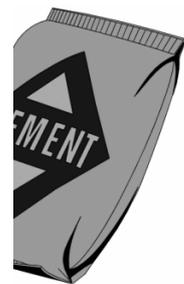


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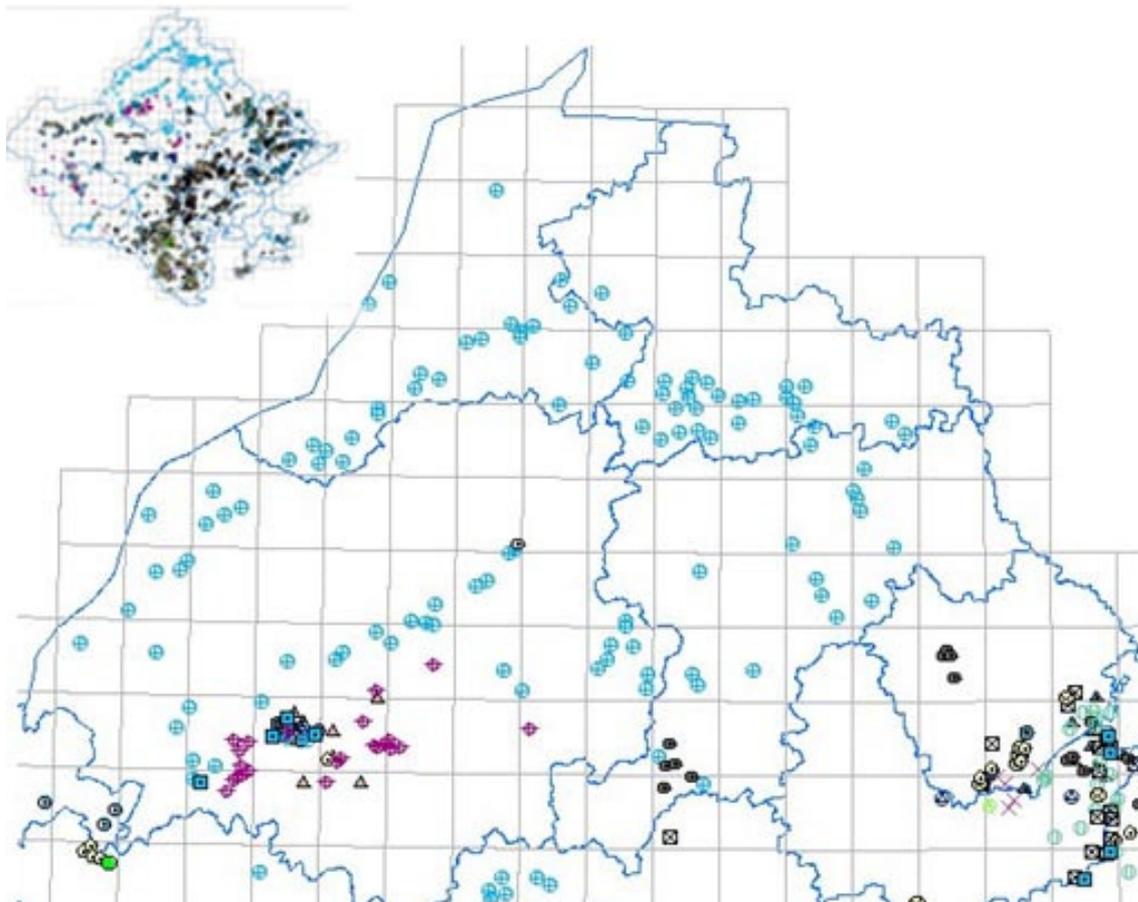


FACTSHEET: GYPSUM ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)

Mineral Outlook

Gypsum is a hydrated compound of Calcium sulphate containing two molecules of water, it thus gives it a crystallite nature. This is the unique characteristic of this mineral as it is highly used in industrial application as it can loose 3/4th of its water upon heating to a particular temperature. The mineral is formed of Alkaline earth metals (Calcium or Ca) and non-metals (Sulphur (S), Oxygen (O) and Hydrogen (H)) and its use as mineral thus correspond to nature of metals / non metals of which it is formed. The weight per unit volume or density ranges from 2.312 – 2.322 g/cm³ and its molecular weight is 172.17 gm.

Gypsum is a common mineral widely distributed in sedimentary rocks, often as thick beds. It frequently occurs interstratified with limestones and shales and is usually found as a layer underlying beds of rock salt, having been deposited there as one of the first minerals to have crystallized on the evaporation of salt waters. It is also found as lenticular bodies or scattered crystals in clays and shales. Found in volcanic regions, especially where limestones have been acted upon by sulfur vapors. Usually the deposits have very little or no overburden and the material being very soft and friable are very easy to mine.



Forms / Variety:

- Selenite (Colourless, transparent, crystalline - It shows a pearl-like luster);
- Alabaster (fine grained, massive variety, white or shaded) - It's an ornamental stone used in fine carvings;
- Satin Spar (Silky & fibrous)

Weight to Volume Outlook:	
Gypsum Pulverised:	1 Tonne = 0.8921 m ³
Gypsum Crushed:	1 Tonne = 0.6242 m ³
Gypsum Solid:	1 Tonne = 0.3588 m ³

Major Production by Public Sector

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
Value in Rs./Tonne		211		256		280

Quantity in Tonnes; Value in Rs. '000

Rajasthan is the principal Gypsum producing state in the country, almost 85 - 90% of the total gypsum production is concentrated in Rajasthan. The Rajasthan Mineral policy stipulates reservation of mining by the SPSUs like RSMML (Bikaner, Ganganagar, Hanumangarh, Jaisalmer, Jalore and Nagaur) in the state of Rajasthan. Fertilizer Corporation of India, a central government undertaking has gypsum mines in Bikaner, Ganganagar and Jaisalmer. Majority of the mining is carried out by the public sector, barring a few mines of private sector.

- 22 mines out of 27 were operated by Public sector in 2008-09 whereas 17 out of 24 in 2009-10.
- Five to six mines accounted for 78% and 82% of production producing more than 2,00,000 tonnes.
- RSSML is the sole producer of Selenite grade of gypsum and is thus wholly a public sector activity.
- The average daily employment of labour in gypsum mines during 2009-10 was 173 as against 144 in the previous year.

Production, Export & Import

	Quantity in Million Tonnes			Value in Rs. Million			Value (Rs./Tonne)		
	2007-08	2006-07	2005-06	2007-08	2006-07	2005-06	2007-08	2006-07	2005-06
Gypsum									
Production	2.607	3.006		542.32	494.242		208.04	164.44	
Export	0.121	0.116	0.088	110	110	90	912.24	948.06	1022.30
Import	0.582	0.422	0.076	800	530	130	1374.06	1256.60	1712.53

Figures for import & export for 2007-08 are provisional and are for Gypsum and Plaster combined

Basic custom duty for Gypsum was reduced to 2.5% in FY 2011-12

Gypsum & plaster were imported mainly from Thailand (67%) and Iran (26%). Alabaster was imported from Spain.

Various grades of Gypsum {as percent of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ content) are produced and consumed by industries like Cement, Fertilizer plants, Plaster of Paris etc. Some of the grade classifications are

- i) above 90%;
- ii) 85 - 90%;
- iii) 80 - 85%; and
- iv) less than 80%.

Uses of Gypsum

- Plaster of Paris (formed upon heating gypsum and converts of hemihydrates form i.e. $\text{CaSO}_4 \cdot 1/2\text{H}_2\text{O}$) is now-a-days commonly seen as a roof aesthetics enhancement or decoration material and its property to get hard on cooling gives it durability.
- Gypsum also acts as a neutralizing agent and helps in improving soil permeability thereby acting as a catalyst to condition soil and natural gypsum is used as a source of sulphur for agriculture and is used in fertilisers.
- Crushed gypsum is added / mixed with cement / clinker as an retarding agent to control the setting time of cement.
- Among other uses, it finds use in surgical products like plasters, toothpastes, creams, decorative items, filler agent in insecticides, mine dusting, chalk, ceramics and construction materials such as boards, partitions etc.
- Mushroom compost,

Gypsum as a By Product

Gypsum is also produced as a by product of various industrial processes, the same is explained below;

Phospho-Gypsum	A by product during manufacturing of phosphoric acid. 4.5 tonnes of phospho-gypsum is produced per tonne of phosphoric acid production	Purity ranges from 77 - 98% and is usually used in cement and fertilizer industry. [Vizag (AP), Vadodara (GJ), Ernakulam (KL), Chembur (MH), Orissa, Tuticorin & Thiruvallur (TN)]
Fluoro Gypsum	Obtained as by product during manufacture of aluminium fluoride and hydrofluoric acid.	Recovery of fluoro gypsum from chemical plants [Surat, Cuddalore, Thane]
Boro Gypsum	Obtained during refining of calcium borates to produce borax and boric acid.	[Ambarnath, Thane District; Chennai; National Peroxide Ltd., Maharashtra]
Marine Gypsum	Obtained as by product during the production of common salt by solar evaporation.	High quality marine gypsum [89 - 92% gypsum]. As per IS specification, marine gypsum should contain 85% $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ Entire consumption in organized sector by Cement and Ceramic Industries

- ✓ Phospho-gypsum is radioactive due to the presence of naturally occurring uranium and radium in the phosphate ore. Limit of 0.15% P_2O_5 is specified for cement!
- ✓ Phospho-Gypsum is unsuitable for sale as common gypsum! [EPA, 1989]

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.

Others:

- Royalty on Gypsum: 20 percent of sale price on ad volorem basis.
- Royalty on Selenite: 10 percent of sale price on ad volorem basis.

Gypsum

Ex-mine Lifri (Gujarat)	233	100	124
Ex-mine Ballar (Rajasthan)	210	227	300
Ex-mine Siyar ka Kosita (Rajasthan)	210	234	270
Ex-mine Sekhra (Rajasthan)	210	229	235
Ex-mine Bajju (Rajasthan)	210	235	300

The factsheet is produced from secondary sources of information, available online. Since there are several sources accessed, no particular source is being mentioned, the basic starting point has been the Indian Mineral Yearbook (2010). The factsheet provides sorted and simplistic information about the mineral and only the facts have been produced without any intention to affect anyone concerned.