

VERMICULITE



Indian Minerals Yearbook 2015

(Part- III : Mineral Reviews)

54th Edition

VERMICULITE

(FINAL RELEASE)

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

Indira Bhavan, Civil Lines,
NAGPUR – 440 001

PHONE/FAX NO. (0712) 2565471
PBX : (0712) 2562649, 2560544, 2560648
E-MAIL : cme@ibm.gov.in
Website: www.ibm.gov.in

July, 2017

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%). Nominal resources are located in Gujarat, Madhya Pradesh and West Bengal (Table-1).

PRODUCTION, STOCKS & PRICES

Production of vermiculite at 15,327 tonnes in 2014-15 increased by 29% 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 five mines in 2014-15 as against seven mines in previous year. About 56% of the total production was reported as an associated mineral of mica and quartz mines in Andhra Pradesh. The share of public sector was 14% as compared to 19% in the preceding year.

Andhra Pradesh was the leading producer of vermiculite in 2014-15 which accounted for 86% of the total output and remaining 14% was from Tamil Nadu (Tables - 2 to 4).

Mine-head closing stocks of vermiculite for the year 2014-15 were 16,388 tonnes as against 13,119 tonnes for the previous year (Table - 5).

The average daily employment of labour during the year was 117 as against 98 in the preceding year.

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

Table – 2 : Principal Producers of Vermiculite, 2014-15

Name & address of producer	Location of mine	
	State	District
M. Hemanth Kumar, I.C. 95, Erramanzil Colony, Rangareddy Hyderabad	Andhra Pradesh	Nellore
Laxmi Narayan Mining Company, East Street, Gudur, Nellore - 524 101 Andhra Pradesh	Andhra Pradesh	Nellore
Tamil Nadu Minerals Ltd, 31, Kamarajar Salai, Chepauk, Chennai-600 005, Tamil Nadu.	Tamil Nadu	Vellore
Dugar Insulations India(P) Ltd, Dugar Towers, 7 th Floor, 34(123) Marshalls Road, Egmore, Chennai - 600 008.	Andhra Pradesh	Nellore
B. Koteswara Rao* 558.53-4A, Swarandhra Bharathi Nagar, Malavya Nagar, Gudur, Nellore - 524 101	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	Total (A) STD122	Feasibility STD211	Pre-feasibility STD221	Measured STD331	Indicated STD332	Inferred STD333		Reconnaissance STD334	Total (B)	
All India: Total	1628475	24593	50939	1704007	75790	71744	35195	24930	569012	3600	803003	2507010
By Grades												
Refractory	32217	-	14238	46455	-	-	-	-	807	-	807	47262
Unclassified	1596258	24593	36701	1657552	22733	71744	35195	24930	568205	3600	802196	2459748
By States												
Andhra Pradesh	102058	24593	50939	177590	1912	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	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, 2012-13 to 2014-15
(By States)**

(Qty in tonnes; Value in ₹'000)

State	2012-13		2013-14		2014-15 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	7947	5010	11851	9470	15327	11094
Andhra Pradesh	6474	1885	9650	4542	13126	6172
Karnataka	100	30	-	-	-	-
Tamil Nadu	1373	3095	2201	4928	2201	4922

**Table – 4 : Production of Vermiculite, 2013-14 & 2014-15
(By Sectors/States/Districts)**

(Qty in tonnes; Value in ₹'000)

State/District	No. of mines	2013-14		No. of mines	2014-15 (P)	
		Quantity	Value		Quantity	Value
India	8(7)	11851	9470	8(5)	15327	11094
Public sector	1	2201	4928	1	2201	4922
Private sector	7(7)	9650	4542	7(5)	13126	6172
Andhra Pradesh	6(7)	9650	4542	6(5)	13126	6172
Nellore	6(6)	8670	3750	6(4)	12519	5666
Visakhapatnam	(1)	980	792	(1)	607	506
Karnataka	1*	-	-	1*	-	-
Mysore	1*	-	-	1*	-	-
Tamil Nadu	1	2201	4928	1	2201	4922
Vellore	1	2201	4928	1	2201	4922

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

* : Only labour reported

**Table – 5 : Mine head Closing Stocks of Vermiculite, 2014-15
(By States)**

(Qty in tonnes)

State	2013-14	2014-15 (P)
India	13119	16388
Andhra Pradesh	7283	10067
Karnataka	400	400
Tamil Nadu	5436	5921

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.

Vermiculite is added to soil for conditioning and lightening either alone or in conjunction with peat or compost. This will accelerate the growth by enabling the plant to absorb the NPK nutrients and promote anchorage for tender young root systems.

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.

Vermiculite is also used for refractory and high temperature insulation which can withstand hot face temperature of up 1000°C.

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 2014-15, the consumption of vermiculite was estimated at 800 tonnes. The asbestos-products and refractory industries were the only two consumers of vermiculite (Table - 6).

POLICY

As per foreign trade policy 2015-20, the imports and exports of vermiculite (unexpanded) (ITC (HS) Code 25301010), and vermiculite insulation bricks (ITC (HS) Code 69029030) are freely allowed .

**Table - 6 : Consumption* of Vermiculite
2012-13 to 2014-15
(By Industries)**

	(In tonnes)		
Industry	2012-13	2013-14 (R)	2014-15 (P)
All Industries	800	900	800
Asbestos products	700(1)	700(1)	700(1)
Refractory	100(6)	200(6)	100(7)

Figures rounded off.

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

** Paucity of data hence consumption may not be completed.*

The apparent consumption of vermiculite during 2012-13, 2013-14 & 2014-15 was 9,277 tonnes, 7,471 tonnes & 4,579 tonnes respectively.

VERMICULITE

WORLD REVIEW

The World reserves of vermiculite at the end of the year 2016 were estimated as per Mineral Commodity Summaries, 2016. The details are given in Table-7.

In 2014, the World production of vermiculite was estimated at 440 thousand tonnes. South Africa (33%), USA (23%), Brazil (16%) and China (11%) were the principal producers (Table-8).

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

(In '000 tonnes)

Country	Reserves
World: Total (Rounded)	NA
Brazil	6300
India	1700
South Africa	14000
USA ^e	25000
Other countries	NA

Source: Mineral Commodity Summaries, 2016.

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

(In '000 tonnes)

Country	2012	2013	2014
Australia	9	9	-
Brazil	52	68	70 ^e
China ^e	15	15	50
India	8	10	24 ^e
Japan ^e	6	6	6
Russia ^e	30	30	30
South Africa	133	128	143
USA ^(e)	100	100	100
Zimbabwe	-	-	13
Oher Countries	8	4	4

Source : World Mineral Production, 2010-2014.

FOREIGN TRADE

Exports

Exports of vermiculite were increased to 1044 tonnes in 2014-15 as compared to 737 tonnes in 2013-14. Exports were mainly to UAE (53%), Norway (31%) and Japan (8%) (Table-9).

Imports

Imports of vermiculite also increased marginally to 391 tonnes in 2014-15 from 176 tonnes in 2013-14. Imports were mainly from Brazil (64%) and USA (22%) (Table - 10).

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

Country	2013-14		2014-15 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	737	8706	1044	9906
UAE	386	4472	550	4912
Norway	150	1081	323	2270
Japan	42	442	85	953
Singapore	18	477	32	740
Cambodia	-	-	40	693
Zambia	-	-	10	192
South Africa	-	-	2	61
Malaysia	17	455	1	43
Greece	-	-	1	36
Saudi Arabia	-	-	++	5
Other countries	124	1779	++	1

VERMICULITE

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

Country	2013-14		2014-15 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	176	8396	391	11486
Brazil	84	1933	252	5754
USA	77	4433	85	3243
South Africa	-	-	43	1005
Japan	10	1549	2	625
Germany	-	-	5	426
Korea, Rep. of	++	39	3	309
UK	-	-	1	115
China	-	-	++	7
Other countries	5	442	++	2