

45 Gypsum

Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) is a hydrated calcium sulphate used widely in industry because of its special property of losing three-fourths of the combined water of crystallisation when moderately heated (calcined) to about 130°C . Besides, calcined gypsum when cooled, finely ground and made plastic with water can be spread out, cast or moulded to any desired surface or form. On drying, it sets into a hard rock-like form. **Selenite** is a colourless, transparent, crystalline variety of gypsum, whereas **alabaster** is a fine grained, massive variety, white or shaded in colour. Silky and fibrous variety of gypsum is called **satin spar**. **Anhydrite** (CaSO_4) is a calcium sulphate mineral found associated with gypsum commonly as a massive or fibrous mineral.

Gypsum that occurs in nature is called mineral gypsum. In addition to mineral gypsum, seawater and some chemical plants are sources of by-product marine gypsum and by-product chemical gypsum, respectively. The later is obtained as by-product phospho- fluoro- or boro-gypsum, depending upon the source. Phosphoric acid plants are important sources of by-product phospho-gypsum.

Marine gypsum is recovered from salt pans during production of common salt in coastal region, particularly in Gujarat and Tamil Nadu. The recovery of by-product gypsum and marine gypsum together is substantial and is comparable with the production of mineral gypsum.

Synthetic gypsum is recovered via flue gas desulfurisation at some coal fired electric power plants.

In Asia, the best quality gypsum is supplied by the Mohangarh Mines, district Jaisalmer, Rajasthan.

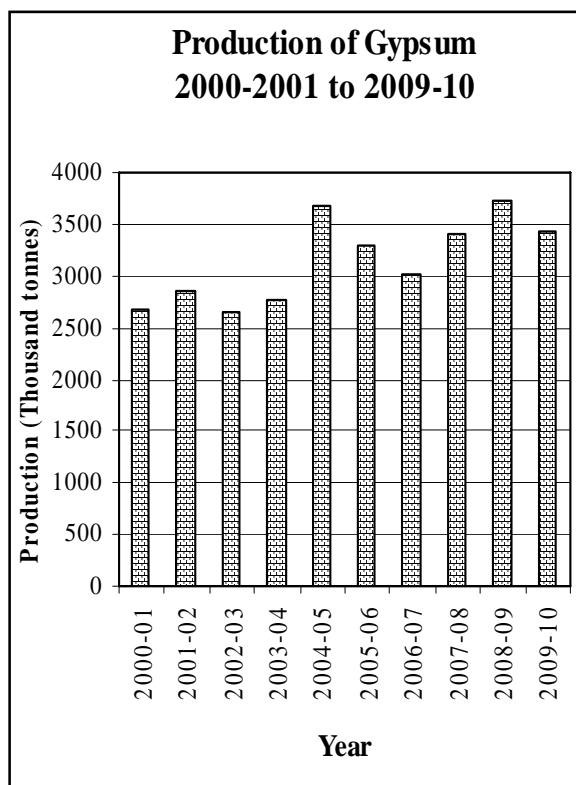
RESOURCES

As per UNFC system, the total resources of mineral gypsum in India as on 1.4.2005 are estimated at 1,237 million tonnes of which 69 million tonnes have been placed under 'reserves' and 1,168 million tonnes under 'remaining resources' category. Of the total resources, fertilizer/pottery grade accounts

for about 79% and cement/paint grade 8%. The unclassified and not-known grades together account for 12% resources. The remaining one percent of resources is shared by surgical plaster and soil reclamation grades. By States, Rajasthan alone accounts over 81% resources and Jammu & Kashmir 14% resources. The remaining 5% resources are in Tamil Nadu, Gujarat, Himachal Pradesh, Karnataka, Uttarakhand, Andhra Pradesh and Madhya Pradesh (Table-1).

EXPLORATION & DEVELOPMENT

During 2009-10, DMG, Rajasthan carried out exploration in areas around Khajuwala, tehsil. Pugal & Kolayat in Bikaner district. About 500 sq km area was covered under RMS (1:50,000 scale), 20 sq km under RGM (1:10,000 scale) and 5 sq km under DGM (1:2000 scale). A total of 22 samples were collected for chemical analysis. On the basis of detailed geological mapping, a total of 1.5 million tonnes of gypsum resources were estimated.



**Table – 1 : Reserves/Resources of Gypsum as on 1.4.2005
(By Grades/States)**

Grade/State	Reserves				Remaining resources					Total resources (A+B)		
	Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Indicated STD332	Inferred STD333		Reconnaissance STD334	Total (B)
		STD121	STD122			STD221	STD222					
All India : Total	40803	1276	26579	68658	285	10418	7756	710681	430034	10	1168218	1236876
By Grades												
Surgical plaster	-	1050	87	1137	-	680	-	-	4062	-	4742	5879
Fertilizer/pottery	21742	81	299	22122	-	9252	135	703244	244882	-	957513	979635
Cement/paint	17657	134	25739	43530	285	60	5534	2854	41096	10	51047	94577
Soil reclamation	1404	11	398	1813	-	426	2088	55	7927	-	10496	12309
Unclassified	-	-	56	56	-	-	-	2944	108876	-	119578	119634
Not-known	-	-	-	-	-	-	-	1585	23191	-	24842	24842
By States												
Andhra Pradesh	-	-	-	-	-	-	-	-	404	-	404	404
Gujarat	9	9	24	42	-	-	-	-	15138	-	15138	15179
Himachal Pradesh	-	-	-	-	-	-	1365	-	3081	-	4446	4446
Jammu & Kashmir	6044	-	6875	12919	285	9852	44	7680	146055	-	163916	176835
Karnataka	-	-	-	-	-	-	-	-	3784	-	3784	3784
Madhya Pradesh	-	-	-	-	-	-	-	-	69	-	69	69
Rajasthan	34381	1142	18670	54192	-	197	653	710454	239951	-	952608	1006800
Tamil Nadu	369	125	1010	1505	-	369	5660	227	19540	10	25806	27311
Uttarakhand	-	-	-	-	-	-	35	-	2012	-	2047	2047

Figures rounded off.

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PRODUCTION, STOCKS AND PRICES

Gypsum

The production of gypsum at 3.42 million tonnes in 2009-10 decreased by 12% as compared to that in the previous year.

There were 24 reporting mines during the year as against 27 in the preceding year. Two principal producers together accounted for about 99% of the total production of gypsum in 2009-10. Five mines, each producing above 2 lakh tonnes annually contributed about 82% of total production. Two mines each producing between 1 to 2 lakh tonnes contributing about 8% of the total production and 7 mines each producing 10 thousand tonnes to one lakh tonnes accounted for 10% production. Nominal production of gypsum was reported from 10 other mines each producing below 10,000 tonnes annually. Almost the entire production of gypsum was contributed by public sector and very nominal quantity of production was reported by private sector.

Rajasthan continued to be the leading producer, contributing 99% of the total output. The rest 1% was contributed by Gujarat and Jammu & Kashmir (Tables - 2 to 5).

The mine-head stocks of gypsum at the end of the year 2009-10 were 15,353 tonnes as against 34,731 tonnes at the beginning of the year (Table - 6).

The average daily employment of labour in gypsum mines during 2009-10 was 173 as against 144 in the previous year. Domestic prices of gypsum are furnished in the General Review on Prices'.

Selenite

The production of selenite was 13,344 tonnes in 2009-10 as against 15,224 tonnes during the preceding year. The entire production of selenite was reported by Rajasthan State Mines & Minerals Ltd (RSMML) operating 3 mines in Barmer & Bikaner districts of Rajasthan (Tables - 7 to 9).

There were no mine-head stocks. The average daily employment of labour in selenite mines during 2009-10 was 11 as against 8 in the previous year. Domestic prices of selenite are furnished in the General Review on 'Prices'.

Table – 2 : Principal Producers of Gypsum 2009-10

Name and address of producer	Location of mine	
	State	District
Rajasthan State Mines & Minerals Ltd, Gypsum Division, Sadul Club Building, Distt.- Bikaner, Rajasthan	Rajasthan	Bikaner Ganganagar Hanumangarh Jaisalmer Jalore Nagaur
Fertilizer Corp. of India Ltd, M/s Fagmil Magu Singh Rajvi Marg, Paotel B Road, Jodhpur, Rajasthan.	Rajasthan	Bikaner Ganganagar Jaisalmer

Table – 3 : Production of Gypsum, 2007-08 to 2009-10 (By States)

(Qty. in tonnes; value in Rs. '000)

States	2007-08		2008-09		2009-10 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	3400050	719738	3876671	993465	3421804	958580
Gujarat	173	27	218	22	1611	161
Jammu & Kashmir	13000	7215	4505	1352	598	179
Rajasthan	3386877	712496	3871948	992091	3419595	958240

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**Table – 4: Production of Gypsum, 2008-09 & 2009-10
(By Sectors/States/Districts)**

(Qty. in tonnes; value in Rs.'000)

State/District	2008-09			2009-10 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	27	3876671	993465	24	3421804	958580
Public sector	22	3855405	987129	17	3344794	938665
Private sector	5	21266	6336	7	77010	19915
Gujarat	4	218	22	4	1611	161
Kachchh	4	218	22	4	1611	161
Jammu & Kashmir	1	4505	1352	1	598	179
Doda	1	4505	1352	1	598	179
Rajasthan	22	3871948	992091	19	3419595	958240
Bikaner	7	2011332	453506	6	2194689	620201
Sri Ganganagar	7	477618	110070	7	90855	23717
Hanumangarh	4	150902	35213	2	162097	44596
Jaisalmer	2	827223	298213	2	686894	199468
Jalore	1	55916	13084	1	66511	16512
Nagaur	1	348957	82005	1	218549	53746

**Table – 5 : Production of Gypsum, 2008-09 & 2009-10 (P)
(By Frequency Groups)**

(Qty. in tonnes)

Production group	No. of mines		Production for the group		Percentage in total production		Cumulative percentage	
	2008-09	2009-10	2008-09	2009-10	2008-09	2009-10	2008-09	2009-10
All Groups	27	24	3876671	3421804	100.0	100.0	–	–
Up to 10000	6	10	5248	3997	0.13	0.12	0.13	0.12
10001 - 50000	7	4	199079	125114	5.14	3.65	5.27	3.77
50001 - 100000	7	3	470676	196727	12.14	5.75	17.41	9.52
100001 - 200000	1	2	192961	285295	4.98	8.34	22.39	17.86
above 200000	6	5	3008707	2810671	77.61	82.14	100.00	100.00

**Table – 6 : Mine-head Stocks of Gypsum, 2009-10 (P)
(By States)**

(In tonnes)

State	At the beginning of the year	At the end of the year
India	34731	15353
Gujarat	527	390
Jammu & Kashmir	2	–
Rajasthan	34202	14963

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Table – 7 : Producer of Selenite, 2009-10

Name and address of producer	Location of mine	
	State	District
Rajasthan State Mines & Minerals Ltd, Gypsum Sadul Club Building, Dist. - Bikaner, Rajasthan.	Rajasthan	Barmer Bikaner

**Table – 8 : Production of Selenite, 2007-08 to 2009-10
(By State)**

(Qty in tonnes; value in Rs.'000)

State	2007-08		2008-09		2009-10 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	3864	3205	15224	12904	13344	11342
Rajasthan	3864	3205	15224	12904	13344	11342

**Table – 9 : Production of Selenite, 2008-09 and 2009-10
(By Sector/State/Districts)**

(Qty in tonnes; value in Rs.'000)

State/District	2008-09			2009-10 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	3	15224	12940	3	13344	11342
Public sector	3	15224	12940	3	13344	11342
Rajasthan	3	15224	12940	3	13344	11342
Barmer	2	2732	2322	2	1063	903
Bikaner	1	12492	10618	1	12281	10439

MINING AND MARKETING

Gypsum is worked by opencast manual mining except in a few semi-mechanised mines in Rajasthan. The deposits are found at shallow depths and scattered over large areas. Production is classified into four grades based on the calcium sulphate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) content: i) above 90%; ii) 85 - 90%; iii) 80 - 85%; and iv) less than 80%.

High grade gypsum is mined in Bikaner and Jaisalmer districts of Rajasthan. Some gypsum mines in Bikaner district also produce crystalline variety (i.e., selenite). Gypsum from Rajasthan is despatched to cement plants in India spread over Rajasthan, Gujarat, Madhya Pradesh, West Bengal, Uttar Pradesh, Bihar, etc. Besides, a substantial quantity, containing 60-70% $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ is supplied to Punjab, Uttar Pradesh, Haryana, Delhi, etc. for reclaiming alkaline soil. A sizeable quantity of gypsum from mines in Barmer, Bikaner, Sri Ganganagar and Nagaur districts of Rajasthan is also supplied to the plaster of Paris units in Rajasthan, Uttar Pradesh, Maharashtra, West Bengal and Delhi. Gypsum produced in Tamil Nadu is mainly of cement grade and hence, despatched to cement plants in southern India.

India Gypsum Ltd, Thane, specialises in dry construction techniques. Its products are marketed under brand name of gypboard, mineral plaster, gypsteel, cellotex and casoprano.

USES AND SPECIFICATIONS

Cement, fertilizer (ammonium sulphate) and plaster of Paris are the three important industries in which gypsum is utilised. Gypsum of less purity in crushed form is utilised in portland cement manufacture for controlling the setting time of portland cement (i.e. as a retarder to prevent quick set). It is added to the clinker just before final grinding to finished cement. Proportion of gypsum in cement industry is 4-5%

of the cement produced. Both, mineral and by-product gypsum are used in cement manufacture. Calcined gypsum finds use in manufacturing plaster of Paris. It is also used in manufacturing partition blocks, sheets and tiles, insulation boards for stucco and lattice works. Gypsum board primarily used as a finish for walls and ceilings. It is also used as a binder in fast dry tennis court clay. Low-grade gypsum is calcined and used as gypsum plaster after preparation of mortar. It is used for internal plastering and masonry work. Requirement of low-grade gypsum for use in building industry as per IS:12654-1989 is : $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ not less than 60 %. In pottery, calcined gypsum is used for preparation of moulds in the production of sanitarywares. The used and discarded moulds are in turn again used as source of gypsum in cement and other industries. Low-grade gypsum is used in conditioning alkaline soil, as a manure in agriculture mainly for correcting black alkali soils. BIS has prescribed IS:6046-1982 (First Revision; reaffirmed 1999) for gypsum for agricultural use.

Selenite, a crystalline variety is used to a limited extent for gypsum plate for petrological microscopes, known as Sensitive Tint. It is also used in the ceramic industry for making moulds to manufacture surgical grade plaster of Paris and also for producing white cement. Plaster of Paris industry requires high purity gypsum. Different grades of plaster of Paris are manufactured, depending upon the period for setting. For surgical plaster, a minimum 96% $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ grade gypsum is required. High-purity gypsum is utilised for manufacturing ammonium sulphate fertilizer. Ground pure white gypsum is also used as a filler in paper, paints and textile goods. Ground low grade gypsum is used in mine dusting, manufacture of blackboard chalks and as a filler in insecticides. Besides, gypsum is also used in other industries like pharmaceutical, textile and asbestos products.

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Alabaster, a dense, massive, granular and translucent variety, is employed as ornamental stone in statuary and interior decoration.

BIS specification for by-product gypsum (IS: 10170-1982, reaffirmed 1999) lays down a minimum 70% content of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ and maximum limit of 0.75% Na, 1.0% F and 15% free moisture on dry basis. The material should pass 2 mm sieve, but 50% of material should also pass through 0.25 mm (60 mesh) sieve. Specifications of mineral gypsum for different industries are given in Table-10. Table-11 gives the specifications of by-product gypsum for use in plaster, blocks and boards industries, as per IS:12679-1989, reaffirmed 2005. Besides, BIS has prescribed IS : 1290 - 1973 (Second Revision; reaffirmed 1999) for mineral gypsum.

BY-PRODUCT GYPSUM

Phospho-gypsum

Phospho-gypsum is produced as a by-product during the manufacture of phosphoric acid by wet process. Generally, a tonne of phosphoric acid production generates about 4.5 to 5 tonnes of phospho-gypsum. The principal manufacturing units of phospho-gypsum are given in Table-12. The production of phospho-gypsum reported by FACT, Ambalamedu, Kerala during 2008-09 was about 35 thousand tonnes and that by Coromandal International Ltd, Thiruvallur, Tamil Nadu was 2.10 lakh tonnes.

The purity of phospho-gypsum ranges from 77 to 98% $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. It contains about 0.2 to 0.7% total P_2O_5 . Phospho-gypsum is mostly used in cement and fertilizer industries.

Fluorine and phosphate contents in by-product gypsum are considered deleterious. The phosphate content affects setting properties of cement and fluorine content causes ring formation in kiln. The limit generally specified for use in cement is 0.15% P_2O_5 maximum. Phospho-gypsum is radioactive due to the presence of naturally occurring uranium and radium in the phosphate ore. Phospho-gypsum contains about 1% P_2O_5 ,

1% F and 10 to 30 times more radon, none is desirable. These entities along with radon that were scare in the 1980s resulted in a 1989 EPA [(Environment Protection Agency), USA] ruling that phospho-gypsum is unsuitable for sale as common gypsum.

Fluoro-gypsum

Fluoro-gypsum is obtained as by-product during the manufacture of aluminium fluoride and hydrofluoric acid using fluorspar. Navin Fluorine Industries, Bhestan, Surat district, Gujarat; Tanfac Industries Ltd, Cuddalore, South Arcot district, Tamil Nadu and Aegies Chemical Ltd, Dombivali, Thane, Maharashtra recover fluoro-gypsum in their chemical plants.

Boro-gypsum

By-product boro-gypsum is obtained at a plant which refines calcium borates (colemanite and ulexite) to produce borax and boric acid. Borax Morarjee Ltd, Ambarnath, Thane district, Maharashtra and Southern Borax Ltd, Chennai engaged in refining of borates were reporting production of by-product boro-gypsum, in the past. However, detailed information on production of boro-gypsum from these two plants is not available. National Peroxide Ltd, Kalyan, Maharashtra is producing sodium perborate and information on production of boro-gypsum, if any, is not available.

Marine Gypsum

Marine gypsum is obtained as a by-product in the production of common salt by solar evaporation. The total production of marine gypsum as per the Salt Commissioner, Jaipur, was 146,028 tonnes in 2008-09 and 233,163 tonnes in 2009-10 reported from Gujarat and Tamil Nadu. Marine gypsum recovered from Gujarat showed 89.72-92.62% $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, 0.48 to 2.08% NaCl, 0.57% MgCl_2 , 3.42% MgSO_4 and 3.48 to 7.65% insolubles. As per the IS specification, marine gypsum should contain 85% $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ and maximum 0.1% NaCl.

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Table – 10 : Specifications of Mineral Gypsum in Different Industries

Constituent	Surgical plaster	Ammonium sulphate fertilizer	Pottery	Cement	Reclamation of soil	Extender in paints
Free water	1.0% (max)	–	1.0% (max)	–	–	0.5% (max) when heated for 2 hr. at 45°C
CO ₂	1.0% (max)	–	3.0% (max)	–	–	–
SiO ₂ & other insoluble matter	0.7% (max)	6.0% (max)	6.0% (max)	–	–	–
Iron & aluminium oxide	0.1% (max)	1.5% (max)	1.0% (max)	–	–	–
MgO	0.5% (max)	1.0% (max)	1.5% (max)	3.0 (max)	–	–
CaSO ₄ .2H ₂ O	96.0% (min)	85-90% (min)	85.0% (min)	70-75% (80-85% for export quality cement)	70% (min)	75% (min)
NaCl	0.01% (max)	0.003% (max)	0.1% (max)	0.5% (max)	–	–
Na ₂ O	–	–	–	–	0.75% (max) (Na)	–
Fineness	–	–	–	–	Residue on 2 mm sieve : Nil & on 0.25 mm sieve : 50% (max)	Residue on 240 mesh B.S. test sieve : 0.5%
Oil absorption	–	–	–	–	–	Within 5% of the approved sample
Colour	–	–	–	–	–	Close match to the approved sample
Lead & its compounds (calculated as metallic lead)	–	–	–	–	–	0.5% (max) when lead-free gypsum is required
Physical form	–	–	–	–	–	In the form of dry powder
Microscopic form	–	–	–	–	–	Material should match entirely with the characteristics of gypsum crystals

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**Table – 11 : Requirement of By-product Gypsum for Use in Plaster, Blocks and Boards
(IS:12679 - 1989, Reaffirmed 2005)**

Sl. No.	Characteristic	Requirement		
		Phospho-gypsum	Fluoro-gypsum	Marine-gypsum
1.	P ₂ O ₅ , % by mass, max	0.40	–	–
2.	F, % by mass, max	0.40	1.0	–
3.	Na ₂ O, % by mass, max	0.10	–	–
4.	K ₂ O, % by mass, max	0.20	–	–
5.	Organic matter, % by mass, max	0.15	–	–
6.	CaSO ₄ .2H ₂ O, % by mass, max	85.0	90.0*	85.0
7.	Cl as NaCl, % by mass, max	0.10	–	0.10
8.	pH of 10% aqueous suspension of gypsum, min	5.0	5.0	6.0

Note: * Fluoro-gypsum shall be in anhydrous form (as CaSO₄).

Table – 12 : Principal Producers of Phospho-gypsum

State	Unit
Andhra Pradesh	Coromandal Fertilizers Ltd, Visakhapatnam.
Gujarat	Gujarat State Fertilizers and Chemicals Ltd, Fertilizernagar, Vadodara district.
Kerala	(i) Fertilizers & Chemical Travancore Ltd, Udyogmandal, Ernakulam district. (ii) Fertilizers & Chemical Travancore Ltd, Ambalamedu, Ernakulam district.
Maharashtra	Rashtriya Chemicals & Fertilizers, Chembur, Mumbai.
Odisha	Paradeep Phosphates Ltd.
Tamil Nadu	(i) Southern Petrochemical Industries Corporation Ltd, Tuticorin. (ii) Coromandal Fertilizers Ltd, Thiruvallur

CONSUMPTION

About 6.92 million tonnes gypsum in all forms was consumed in organised sector in 2009-10 as against 7.12 million tonnes in 2008-09. In addition, a substantial quantity of mineral gypsum as well as phospho-gypsum was used in agricultural sector for conditioning alkaline soil. The respective share of mineral gypsum, by-product phospho & fluoro-gypsum and marine-gypsum & plaster of Paris moulds in total consumption in 2009-10 was about 48%, 46% and 6%, respectively.

A major quantity of natural gypsum in 2009-10 was consumed in the manufacture of cement (94.70%) and plaster of Paris (5.20%). The remaining 0.1% consumption was in asbestos products, ceramic, fertilizer, textile, pharmaceuticals, refractory and chemical industries. The entire quantity of marine and gypsum moulds was consumed in cement and ceramic industries. Phospho-gypsum was consumed mainly for manufacture of cement (99.9%) and a meagre consumption was in ceramic industry in 2009-10 (Table - 13).

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**Table – 13 : Reported Consumption of Gypsum, 2007-08 to 2009-10
(By Industries & Categorywise)**

(In tonnes)

Category	Industry	2007-08	2008-09	2009-10(R)
All Industries:	Grand Total	6139400	7126000	6922900
Natural-Gypsum:	Total	3159900	3422000	3373600
	Asbestos products	700(5)	700(5)	700(5)
	Cement	2981200(68)	3243200(69)	3194800(69)
	Ceramic	1000(5)	1000(5)	1100(5)
	Fertilizer	400(4)	400(4)	400(4)
	Glass	++(2)	++(2)	++(2)
	Paint	++(3)	++(3)	++(3)
	Pharmaceutical	800(1)	800(1)	800(1)
	Plaster of Paris	175600(8)	175600(8)	175600(8)
	Refractory	100(1)	100(1)	100(1)
	Textile	100(4)	100(4)	100(4)
By-product-Gypsum:	Total	2598500	3313400	3158500
	Cement	2597900(73)	3312800(76)	3157900(76)
	Ceramic	600(1)	600(1)	600(1)
	Chemical	++(1)	++(1)	++(1)
	Fertilizer	++(2)	++(2)	++(2)
Marine-Gypsum:	Total	378400	387900	388100
	Cement	376900(23)	386400(23)	386600(23)
	Ceramic	1500(1)	1500(1)	1500(1)
Gypsum-Moulds:	Total	2600	2700	2700
	Cement	++(2)	++(2)	++(2)
	Ceramic	2600(5)	2700(5)	2700(5)

Figures rounded off. Data collected on non-statutory basis.

Figures in parentheses denote the number of units in organised sector reporting consumption.*

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

In addition to the above consumption, gypsum is also consumed in agriculture as soil amendment for reclamation of alkali soils.

INDUSTRY

The India Gypsum Ltd has a plant at Jind, Haryana capable of producing one lakh tpy of gypsum plasterboards and accessories. It uses mineral gypsum produced by RSMML.

WORLD REVIEW

The world reserves of gypsum are large and adequate to meet the demand. The total reported production of gypsum in 2009 was about 231 million tonnes as against 223 million tonnes in 2008. Chile was the largest producer accounting for 14%, followed by Iran (5%), USA, Canada, Spain and Thailand (4% each) (Table - 14).

**Table – 14 : World Production of Gypsum
(By Principal Countries)**

(In '000 tonnes)

Country	2007	2008	2009
World: Total	166100	223000	231000
Australia	4385	4472	4365
Canada@	6819	8229	9210
Chile	44775	33639	33000 ^(e)
China	67700	2339	3351
Germany@	1898	2112	1898
India#	3400	3716	3516
Iran	11931	11251	11250 ^(e)
Italy	1600 ^(e)	1600 ^(e)	1600 ^(e)
Mexico	6919	6933	7543
Russia	2300 ^(e)	2400 ^(e)	2300 ^(e)
Spain	14535	11956	9000 ^(e)
Thailand@	9336	8989	9169
United Kingdom	1700 ^(e)	1700 ^(e)	1700 ^(e)
USA	17900	14400	9400 ^(e)
Other countries	30247	31003	32005

Source: World Mineral Production, 2005-2009.

@ Including Anhydrite, # Including selenite.

GYPSUM

FOREIGN TRADE

Exports

Exports of gypsum and plaster decreased substantially (52%) to 100,520 tonnes in 2009-10 from 209,157 tonnes in 2008-09. During the same period, export of alabaster was nominal against 5 tonnes in the previous year. Gypsum & plaster were exported in bulk to neighbouring countries, viz, Nepal (54%) and Bangladesh (42%). Alabaster was exported to UAE (Tables - 15 and 16).

Imports

Imports of gypsum & plaster increased to 15,48,701 tonnes in 2009-10 from 890,912 tonnes in 2008-09. Imports of alabaster increased to 413 tonnes in 2009-10 from 397 tonnes in 2008-09. Gypsum & plaster were imported mainly from Thailand (67%) and Iran (26%). Alabaster was imported from Spain. (Tables - 17 and 18).

**Table – 15 : Exports of Gypsum and Plaster
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs.'000)
All Countries	209157	157652	100520	114300
Bangladesh	100227	96277	42460	55094
Nepal	34905	24513	54606	39548
Kenya	59	613	569	4853
Turkey	28	297	41	2784
China	–	–	794	1786
South Africa	339	1460	560	1750
UK	2609	19223	201	1036
Israel	100	3181	10	206
Spain	68183	1607	49	195
Nigeria	508	2691	7	24
Other countries	2199	7790	1223	7024

**Table – 16 : Exports of Alabaster
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs.'000)
All Countries	5	33	–	–
UAE	5	33	–	–

GYPSUM

**Table – 17: Imports of Gypsum and Plaster
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs.'000)
All Countries	890912	1419361	1548701	2212673
Thailand	616997	921527	1033358	1356137
Iran	221810	360772	407478	672775
Oman	48680	69887	103103	119074
USA	857	22692	1553	30545
China	743	12175	1881	16001
UK	784	17471	183	4505
France	313	2516	349	3547
Malaysia	138	990	376	2628
Germany	205	6452	78	2438
Italy	60	1516	26	1369
Other countries	325	3363	316	3654

**Table – 18 : Imports of Alabaster
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs.'000)
All Countries	397	6822	413	7425
Spain	336	5916	365	6527
Hong Kong	++	56	–	–
Italy	61	850	–	–
Unspecified	–	–	48	898

FUTURE OUTLOOK

India's domestic resources of gypsum are large to meet increased demand. Steps would be necessary to find out suitable mining technology to exploit deep-seated gypsum resources in Rajasthan.

India's main focus is the creation of more infrastructure with a view to infuse momentum in its economy and participation in its industrial development. These activities will keep the cement industry to grow and accordingly, the consumption of gypsum will increase.