

CALCITE



# Indian Minerals Yearbook 2016

(Part- III : Mineral Reviews)



**55<sup>th</sup> Edition**

**CALCITE**

**(FINAL RELEASE)**

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

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# 7 Calcite

Calcite is a rock forming mineral with a chemical formula of (CaCO<sub>3</sub>), containing 56% CaO and 44% CO<sub>2</sub>. It is extremely common and found throughout the world in igneous, sedimentary and metamorphic rocks. It is one of the important industrial minerals also known as 'Calc Spar'. Pure crystallised transparent variety of calcite known as 'Iceland Spar' is used for optical purposes.

## RESERVES/RESOURCES

Calcite occurs in abundance. As per NMI data, based on UNFC system as on 01.04.2015, the total reserves/resources of calcite have been estimated at about 23 million tonnes of which about 3.45 million tonnes (15%) are under 'reserves' category and remaining are under 'resources' category. Of the total resources, Chemical grade accounts for 22% and glass & ceramic grade about 3%. The remaining 75% resources fall under Unclassified/Not known and Other grades etc.

Rajasthan has the largest share (53%) of calcite resources, followed by Andhra Pradesh (40%) and Madhya Pradesh (5%). The remaining resources (2%) are located in Karnataka, Gujarat, Haryana, Tamil Nadu and Uttar Pradesh (Table- 1).

## EXPLORATION

A calcite vein deposit is having 60 m length and 1 m width exposed on the way of villages Bhamriya to Jambudi in Sirohi district, Rajasthan. Reserve not calculated.

## PRODUCTION & STOCKS

As per GOI notification S.O. 423(E) dated 10<sup>th</sup> February, 2015, calcite has been declared as 'Minor Mineral' hence, the production beyond January, 2015 is not available with IBM. List of producers of calcite is furnished in Table-2.

**Table – 2 : Producers of Calcite**

Name & address of producers	Location of mine	
	State	District
Wolkem Industries Ltd,* E - 101, Mewar Industrial Area, Madri, Udaipur-313 003, Rajasthan.	Rajasthan	Sirohi
Wolkem India Ltd, E-101, Mewar Industrial Area, Madri, Udaipur - 313 003, Rajasthan.	Rajasthan	Udaipur
Kalpana Minerals & Chemicals, Ashok Vatika, N.H.8, Sukher, Udaipur-318 004, Rajasthan.	Rajasthan	Udaipur
Mohd. Sher Khan, Khwaja Bagh, P.O., Sawa, Chittorgarh- 312 613, Rajasthan.	Rajasthan	Sirohi
Stone mining quarries, Durga ST Stand, Ananthagi, Visakhapatnam - 535 145 Andhra Pradesh.	Andhra Pradesh	Visakhapatnam

\* Producing calcite as an associated mineral with wollastonite.

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**Table – 1 : Reserves/Resources of Calcite as on 1.4.2015  
(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)	
<b>All India : Total</b>	<b>928119</b>	<b>798170</b>	<b>3448867</b>	<b>1332076</b>	<b>217790</b>	<b>3339239</b>	<b>9122696</b>	<b>1246494</b>	<b>4204311</b>	<b>97476</b>	<b>19555082</b>	<b>23003949</b>
<b>By Grades</b>												
Chemical	449149	-	468730	753222	170359	1881020	-	-	1750993	-	4555594	5024324
Glass & Ceramic	-	8098	13273	92767	47423	90993	20250	67395	451704	-	770532	783805
Poor/Low	-	-	-	-	-	-	-	70310	134220	-	204530	204530
Others	313094	-	1276364	27656	8	827193	500	-	22813	-	878170	2154534
Unclassified	165876	790072	1690500	236446	-	247670	8557000	66551	1391088	-	10493756	12184256
Not-known	-	-	-	221985	-	292363	544946	1042238	453493	97476	2652501	2652501
<b>By States</b>												
Andhra Pradesh	16522	8098	144146	8538	-	105470	8562700	5200	282204	-	8964112	9108258
Gujarat	-	-	-	-	-	-	-	-	12380	-	12380	12380
Haryana	-	-	-	166900	-	183900	-	-	-	-	350800	350800
Karnataka	-	-	-	31800	-	15900	-	14400	51547	-	113647	113647
Madhya Pradesh	-	-	5175	215327	35077	160421	20250	180226	358636	97476	1067412	1072587
Rajasthan	911597	790072	3299546	909511	182713	2873548	539746	1041668	3371912	-	8919099	12218645
Tamil Nadu	-	-	-	-	-	-	-	-	116632	-	116632	116632
Uttar Pradesh	-	-	-	-	-	-	-	-	11000	-	11000	11000

Figures rounded off.

## MINING AND MARKETING

Almost all calcite mines in the country are worked manually by opencast methods and most of these are confined to shallow depths except the semi-mechanised Belkapahar Wollastonite and Calcite Mine of Wolkem Industries Ltd in Sirohi district, Rajasthan. Mining of calcite poses certain difficulties in excavating of transparent crystals as application of pressure during mining which affects the transparency causes internal imperfections and cracks. Therefore, precaution and care during mining is imperative so that final marketable products can be produced with maximum recovery. Calcite is usually marketed after pulverising or after some initial processing and grinding to a fine powder size ranging from 200 to 300 mesh. In Rajasthan, Wolkem India Ltd, the principal Mining Company, markets its products under three different trade names, viz, Calstar 1-4 (Super snow-white powder with 100% whiteness), Calsun 1-5 (snow white powder with 98.4% whiteness) and Belsun 1-4 (white powder with 95% whiteness). Besides, super snow-white micronised products (Calcron and Addon) of extremely high brightness and whiteness (25 to 5 microns) and ultra fine slurries and powder (FMT) with top size of 2 microns are also marketed by the Company. Naga Ltd South India's largest producer of white minerals having a captive mine producing calcite powder. The capacity of calcite powder is 50,000 tonnes per annum.

## USES AND SPECIFICATIONS

The use of calcite is dictated by its level of purity. The highest purity of  $\text{CaCO}_3$ , which is as high as (+) 98%, has minimum inclusions and highest brightness. Its applications are in varying sizes from coarse to as fine as 10 to 2 microns. Various grades of calcite products marketed by Wolkem India Ltd contain  $\text{CaCO}_3$  95-98.5%,  $\text{MgO}$  0.2-0.4%,  $\text{SiO}_2$  0.3% and  $\text{Fe}_2\text{O}_3$  0.03-0.15%.

Calcite is one of the important ingredients required in Glass and Ceramic Industries for imparting glaze and it is also used as a flux. In pulverised form, it is used as a filler in rubber goods, textile and as an extender in paints and as a carrier in insecticides. Other uses are in the manufacture of mortar, cement, bleaching powder, abrasive, for agricultural soil treatment and pharmaceuticals etc. It is also used in the preparation of fat lime, soaps, detergents, plastics, polymers, etc. The  $\text{CaCO}_3$  content in calcite used in Glass Industry is 95% (min.) and in Ceramic Industry 95%. Calcium oxide is a mild flux and makes the glass stick to the articles shaped by its hardening nature. Generally, 54% (min.)  $\text{CaO}$  is used. In Ceramic Industry, generally, super-white calcite of 30 mesh is used while in Glass Industry, powder size ranging from 20 to 80 mesh is used.

The transparent crystal of calcite (Iceland Spar) free from flaw is most valued in the Optical Industry for the manufacture of Nicol prism. However, polarised films and lenses are fast replacing Nicol prisms. 'Iceland Spar' used in optical instruments, like polarising microscopes, should have a high degree of purity and perfect crystalline structure. The mineral must be at least 2.54 cm long and 1.27 cm thick (2-inch cube is preferred), colourless, perfectly transparent and free from cloudy inclusions, cavities or foreign substances. It should be free from internal iridescence caused due to incipient cracks along cleavage planes and from twinning other than parallel to the base.

The specifications of calcite for various industrial uses are given in Table-3. BIS has prescribed IS : 15751-2007 (reaffirmed in March-2012) as specification for use of calcite in Ceramic Industry.

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**Table – 3 : Specifications of Calcite Used in Different Industries**

*(Figures relate to percentages, unless otherwise stated.)*

Constituent	Chemical	Cosmetic	Electrode	Glass	Ceramic
CaCO <sub>3</sub>	99	97	95	95	95
Fe	0.5	200 ppm	-	-	-
Cu	-	10 ppm (max.)	-	-	-
Mn	-	100 ppm (max.)	-	-	-
As (max.)	2 ppm	-	-	-	-
Pb	10 ppm	-	-	-	-
Chlorides	-	-	-	-	0.005 (max.)
P	-	-	0.01	-	-
S	-	-	0.035	-	-
Iron & titanium	-	-	-	-	0.5
Fe <sub>2</sub> O <sub>3</sub>	-	-	-	0.15	-
MgCO <sub>3</sub>	-	-	-	2.00	-
Moisture	-	0.2 (max.)	3.6%	-	-
SiO <sub>2</sub>	-	-	2	-	-

### CONSUMPTION

The consumption of calcite at 2,08,000 tonnes in 2015-16 was 3% higher than in the preceding year. Cement Industry accounted for about 45% consumption, followed by paint & chemical (15% each), ceramic (12%), glass (11%) and electrode (1%), etc. Industry-wise consumption of calcite is given in Table-4.

### FOREIGN TRADE

Export of calcite decreased considerably to 25,198 tonnes in 2015-16 from 30,768 tonnes in 2014-15. Exports were mainly to Kuwait (29%), Nepal (19%), UAE (18%) & Bangladesh (13%) (Table- 5).

In 2015-16, import of calcite also decreased drastically by 34% to 43,812 tonnes from 66,450 tonnes in the previous year. Imports were mainly from Vietnam (69%) and Egypt (25%) (Table- 6).

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**Table- 4: Consumption\* of Calcite  
2013-14 to 2015-16  
(By Industries)**

(In tonnes)

Industry	2013-14	2014-15 (R)	2015-16 (P)
<b>All Industries</b>	<b>128300</b>	<b>201100</b>	<b>208500</b>
Cement	48900	92800	92800
Ceramic	18800	19800	24700
Chemical	-	28600	30500
Cosmetics	800	700	700
Electrical	700	700	700
Electrode	3000	3000	2900
Glass	22500	22500	22500
Paint	29700	29600	30300
Pesticide	2600	2600	2600
Pharmaceutical	600	600	600
Others (abrasive, chemicals, refractories & rubber)	700	200	200

Figures rounded off.

\* Includes actual reported consumption and/or estimates made wherever required and due to paucity of data, coverage may not be complete.

**Table- 5 : Export of Calcite  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
<b>All Countries</b>	<b>30768</b>	<b>192309</b>	<b>25198</b>	<b>177978</b>
Kuwait	4161	31670	7286	57565
UAE	3070	26060	4453	36633
Bangladesh	2838	20034	3398	21296
Nepal	9050	20376	4905	19646
Pakistan	100	755	1452	11338
Indonesia	3000	22814	840	6600
Saudi Arabia	92	1089	683	5294
Singapore	1722	14099	481	4016
Qatar	693	5661	384	3317
Oman	1601	11634	403	2953
Other countries	4441	38117	913	9320

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**Table – 6 : Import of Calcite  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
<b>All Countries</b>	<b>66450</b>	<b>369703</b>	<b>43812</b>	<b>219917</b>
Vietnam	55588	327840	30358	166166
Egypt	2943	13015	11057	41640
Oman	6098	16238	1250	4304
Turkey	756	4993	452	2855
Croatia	22	217	218	1464
USA	32	1249	17	1350
China	-	-	208	1021
Greece	28	122	242	902
France	-	-	7	180
Germany	25	551	3	35
Other countries	958	5478	-	-