street, Gudur, Dist. Nellore- 524 101, Andhra Pradesh.	Andhra Pradesh	Nellore
V.L. Prasanna*, 27-2-1850-4, Near Childrens Park, 9 th Lane, Ramji Nagar, Dist. Nellore- 524 001, Andhra Pradesh.	Andhra Pradesh	Nellore

* Associated with mica and Quartz.

Table-1: Reserves/Resources of Vermiculite as on 1.4.2010
(By Grades/States)

(In tonnes)

Grade/State	Reserves				Remaining resources				Total resources (A+B)				
	Proved STD111	Probable STD121	STD122	Total (A)	Feasibility STD211	Pre-feasibility STD221	STD222	Measured STD331		Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)
All India: Total	1628475	24593	50939	1704007	22733	75790	71744	35195	24930	569012	3600	803004	2507011
By Grades													
Refractory	32217	-	14238	46455	-	-	-	-	-	807	-	807	47262
Unclassified	1596258	24593	36701	1657552	22733	75790	71744	35195	24930	568205	3600	802197	2459749
By States													
Andhra Pradesh	102058	24593	50939	177590	1912	3981	2750	35195	9878	119270	3600	176586	354176
Gujarat	-	-	-	-	-	-	-	-	-	1960	-	1960	1960
Jharkhand	-	-	-	-	-	-	-	-	-	30048	-	30048	30048
Karnataka	-	-	-	-	-	69050	64500	-	1562	66658	-	201770	201770
Madhya Pradesh	-	-	-	-	197	-	66	-	-	66	-	329	329
Rajasthan	-	-	-	-	20623	2759	4428	-	13000	2883	-	43693	43693
Tamil Nadu	1526417	-	-	1526417	-	-	-	-	-	343051	-	343051	1869468
West Bengal	-	-	-	-	-	-	-	-	490	5076	-	5566	5566

Figures rounded off.

VERMICULITE

Table – 3 : Production of Vermiculite, 2011-12 to 2013-14 (P)
(By States)

(Qty in tonnes; value in ₹'000)

State	2011-12		2012-13		2013-14 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	10194	7085	7947	5010	10176	8518
Andhra Pradesh	8652	3631	6474	1885	7974	3588
Karnataka	-	-	100	30	-	-
Tamil Nadu	1542	3454	1373	3095	2202	4930

Table – 4 : Production of Vermiculite, 2012-13 & 2013-14 (P)
(By Sectors/States/Districts)

(Qty in tonnes; value in ₹'000)

State/District	No. of mines	2012-13		No. of mines	2013-14 (P)	
		Quantity	Value		Quantity	Value
India	8(6)	7947	5010	8(7)	10176	8518
Public sector	1	1373	3095	1	2202	4930
Private sector	7(6)	6574	1915	7(7)	7974	3588
Andhra Pradesh	6(6)	6474	1885	6(7)	7974	3588
Nellore	6(5)	6434	1852	6(6)	7344	3078
Vishakhapatnam	(1)	40	33	(1)	630	510
Karnataka	1	100	30	1*	-	-
Mysore	1	100	30	1*	-	-
Tamil Nadu	1	1373	3095	1	2202	4930
Vellore	1	1373	3095	1	2202	4930

() : Figures in parentheses indicate the number of associated mines with apatite, feldspar, mica and quartz.

* : only labour reported.

Table – 5 : Mine-head Stock of Vermiculite, 2012-13 & 2013-14 (P)
(By States)

(Qty in tonnes)

State	2012-13	2013-14 (P)
India	10131	12867
Andhra Pradesh	4475	7031
Karnataka	400	400
Tamil Nadu	5156	5436
Rajasthan	100	-

VERMICULITE

USES

Vermiculite is known for its horticultural applications. It is a common component in potting soils. Unfoliated (unexpanded) vermiculite has only minor uses, such as for circulation in drilling muds and in the annealing of steel. In order to convert raw vermiculite into a product suitable for industrial use, it must be exfoliated or expanded by heating, a process termed 'exfoliation'. Vermiculite is chemically inert, fireproof, non-conductor of electricity and a good insulator against heat (both radiant and conducted), cold and sound. Unlike cork and other organic lightweight insulating material, it neither rot, nor attacked by vermin and has a fair mechanical strength.

It is also used as a carrier in fertilizers, herbicides and insecticides. Cementing mixtures of exfoliated vermiculite and binding agents, such as gypsum and plaster, have been important products and are applied to structural steel members in commercial buildings.

The mineral is used in various types of building boards and in pollution control applications. Fine-sized, untreated vermiculite concentrates are included in the preparation of fireproof plaster boards. The exfoliated product forms the basis of some lightweight plasterboard, whilst ground, exfoliated vermiculite is used in various refractory board products.

The principal uses of expanded vermiculite are based on its thermal insulating quality (due to presence of innumerable air cells), low-density, fireproof nature and granular form. Larger vermiculite granules are used as a loose fill for thermal insulation for homes, industrial structures, cold storage, refrigeration and high temperature and low temperature industrial equipment.

The high absorbency and chemical inertness of exfoliated vermiculite has made it suitable for a wide range of absorbent packing materials as well as for packaged units for the containment of oil and similar liquids.

SUBSTITUTES

Expanded perlite is a substitute for vermiculite in lightweight concrete and plaster. Other more dense but less costly material

substitutes in these applications are expanded clay, shale, slag and slate. In agriculture, substitutes include peat, perlite, sawdust, bark and other plant materials and synthetic soil conditioners.

CONSUMPTION

In 2013-14, the consumption of vermiculite was estimated at 900 tonnes. The asbestos-product and refractory industries were the only two consumers of vermiculite (Table- 6).

POLICY

Imports of vermiculite (unexpanded) are allowed freely under HS Code 25301010, as also those of vermiculite insulation bricks under HS Code 69029030 as per the Export-Import Policy, 2009-2014 and the Foreign Trade Policy thereunder.

**Table - 6 : Estimated Consumption* of Vermiculite
2011-12 to 2013-14 (P)
(By Industries)**

Industry	(In tonnes)		
	2011-12	2012-13 (R)	2013-14 (P)
All Industries	800	800	900
Asbestos products	700(1)	700(1)	700(1)
Refractory	100(6)	100(6)	200(7)

Figures rounded off.

Figures in parentheses denote the number of units in organised sector.

** Includes actual reported consumption and/or estimates made wherever required.*

The apparent consumption of vermiculite during 2011-12, 2012-13 & 2013-14 was 9,277 tonnes, 7,471 tonnes & 4,579 tonnes respectively.

WORLD REVIEW

The World reserves of vermiculite at the end of the year 2013 were estimated as per Mineral Commodity Summaries 2015. The details are given in Table-7.

In 2013, the World production of vermiculite was estimated at 383 thousand tonnes. South Africa (33%), USA (26%), Brazil & China (13% each) were the principal producers (Table- 8).

VERMICULITE

**Table – 7 : World Reserves of Vermiculite
(By Principal Countries)**

(In '000 tonnes)

Country	Reserve
World: Total (Rounded)	NA
Brazil	13100
China	NA
India*	1700
Russia	NA
South Africa	14000
USA	25000
Other countries	15000

* As per UNFC System the India's total resources of vermiculite are placed at 2.5 million tonnes as on 1.4.2010.
Source: Mineral Commodity Summaries, 2015.

**Table – 8 : World Production of Vermiculite
(By Principal Countries)**

(In '000 tonnes)

Country	2011	2012	2013
Australia	8	9	9
Brazil	55	52	50 ^(e)
China ^(e)	15	15	50
India	10	8	10
Japan ^(e)	6	6	6
Russia ^(e)	30	30	30
South Africa	171	133	128
USA ^(e)	100	100	100

Source : World Mineral Production, 2009-2013.

FOREIGN TRADE

Exports

Exports of vermiculite were increased marginally to 737 tonnes in 2013-14 as compared to 648 tonnes in 2012-13. Exports were mainly to UAE (52%), Norway (20%) and UK (7%) (Table- 9).

Imports

Imports of vermiculite also increased marginally to 176 tonnes in 2013-14 from 170 tonnes in 2012-13. Imports were mainly from Brazil (48%) and USA (44%) (Table- 10).

VERMICULITE

**Table – 9 : Exports of Vermiculite
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	648	5502	737	8706
UAE	327	3282	386	4471
Norway	144	745	150	1081
Israel	-	-	44	742
UK	24	350	48	699
Singapore	17	48	18	477
Malaysia	++	3	17	455
Japan	21	178	42	442
Nepal	-	-	32	237
USA	-	-	++	85
Brunei	-	-	++	17
Other countries	115	896	-	-

**Table – 10 : Imports of Vermiculite
(By Countries)**

Country	2012-13		2013-14	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	170	8263	176	8396
USA	79	3149	77	4433
Brazil	24	841	84	1933
Japan	13	2169	10	1549
Belgium	-	-	5	442
Korea, Rep. of	-	-	++	39
Other countries	54	2104	-	-