

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 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. 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 latter 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.

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 resources are 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).

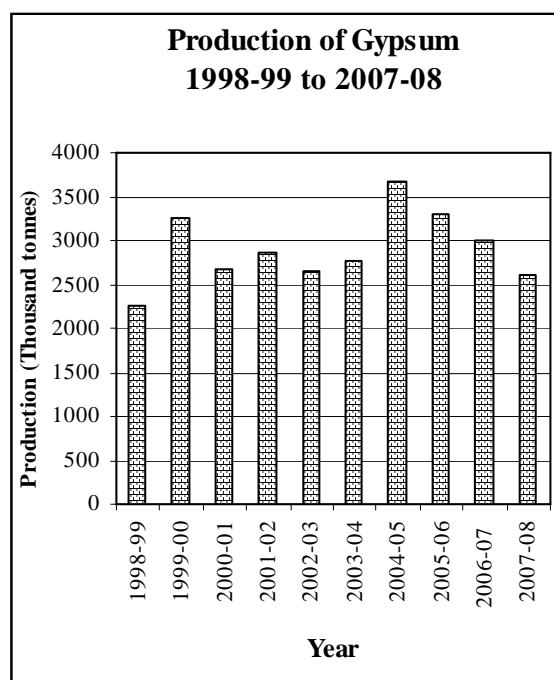
EXPLORATION & DEVELOPMENT

In the year 2007-08 DMG, Haryana carried out exploration by way of mapping on 1:50,000 scale and collecting 17 samples for chemical analysis in villages Garonpur Kalan, Dariyapur, Titani and Sahdwa in Bhiwani and Hisar districts. Gypsum occurs as pocket deposit in agriculture land having variable thickness. Resources were not assessed.

PRODUCTION, STOCKS AND PRICES

Gypsum

The production of gypsum at 2.61 million tonnes in 2007-08 decreased by 13% as compared to that in the previous year due to less demand and temporary closure of some mines for want of environmental clearance.



**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		Measured STD331	Indicated STD332	Inferred STD333		Reconnaissance STD334	Total (B)
		STD121	STD122			STD221	STD222						
All India : Total	40803	1276	26579	68658	285	10418	7756	9033	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	1209	2854	41096	10	51047	94577
Soil reclamation	1404	11	398	1813	-	426	2088	-	55	7927	-	10496	12309
Unclassified	-	-	56	56	-	-	-	7758	2944	108876	-	119578	119634
Not known	-	-	-	-	-	-	-	66	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	1353	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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There were 21 reporting mines during the year as against 28 in the preceding year. Two principal producers together accounted for 99% of the total production of gypsum in 2007-08. Seven mines, each producing above 50 thousand tonnes annually contributed 93% of total production and 6 mines each producing 10 thousand tonnes to 50 thousand tonnes accounted for 6% of production. Nominal production of gypsum was reported from 8 other mines each producing below 1,000 tonnes annually. Almost the entire production of gypsum was contributed by public sector and nominal production was reported from private sector during the year under review.

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

The mine-head stocks of gypsum at the end of the year 2007-08 were 338 tonnes as against 3,799 tonnes at the beginning of the year (Table - 6).

The average daily labour employed in gypsum mines during 2007-08 was 187 as against 299 in the previous year. Domestic prices of gypsum are furnished in Table - 7.

Selenite

The production of selenite was 3,341 tonnes in the year 2007-08 as against nil during preceding year. The entire production of selenite is reported from Barmer and Bikaner districts of Rajasthan by two mines in public sector (Tables - 8 and 9).

Mine-head stock of selenite was reported nil during both the years. The average daily employment of labour during the year under review was 5 as against nil in 2006-07. Domestic prices of selenite are given in Table - 10.

**Table – 2 : Principal Producers of Gypsum
2007-08**

Name and address of producer	Location of mine	
	State	District
Rajasthan State Mines & Minerals Ltd. C-80/90, Janpath Scheme, Lalkothi, Jaipur, Rajasthan.	Rajasthan	Bikaner Sri Ganganagar Jaisalmer
Jammu and Kashmir Minerals Ltd. Surya Hotel, Residency Road, Srinagar-190 001, Jammu and Kashmir.	Jammu & Kashmir	Srinagar

**Table – 3 : Production of Gypsum, 2005-06 to 2007-08
(By States)**

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

State	2005-06		2006-07		2007-08 (p)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	3291478	401288	3005572	494242	2606788	542320
Gujarat	109	15	58	10	128	17
Jammu & Kashmir	32636	21768	23903	18573	10407	8086
Rajasthan	3258733	379505	2953661	468671	2596253	534217
Tamil Nadu	-	-	27950	6988	-	-

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**Table – 4 : Production of Gypsum, 2006-07 and 2007-08
(By Sectors/States/Districts)**

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

State/District	2006-07			2007-08 (p)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	28	3005572	494242	21	2606788	542320
Public sector	24	2977564	487244	17	2606660	542303
Private sector	4	28008	6998	4	128	17
Gujarat	3	58	10	4	128	17
Kachchh	3	58	10	4	128	17
Jammu & Kashmir	1	23903	18573	1	10407	8086
Doda	1	23903	18573	1	10407	8086
Rajasthan	23	2593661	468671	16	2596253	534217
Bikaner	7	1356757	190461	6	1771351	371835
Ganganagar	8	532995	82573	3	436595	84505
Hanumangarh	4	69854	10118	3	82044	16137
Jaisalmer	2	868155	168405	1	233225	46402
Jalore	1	67842	9566	2	73038	15338
Nagaur	1	58058	7548	1	-	-
Tamil Nadu	1	27950	6988	-	-	-
Tiruchirapalli	1	27950	6988	-	-	-

**Table - 5 : Production of Gypsum, 2006-07 and 2007-08 (p)
(By Frequency Groups)**

(Qty. in tonnes)

Production group	No. of mines		Production for the group		Percentage in total production		Cumulative percentage	
	2006-07	2007-08	2006-07	2007-08	2006-07	2007-08	2006-07	2007-08
All Groups	28	21	3005572	2606788	100.00	100.00	-	-
Up to 1000	4	8	748	6875	0.02	0.26	0.02	0.26
1001 - 5000	-	-	3395	-	0.11	0.00	0.13	0.26
5001 - 10000	-	-	-	-	0.00	0.00	0.13	0.26
10001 - 50000	11	6	303211	165691	10.08	6.36	10.21	6.62
50001 - 100000	4	2	275508	169748	9.17	6.51	19.38	13.13
100001- 200000	3	5	445099	2264474	14.81	86.87	34.19	100.00
Above 200000	6	-	1977611	-	65.81	0.00	100.00	-

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Table – 6 : Mine-head Stocks of Gypsum, 2007-08 (p)
(By States)

(In tonnes)

State	At the beginning of the year	At the end of the year
India	3799	338
Gujarat	285	333
Jammu & Kashmir	10	5
Rajasthan	3004	-
Tamil Nadu	500	-

Table – 7 : Prices of Gypsum, 2005-06 to 2007-08
(Domestic Markets)

(In Rs. per tonne)

Grade	Market	2005-06	2006-07	2007-08 (p)
r.o.m. 75% CaSO ₄ .2H ₂ O	f.o.r. Kanasar (Rajasthan)	325	325	325
r.o.m. 70% CaSO ₄ .2H ₂ O	f.o.r. Anupgarh (Rajasthan)	260	260	260
r.o.m. 65% CaSO ₄ .2H ₂ O	f.o.r. Hanumangarh (Rajasthan)	290	290	290
Gypsum Powder 70% CaSO ₄ .2H ₂ O	f.o.r. Hanumangarh (Rajasthan)	400	400	400
Gypsum Powder 65% CaSO ₄ .2H ₂ O	Ex-mine Ramka (Rajasthan)	280	280	280
Gypsum +70% CaSO ₄ .2H ₂ O	Ex-Pit RSMML (Rajasthan)	120	130	210
r.o.m.	Ex-mine Mohangarh (Rajasthan)	237	237	237
Gypsum Powder (loose)	f.o.r. Suratgarh (Rajasthan)	330	330	330
Powder Packed	f.o.r. Suratgarh (Rajasthan)	480	480	480
R.O.M.	f.o.r. Bikaner (Rajasthan) RSMML	204	217	217

Table – 8 : Production of Selenite, 2005-06 to 2007-08
(By State)

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

State	2005-06		2006-07		2007-08 (p)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	-	-	-	-	3341	2339
Rajasthan	-	-	-	-	3341	2339

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**Table – 9 : Production of Selenite, 2006-07 and 2007-08
(By Sectors/States/Districts)**

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

State/District	2006-07			2007-08 (p)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	-	-	-	2	3341	2339
Public sector	-	-	-	2	3341	2339
Rajasthan	-	-	-	2	3341	2339
Barmer	-	-	-	1	2825	1978
Bikaner	-	-	-	1	516	361

**Table – 10 : Prices of Selenite, 2005-06 to 2007-08
(Domestic Markets)**

(In Rs. per tonne)

Grade	Market	2005-06	2006-07	2007-08 (p)
Above 95% CaSO ₄ .2H ₂ O	Ex pit Thob (Rajasthan)	700	700	700
Above 95% CaSO ₄ .2H ₂ O	Ex pit Lunkaransar (Rajasthan)	700	700	700

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 (CaSO₄.2H₂O) 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. Rajasthan gypsum is despatched to cement plants in India spread over Rajasthan, Gujarat, Madhya Pradesh, West Bengal, Uttar Pradesh, Bihar, etc. Besides, a substantial quantity of Rajasthan gypsum containing 60-70% CaSO₄.2H₂O 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 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.

USES AND SPECIFICATIONS

Cement, fertilizer (ammonium sulphate) and plaster of Paris are the 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. 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.

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-11. Table-12 gives the specifications of by-product gypsum for use in plaster, blocks and boards industries, as per IS:12679-1989. 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. Major phospho gypsum producing fertilizer units are Coromandal Fertilizer Ltd, Visakhapatnam in Andhra Pradesh; Gujarat State Fertilizers and Chemicals Ltd, Vadodara in Gujarat; FACT Udyogmandal, Ernakulam in Kerala, RCF, Chembur, Mumbai in Maharashtra; Paradeep Phosphates Ltd in Orissa, SPIC Tuticorin and Coromandal Fertilizers Ltd, Thiruvallur in Tamil Nadu. Manufacturing units of phospho-gypsum together with production are given in Table-13.

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 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 scarce 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.

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Table – 11 : 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

Table – 12 : Requirement of By-product Gypsum for Use in Plaster, Blocks and Boards (IS:12679 - 1989, Reaffirmed 2000)

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).

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Table – 13 : Principal Producers of Phospho-gypsum, 2005-06 and 2006-07

State	Unit	Production in tonnes	
		2005-06	2006-07
Gujarat	Gujarat State Fertilizers and Chemicals Ltd. Fertilizernagar, Vadodara district.	458450(e)*	435500(e)
Kerala	(i) Fertilizers & Chemical Travancore Ltd., Udyogmandal, Ernakulam district.	530700	453205
	(ii) Fertilizers & Chemical Travancore Ltd., Ambalamedu, Ernakulam district.	530700	543205
Maharashtra	Rashtriya Chemicals & Fertilizers, Chembur, Mumbai.	145011(e)	NA
Tamil Nadu	(i) Southern Petrochemical Industries Corporation Ltd., Tuticorin.	316000(e)	142025 ^e
	(ii) Coromandal Fertilizers Ltd, Thiruvallur	NA	345010

* Utilised in production of ammonium sulphate and ammonium phosphate sulphate in own plant.

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 221,717 tonnes in 2007-08, and 95,297 tonnes in 2006 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.

CONSUMPTION

About 6.05 million tonnes gypsum in all forms was consumed in organised sector in 2007-08 as against 5.72 million tonnes in 2006-07. 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 2007-08 was about 53%, 41% and 6%, respectively.

A major quantity of natural gypsum in 2007-08 was consumed in the manufacture of cement (94.4%) and plaster of Paris (5.5%). The remaining 0.1% consumption was in asbestos products, ceramic, fertilizer, textile 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 2007-08 (Table - 14).

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**Table – 14 : Reported Consumption of Gypsum, 2005-06 to 2007-08
(By Industries & Categorywise)**

		(In tonnes)		
Category	Industry	2005-06 (R)	2006-07	2007-08 (p)
All Industries :	Grand Total	4923600	5716900	6054300
Natural-Gypsum :	Total	2818100	3098500	3210300
	Asbestos products	1400(5)	700(5)	700(5)
	Cement	2638700(65)	2919800(69)	3031600(69)
	Ceramic	1000(5)	1000(5)	1000(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	1727500	2246100	2463000
	Cement	1726900(69)	2245500(72)	2462400(72)
	Ceramic	600(1)	600(1)	600(1)
	Chemical	++(1)	++(1)	++(1)
	Fertilizer	++(2)	++(2)	++(2)
Marine-Gypsum :	Total	375200	369500	378400
	Cement	373700(21)	368000(23)	376900(23)
	Ceramic	1500(1)	1500(1)	1500(1)
Gypsum-Moulds :	Total	2800	2800	2600
	Cement	++(2)	++(2)	++(2)
	Ceramic	2800(5)	2800(5)	2600(5)

Figures rounded off. Data collected on non-statutory basis

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

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

Production of mineral gypsum in USA increased. BPB is to build two large gypsum wallboard plants in USA which were scheduled to come on stream in 2007 and 2008, respectively. American Gypsum and National Gypsum are also setting up plants while Lafarge and US Gypsum are to raise the capacity of their wallboard plants.

BPB, UK, Lafarge, France and Knauf, Germany dominate supplies over Europe. BPB is the world's

largest gypsum and plasterboard producer. Plasterboard usage continued to grow in Spain and Italy while strong growth was seen in Poland, Russia, Czech Republic, Hungary, Romania and Turkey.

BPB had been contemplating to open new plaster and plasterboard plant in India and Thailand and Malaysia. Iran continues to be the largest producer in the Middle East Region.

The world reserve base of gypsum is large and adequate to meet the demand. The total reported production of gypsum in 2007 was about 149.7 million tonnes as against 148 million tonnes in 2006. China was the largest producer accounting for 23.4%, followed by USA(14.7%), Spain (9.3%), Iran(7.3%), Thailand (6.2%), Canada (5.1%) and Mexico (4.6%) (Table - 15).

GYPSUM

**Table – 15 : World Production of Gypsum
(By Principal Countries)**

Country	(In '000 tonnes)		
	2005	2006	2007
World Total	142400	148000	149700
Australia	3882	4249	3864
Canada @	8272	9072	7638
China	32000	35000	35000 ^e
France	4902	4800 ^e	4800 ^e
Germany @	1644	1771	1898
India #	3291	2889	2638
Iran	11196	10761	11000 ^e
Italy	1600 ^e	1600	1600 ^e
Mexico	6252	6076	6919
Russia	2200e	2200e	2400e
Spain	14453	14597	14000
Thailand @	7651	8915	9336
United Kingdom	1700 ^e	1700 ^e	1700 ^e
USA	21100	21100	22000 ^e
Other countries	22257	23270	24907

Source : World Mineral Production, 2003-2007.

@ Including anhydrite

FOREIGN TRADE

Exports

Exports of gypsum and plaster increased to 120,582 tonnes in 2007-08 from 116,027 tonnes in 2006-07. During the same period, export of alabaster was nominal at 2 tonnes against 107 tonnes in the previous year. Gypsum & plaster were exported in bulk to neighbouring countries, viz, Bangladesh (47%) and Nepal (30%). Alabaster was exported to Nepal (Tables - 16 and 17).

Imports

Imports of gypsum & plaster increased to 582,215 tonnes in 2007-08 from 421,772 tonnes in 2006-07. Imports of alabaster also increased to 658 tonnes in 2007-08. from 552 tonnes in 2006-07. Gypsum & plaster were imported mainly from Thailand (70%) and Iran (29%). Alabaster was imported from Spain and Italy (Tables - 18 and 19).

**Tale – 16 : Exports of Gypsum & Plaster
(By Countries)**

Country	2006-07		2007-08	
	Qty. (t)	Value (Rs. '000)	Qty. (t)	Value (Rs. '000)
All Countries	116027	105938	120582	112769
Bangladesh	80521	64768	56359	48136
Nepal	28968	25587	35813	25290
Canada	6	47	17000	17013
UK	387	2033	6619	11046
Bhutan	1829	4275	460	2187
USA	-	-	421	1358
Belgium	664	1079	617	1125
UAE	6	102	1029	1091
South Africa	143	1171	22	543
Unspecified	2424	1837	-	-
Other countries	1079	5039	2242	4980

**Table – 17 : Exports of Alabaster
(By Countries)**

Country	2006-07		2007-08	
	Qty. (t)	Value (Rs. '000)	Qty. (t)	Value (Rs. '000)
All Countries	107	519	2	9
Nepal	1	20	2	9
Syria	106	499	-	-

**Table – 18 : Imports of Gypsum & Plaster
(By Countries)**

Country	2006-07		2007-08	
	Qty. (t)	Value (Rs. '000)	Qty. (t)	Value (Rs. '000)
All Countries	421772	527720	582215	802051
Thailand	255670	296976	408104	535522
Iran	155472	172508	171187	220821
USA	997	20079	1058	19905
UK	393	8757	405	8307
China	381	5228	479	5451
Germany	70	1678	46	2456
Singapore	144	1170	175	1389
Italy	45	1727	78	680
Spain	873	5549	++	2
Russia	7200	7706	-	-
Other countries	527	6342	683	7518

GYPSUM

**Table – 19 : Imports of Alabaster
(By Countries)**

Country	2006-07		2007-08	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	552	7296	658	9777
Spain	349	4748	365	5283
Italy	203	2548	252	4036
Turkey	-	-	21	257
Mexico	-	-	20	200
Hong Kong	-	-	++	1

FUTURE OUTLOOK

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

increase. 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.

Production of gypsum wallboard in India is low. Because of its lightweight and many other characteristics, its domestic demand as lightweight and attractive partition designing material in high-rise buildings has to be explored. In view of the environmental problem arising from huge accumulation of phospho-gypsum at different fertilizer plants, increasing utilisation of phospho-gypsum is necessary. Low-grade mineral gypsum being cheaper should be utilised more as a soil conditioner in the reclamation of alkaline soils. An India based organisation, Fertilizers & Chemicals Travancore is planning to launch a new Gypsum based fertilizer in response to high Gypsum inventory. They are currently developing the brand and will introduce the product in the next fertilizer season.