

MAGNESITE



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MAGNESITE

(FINAL RELEASE)

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

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33 Magnesite

Magnesite ($MgCO_3$) is a carbonate of magnesium. It is usually found as irregular veins in serpentine and formed by replacement of dolomite and limestone. Calcium and silica are therefore, the most common impurities observed in magnesite along with Fe_2O_3 and Al_2O_3 . It is a very important mineral for the manufacture of basic refractories, which are largely used in the steel industry. In commerce, the term 'magnesite' refers not only to the mineral, but also to many products, obtained by calcining the natural carbonate; e.g., caustic magnesite (magnesia obtained by calcining crude magnesite at comparatively low temperatures 700 to 1000 °C, and retaining 2 to 7% CO_2 as carbonate) and dead-burnt or refractory magnesite (magnesia obtained by calcining magnesite at high temperatures, 1500 to 1800°C, usually containing less than 0.5% CO_2). Pure magnesite calcined at still higher temperatures (1600 - 1800°C) to expel carbon dioxide completely is termed as 'periclase' (MgO) in the trade.

RESOURCES

The total reserves/resources of magnesite as per UNFC system as on 1.4.2010 are about 335 million tonnes of which reserves and remaining resources are 42 million tonnes and 293 million tonnes, respectively. Substantial quantities of resources are established in Uttarakhand (69%), followed by Rajasthan (16%) and Tamil Nadu (12%). Resources are also located in Andhra Pradesh, Himachal Pradesh, Jammu & Kashmir, Karnataka and Kerala.

Occurrences of magnesite in Tamil Nadu are low in lime and high in silica, whereas those of Uttarakhand are high in lime and low in silica. The gradewise and statewise reserves and resources of magnesite are given in Table - 1.

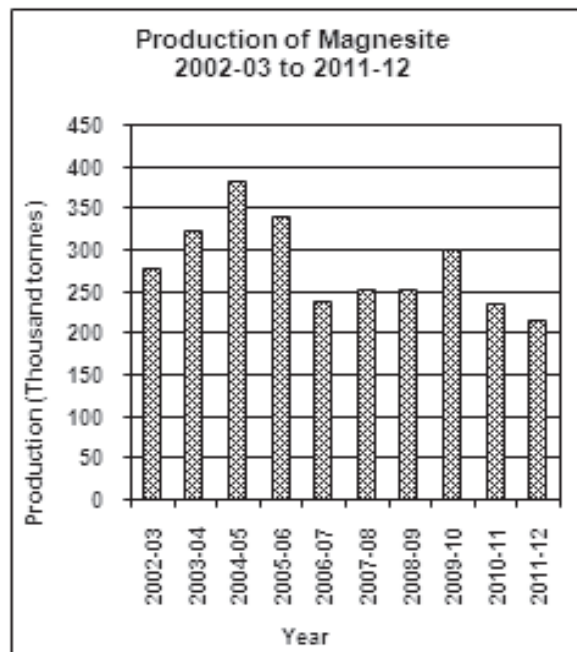
PRODUCTION, STOCKS & PRICES

Production of magnesite in 2011-12 at 218 thousand tonnes decreased by 8% as compared to that in the previous year due to non-availability of labour in some mines. There were 11 reporting mines in 2011-12 and 10 in the previous year. Five principal producers accounted for 95% of the total output during the year 2011-12. About 77% of the total production of magnesite was contributed by public sector during 2011-12 as against 64% in the preceding year.

Tamil Nadu continued to be the major producing state with maximum share of 67% in total output during 2011-12 followed by Uttarakhand (28%) and the remaining 5% was contributed by Karnataka.

Mine-head stocks at the end of the year were 61 thousand tonnes as against 75 thousand tonnes in the beginning of the year.

The average daily employment of labour during the year was 764 as against 899 in the previous year.



**Table – 1 : Reserves/Resources of Magnesite as on 1.4.2010
(By Grades/States)**

(In '000 tonnes)

	Reserves			Remaining resources						Total resources (A+B)			
	Proved STD111	Probable		Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333		Reconnaissance STD334	Total (B)	
		STD121	STD122		STD221	STD222							
All India : Total	20851	7786	13313	41950	1776	2244	32326	59010	59652	138169	45	293222	335172
By Grades													
High Grade	2616	-	2	2618	600	-	3	2	-	25	-	630	3248
Medium Grade	11676	7326	11038	30040	1159	222	317	64	109	14637	-	16508	46548
Beneficial/Low	3237	202	53	3492	-	84	479	648	31558	117216	-	149985	153477
High & Medium Mixed	-	-	-	-	18	173	2290	-	-	100	-	2581	2581
Medium & Low Mixed	1239	257	-	1496	-	429	29237	58271	27766	414	-	116117	117613
Others	2085	-	2025	4110	-	1336	-	24	-	2525	-	3885	7995
Unclassified	-	-	-	-	-	-	-	-	-	83	-	83	83
Not-known	-	-	194	194	-	-	-	-	219	3170	45	3434	3628
By States													
Andhra Pradesh	-	-	-	-	-	-	-	-	-	80	-	80	80
Himachal Pradesh	-	-	-	-	-	-	-	-	-	298	-	298	298
Jammu & Kashmir	2610	740	-	3350	600	100	-	-	-	150	45	895	4245
Karnataka	332	202	163	697	18	-	499	88	10	2734	-	3349	4046
Kerala	-	-	-	-	-	-	-	2	-	38	-	40	40
Rajasthan	1024	57	2045	3126	-	1420	76	-	149	49033	-	50678	53804
Tamil Nadu	12462	5968	7474	25904	997	27	474	17	737	12355	-	14607	40511
Uttarakhand	4424	818	3632	8874	162	697	31277	58902	58756	73481	-	223275	232149

Figures rounded off.

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Table – 2 : Principal Producers of Magnesite, 2011-12

Name & address of producer	Location of mine	
	State	District
Tamil Nadu Magnesite Ltd, 5/53, Olamur Main Road, Jagir Ammapalayam, Dist. Salem - 636 302, Tamil Nadu.	Tamil Nadu	Salem
Almora Magnesite Ltd, At Metela, P.O. Billori, Dist. Bageshwar, Uttarakhand.	Uttarakhand	Bageshwar
Dalmia Maganesite Corpn. Ltd, Dalmia Cement (Bharat) Ltd, Dist.Salem-636 012, Tamil Nadu.	Tamil Nadu	Salem
N.B.Minerals Corporation Opp. Bhatt Colony, Nawabi Road, Haldwani, Dist. Nainital, Uttarakhand - 263 139.	Uttarakhand	Pithoragarh
Mysore Minerals Ltd, 39, M.G.Road, Bengaluru - 560 001.	Karnataka	Mysore

**Table – 3 : Production of Magnestie, 2009-10 to 2011-12
(By States)**

(Qty in tonnes; value in ₹ '000)

State	2009-10		2010-11		2011-12(P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	301070	435118	235762	378217	217662	340948
Karnataka	6437	13591	11820	26839	8331	24120
Tamil Nadu	235446	349195	165601	276628	147207	237760
Uttarakhand	59187	72332	58341	74750	62124	79068

**Table – 4 : Production of Magnestie, 2010-11 & 2011-12
(By Sectors/States/Districts)**

(Qty. in tonnes; value in ₹ '000)

State/District	2010-11			2011-12(P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	10	235762	378217	11	217662	340948
Public sector	5	150237	215683	4	167814	247654
Private sector	5	85525	162534	7	49848	93294
Karnataka	3	11820	26839	3	8331	24120
Mysore	3	11820	26839	3	8331	24120
Tamil Nadu	5	165601	276628	6	147207	237760
Erode	-	-	-	2	1515	3179
Karur	-	-	-	1	180	180
Salem	5	165601	276628	3	145512	234401
Uttarakhand	2	58341	74750	2	62124	79068
Bageshwar	1	46826	63028	1	49923	70287
Pithoragarh	1	11515	11722	1	12201	8781

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**Table – 5 : Mine-head Stocks of Magnesite 2011-12(P)
(By States)**

State	At the beginning of the year	At the end of the year
India	74827	61412
Karnataka	6921	8219
Rajasthan	-	35
Tamil Nadu	67843	53108
Uttarakhand	63	50

MINING AND MARKETING

Magnesite is being worked by opencast method by developing benches. In Salem area (Tamil Nadu), magnesite is found chiefly as encrustations, veins and stringers in ultra basic rocks like dunite and peridotite. Stringers and veins occurring irregularly in fractures of rocks giving rise to different patterns. Veins are broken and magnesite is sorted out. Major magnesite producing mines in Salem area belong to Tamil Nadu Magnesite Ltd (a State Government Undertaking), Dalmia Magnesite Corporation (a private sector enterprise) and Burn Standard Company (a Central Government Undertaking). These mines are semi-mechanised as well as mechanised and use compressors, wagon drills, jackhammers, power shovels, loaders, dumpers, dozers and pumps. Normally, Ammonium Nitrate Fuel Oil Mixture (ANFO) with about 15% of high explosives as booster is used for blasting. The powder factor may go up to 10. The blasted rock or run-of-mine material containing 25 to 30% magnesite is subjected to manual sorting.

The hand-picked crude magnesite is further subjected to sorting and dressing in the dressing yard. Magnesite lumps which are not considered fit for dressing (containing 10 to 20% silica) constitute 2 to 6% of the run-of-mine. These lumps are hand-picked and stacked separately as rejects. The remaining material is further dressed to obtain usable magnesite containing less than 3% silica. The usable magnesite hardly constitutes 4 to 8% of blasted rocks even though run-of-mine contains 20 to 30% magnesite. Magnesite mine in Karnataka is worked by Tata Steel. In Uttarakhand, Almora Magnesite Ltd and N.B. Minerals

Corporation are the important producers having mines in Bageshwar and Nainital districts, respectively.

Magnesite is marketed generally after calcination; that is, after converting it into lightly calcined or caustic magnesite by heating the mineral to 800⁰ to 1,000⁰C and dead-burnt variety to 1,800⁰C.

USES AND SPECIFICATIONS

The major proportion (about 98%) of magnesite mined is used for conversion in calcined form which finds many applications. The other industries where raw magnesite is used are mosaic tiles, electrodes, chemicals and manufacture of magnesium metal. Magnesite is also used in fertilizers and by food processing industry. Raw magnesite is dead-burnt for making basic refractory bricks, basic refractory mortars, ramming mass, tar/pitch impregnated magnesite, magnesia-carbon bricks, slide-gate plates and other refractories. Caustic calcined magnesite is used for manufacturing sorel cement (magnesium oxychloride), castable refractories and extraction of magnesium metal. It is also the source material for manufacture of magnesium compounds like magnesium sulphate (Epsom salt) and other salts used in paper and pharmaceutical industries. In paper industry, magnesium bisulphate produced from magnesite was used as cooking liquor for preparing pulp. It is also used in textile, rubber, glass, ceramic industries and as animal feed stuff. Fused magnesia finds application as insulating material in tubular heating elements in electrical industry and refractory brick linings in steel furnaces.

Refractory Industry

In India, about 95% consumption is accounted by refractory industry. In the manufacture of refractories, deleterious constituents are SiO₂, CaO, Fe₂O₃ and Al₂O₃. The permissible limits for these constituents are governed by its end-use. The refractory bricks are made from dead-burnt magnesite by judicious blending of different types of raw magnesite before dead-burning or of different qualities of dead-burnt magnesite prior to brick making.

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Indian steel plants use domestic dead-burnt magnesite (DBM) bricks containing up to 5% silica and 2.5% maximum CaO. By and large, Indian refractory makers prefer magnesite for making high grade DBM containing MgO 45.5% (min), SiO₂ 2.5% (max) and CaO 1.5% (max).

The BIS has prescribed the IS specification (14303-1995, Reaffirmed 2010) for magnesite for use in refractory industry. The said specification has laid down five grades of magnesite as follows:

S. No.	Constituent	Requirements, Percent				
		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
i)	MgO, min	45.00	43.00	42.50	45.00	43.00
ii)	CaO, max	0.75	0.75	0.75	2.00	2.00
iii)	Al ₂ O ₃ , max	0.50	0.50	0.50	0.50	0.50
iv)	Fe ₂ O ₃ , max	0.50	0.50	0.50	2.50	2.00
v)	SiO ₂ , max	2.00	3.00	4.00	1.00	2.00
vi)	Size*	25-75 mm	25-75 mm	25-75 mm	50-100 mm	50-100 mm

* Unless and otherwise agreed to.

Chemical Industry

The BIS specification (IS : 3607-1979, First Revision, Reaffirmed 2010) has prescribed the following specifications for magnesite for use in chemical industry:

S.No.	Characteristic	Requirement
i)	Loss on ignition, percent by mass, min	48.0
ii)	Silica (as SiO ₂), percent by mass, max	2.0
iii)	Alumina (as Al ₂ O ₃), percent by mass, max	0.3
iv)	Iron oxide (Fe ₂ O ₃), percent by mass, max	0.4
v)	Magnesium (as MgO), percent by mass, min	45.0
vi)	Calcium (as CaO), percent by mass, max	1.0

CONSUMPTION

About 95% consumption was reported for refractory purposes (including iron and steel plants). Chemical industry consumed magnesite for producing magnesium sulphate. Magnesite consumption pattern by industries is shown in Table - 6.

Table – 6 : Reported Consumption of Magnesite¹ 2009-10 to 2011-12 (By Industries)

Industry	(In tonnes)		
	2009-10	2010-11	2011-12(P)
All Industries	238300	240500	216300
Alloy steel (as refractory)	1600 (1)	1600(1)	1600(1)
Ferro-alloys	4700(9)	6800(10)	8100(10)
Foundry (as refractory)	1100 (6)	1100 (6)	1100(6)
Paper	1800 (1)	1800 (1)	1800(1)
Refractory ² (including Iron & steel)	228700(36)	228800(36)	203300(36)
Others (abrasive, asbestos products, ceramic, chemical, glass and rubber).	400(8)	400(8)	400(8)

Figures rounded off.

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

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

1: Includes consumption of imported magnesite and magnesite equivalent to dead-burnt magnesite.

2: Besides, imported sea water magnesia which was about 5,000 tonnes during 2009-10, 2010-11 and 2011-12 were consumed in refractory industries.

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INDUSTRY

Dead-burnt Magnesite (DBM)

When the raw magnesite is calcined between 1,660^o-1,800^o C. Carbon dioxide is expelled completely and a dense product 'dead-burnt magnesite' is obtained. Dead-burnt magnesite refers to the magnesite that is unreactive, namely 'dead' because it has been calcined at a temperature high enough to enable it to be used in brick making or monolithic hearths without undue difficulty arising out of hydration or shrinkage.

Caustic Magnesia

Low calcined magnesite, also known as caustic magnesia, is obtained by calcining magnesite in a shaft or rotary kiln between 800 and 1,000^o C. Because of incomplete dissociation, it still contains 8 to 10% carbon dioxide as carbonate. Low calcined magnesia when mixed with water forms a feebly plastic paste. Industries like paper, rubber, ceramic, asbestos products, glass, etc. use caustic magnesia.

Fused Magnesia

Fused magnesia is produced by the fusion of the high-grade magnesite in Higgin's or electric arc tilt furnaces between 2,500 and 3,000^o C. It is resistant to the action of molten metals, basic slags and fluxes and high temperatures. It is used in the form of moulded vessels and as compressed material for covering resistant elements of the furnaces used in the melting of lead, tin, etc.

There were 14 major plants manufacturing dead-burnt magnesite and six plants producing lightly-calcined magnesite, two magnesium metal extracting plants, one pilot plant and one plant of sea water magnesia (Table- 7). By-product magnesium carbonate and other magnesium salts were also produced during salt manufacture from sea water. Tamil Nadu Magnesite Ltd, (Tanmag) is one of the largest producers producing DBM in a rotary kiln, sintered at 1,750^o C. In addition, it has five oil fired vertical shaft kilns which heat magnesite to 1,000-1,100^o C for caustic calcined grades.

Table - 7 : Manufacturing Plants of Dead-Burnt Magnesite (DBM) , Lightly Calcined Magnesite, etc.

Name of the plant	Location	Installed capacity (tpy)
Tamil Nadu Magnesite Ltd	Salem, Tamil Nadu	30000 (DBM) 19500 (calcined magnesite)
Ramakrishna Magnesite Mines	-do-	3000 (calcined magnesite)
Burn Standard Co. Ltd	-do-	54000 (DBM) 18000 (calcined magnesite)
Dalmia Magnesite Corporation	-do-	72,000 (DBM)
Salem Refractories	-do-	18000 (DBM)
Badrinath Refractory	-do-	900 (DBM) 2000 (calcined magnesite)
Khaitan Hostambe Spinel	-do-	30000 (DBM) 10000 (magnesite chrome clinker)
Ponkumar Magnesite Ltd	-do-	26500 (DBM)
Tamil Nadu Products Ltd	-do-	3000 (calcined magnesite)
Tata Refractories Ltd	-do-	25000 (DBM) 2000 (calcined magnesite)
Orissa Industries Ltd	Barang, Sundergarh, Odisha	5000 (DBM)
-do-	Chandak, Pithoragarh, Uttarakhand	45000 (DBM)
Almora Magnesite Ltd	Haldwani, Bageshwar, Uttarakhand	30,000 (DBM, calcined semicalcined magnesite)
Magnesite & Minerals Ltd	Pithoragarh, Uttarakhand	45000 (DBM)
Himalayan Magnesite Ltd	-do-	20000 (DBM) 3000 (calcined magnesite)
J & K Minerals Ltd	Chipprian, Panthal, Udhampur, Jammu & Kashmir	30000 (DBM) 75000 (sized magnesite)
Hansaflon Plastochem Ltd	NA	1500 (Fused magnesia)
Birla Periclase (Presently closed)	Visakha-patnam, Andhra Pradesh	50000 (sea water magnesia)

Sea Water Magnesia (SWM)

Sea water or lake bitterns is an alternative source to obtain magnesia by chemical reaction. The main raw materials required other than sea water are dolomite or limestone, fresh water and sulphuric acid. The magnesia content of sea water is about 0.2%, and even by enrichment with dolomite, around 300 kilograms sea water needs to be processed to obtain a kilogram of magnesia. The sea water magnesia can be used to manufacture dead-burnt magnesite, caustic magnesia and the magnesium compounds.

Birla Periclase, Visakhapatnam, Andhra Pradesh, had commenced commercial production of sea water magnesia in February 1998. The installed capacity of the plant was 50,000 tonnes per annum. For the extraction of sea water magnesia, high purity limestone is needed. The plant had suspended production operations since December 1998 due to severe adverse market conditions resulting in very poor off take and heavy accumulation of stock.

Marine By-products

Carbonates, chlorides and sulphates of magnesium are obtained as by-products in the production of common salt by solar evaporation. Salt Commissioner, Jaipur, reported 16,336 tonnes production of magnesium chloride in 2011-12. By-product magnesium sulphate production of 37 tonnes was also reported during 2011-12 by the Salt Commissioner. The production is normally reported from the salt pans in Jamnagar-Gandhidham, Gujarat.

Magnesium Metal

India's primary magnesium metal production capacity is estimated at 900 tpy. Tamil Nadu Magnesium & Marine Chemical Ltd (TMML), Salem, Tamil Nadu, has suspended production since 1992 and under liquidation since 2001. Southern Magnesium & Chemical Ltd is likely to be the sole producer in India with 600 tpy capacity. (Table - 8).

TRADE POLICY

As per the Foreign Trade Policy (FTP) 2009-2014, as amended and effective from 05.6.2012, exports and imports of all grades and varieties of magnesite under heading no. 2519 are allowed freely.

Table – 8 : Magnesium Metal Extracting Pilot Plants

Name of plant	Location	Pilot/Metal extracting plant
Central Electro-Chemical Research Institute (CECRI)	Karaikudi, Tamil Nadu.	Pilot plant
Southern Magnesium & Chemical Ltd	Rajahmundry, Andhra Pradesh	Metal extracting plant
Tamil Nadu Magnesium & Marine Chemicals Ltd	Tamil Nadu	-do-

WORLD REVIEW

The world reserves of magnesite was estimated at around 2,400 million tonnes in terms of magnesium content, excluding large resources of magnesium-bearing substitutes, such as, dolomite, brucite and olivine. Further, magnesium compounds could be recovered economically from well and lake brines and from sea water. The latter, which contains 0.13% magnesium by weight, was a major source of metal and compounds. The world reserves of magnesite are given in Table -9.

The world production of magnesite was estimated at 23.1 million tonnes in 2011. China continued to be the leading producer, accounting for about 63% production, followed by Russia (11%) and Turkey (4%). The world production of magnesite is given in Table -10.

Worldwide, over 98% raw ore producers convert it to magnesia for commercial application, mainly in refractory industry (75%) based on both the sintered and fused forms generally called DBM and electrofused magnesia (EFM), respectively, for lining furnaces used in steel production, non-ferrous metals, cement, glass, ceramic and petrochemicals. Primary producers of magnesium metal and alloys were China, USA and Russia. The consuming market segments are aluminium alloying, die-casting and desulphurisation.

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China

As per China Non-ferrous Metals Industry Association, China produced 661,000 tonnes of magnesium in 2011. This was slightly more than the quantity produced in 2010. 44% of the country's primary magnesium was produced in Shanxi Province, and 38% was produced in Shaanxi Province.

Australia-based China Magnesium Corp. Ltd. began producing magnesium from a refurbished 5,000 tpy plant at Pingyao, Shanxi Province which had been idle since 2008, and was on schedule to complete expansion to 20,000 tpy. Xinjiang Hongxing Kejian Magnesium Co. Ltd brought a 20,000 tpy magnesium plant onstream in the Xinjiang Uygur Autonomous Region and planned to increase production capacity to 1,000,000 tpy.

Armenia

If investors were found, the Armenian Development Agency will construct a primary magnesium plant with a capacity to produce 300 tpy at the Yeghvard branch of Yerevan Scientific Research Institute of Mathematical Machines (more commonly known as Mergelyan Institute) and will increase production to 10,000 tpy in the future.

Australia

Latrobe Magnesium Ltd completed a prefeasibility study for a plant to produce 10,000 t/yr of magnesium from coal fly ash at the hazelwood power plant in Victoria. The demonstration plant is expected to be commissioned in March 2014, and a 40,000 tonnes/year plant built in early 2015.

Advanced Magnesium Ltd (AML) has takeover the Varomet Holdings Ltd. (the holding company for the Magontee Group Business) from Straits Mine Management Pty. Ltd included magnesium alloy and anode manufacturing plants in Xi, an and Suzhou, China, recycling operations at Bottrop, Germany, and a recycling facility at Santana, Romania. AML's total magnesium manufacturing and recycling capacity would be 60,000 tpy. In addition to the manufacture of magnesium alloy in Xi' an and at HNKWE (AML's 53%-owned Chinese joint-venture), the company has installed recycling capacity of 19,000 tonnes/year.

Israel

Dead Sea Magnesium Ltd (Beer Sheva, Israel) will increase production at its magnesium plant in Sdom by as much as 10% from its present capacity of 34,000 tpy.

Korea, Republic of

Steel producer POSCO Co. Ltd will begin construction of a 10,000 tpy primary magnesium plant in Gangneung City, Gangwon Province. Construction of the modified Pidgeon process plant with further expansion to 20,000 tpy by 2016 and 100,000 tpy by 2018.

Russia

Despite the removal of the antidumping duties, Solikamsk Magnesium Works reportedly did not plan to sell magnesium into the United States in 2011. Based on information available in early 2011, the company planned to produce 13,500 t of magnesium in 2011 for its customers in Belarus, Kazakhstan and Russia.

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**Table – 9 : World Reserves of Magnesite
(By Principal Countries)**

(In '000 tonnes of magnesium content)

Country	Reserves
World : Total (rounded)	2,400,000
Australia	95000
Austria	15000
Brazil	86000
China	500000
Greece	80000
India*	20000
Korea, Dem P.R.	450000
Russia	650000
Slovakia	35000
Spain	10000
Turkey	49000
USA	10000
Other countries	390000

Source: Mineral Commodity Summaries, 2013.

*As Per UNFC System, as on 1.4.2010, the total resources of magnesite in India are estimated at 335 million tonnes.

**Table – 10 : World Production of Magnesite
(By Principal Countries)**

(In '000 tonnes)

Country	2009	2010	2011
World : Total	20244	22317	23100
Australia	366	295 ^(e)	663 ^(e)
Austria	545	757	868
Brazil	410	439	500
China	13000	14000	14500
Greece	381	396	394
India*	301	229	215
Korea, Dem. P. R.	150	150	150
Russia	2600	2600	2600
Slovakia	478	650	752
Spain	434	460	578
Turkey	861	1542 ^(e)	1000 ^(e)
Other countries	718	799	880

Source: World Mineral Production, 2007-2011.

* India's production of magnesite in 2009-10, 2010-11 and 2011-12 was 301 thousand tonnes, 236 thousand tonnes and 218 thousand tonnes, respectively.

FOREIGN TRADE

Exports

The exports of magnesite increased to 13,369 tonnes in 2011-12 from 11,052 tonnes in the previous year. Out of the total exports in 2011-12, those of fused magnesia were 284 tonnes, non-calcined magnesite 2170 tonnes, calcined magnesite 16 tonnes, magnesium oxide 5,796 tonnes and 74 tonnes of dead-burnt magnesite and other magnesite 5,082 tonnes. Exports were mainly to Malaysia (19%), UAE (12%), and South Africa (10%). Exports of magnesium and scrap were 303 tonnes in 2011-12 compared to 87 tonnes in the previous year. It's exports were mainly to Turkey, UAE and Luxembourg (Tables - 11 to 18).

Imports

Imports of magnesite increased to 72,475 tonnes in 2011-12 from 54,929 tonnes in the previous year. Out of total imports in 2011-12, those of fused magnesia were 11,141 tonnes, calcined magnesite 14,702 tonnes, non-calcined magnesite 2,375 tonnes, dead burnt magnesia 16,104 tonnes, other magnesite 16,899 tonnes and magnesium oxide 11,254 tonnes. Imports were mainly from China (45%) followed by Ireland (31%), Japan (9%) and Pakistan (3%) (Tables 19 - 25). Imports of magnesium and scrap marginally increased to 11,976 tonnes in 2011-12 from 11,151 tonnes in the previous year. Imports were mainly from China (Table 26).

**Table – 11 : Exports of Magnesite : Total
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	11052	203919	13369	175082
South Africa	627	9320	1377	25606
UAE	952	13888	1609	22357
Netherlands	1395	16936	890	16669
Thailand	318	4215	683	14101
Bahrain	555	7771	702	12343
Malaysia	2000	7934	2485	10084
Saudi Arabia	617	8497	505	8145
Latvia	216	3192	528	8092
Tanzania, Rep. of	-	-	310	7656
Indonesia	611	6764	434	5308
Other countries	3761	125402	3846	44721

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**Table – 12 : Exports of Magnesia (Fused)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	85	2205	284	7883
Thailand	-	-	113	3234
China	-	-	56	1615
Singapore	-	-	51	1502
Vietnam	-	-	38	1099
Pakistan	56	1764	1	195
Nigeria	28	437	3	146
Indonesia	-	-	16	58
Nepal	-	-	6	32
Kenya	-	-	++	2
Other countries	1	4	-	-

**Table – 13 : Exports of Magnesite (Not Calcined)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1023	14224	2170	30928
Thailand	318	4215	464	8875
Syria	-	-	200	4761
Sudan	180	2982	178	3365
Sri Lanka	121	803	533	3151
Vietnam	-	-	134	1751
South Africa	-	-	53	1072
UAE	60	895	306	1512
Philippines	-	-	44	1232
Chad	-	-	50	994
Oman	26	902	24	918
Djibouti	157	2237	50	762
Other countries	161	2190	134	2535

**Table – 14: Exports of Magnesite (Calcined)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	40	908	16	240
Nepal	-	-	16	240
Other countries	40	908	-	-

**Table – 15 : Exports of Magnesite:
Dead-Burnt Magnesia
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	3	88	74	31
Bangladesh	-	-	74	31
Other countries	3	88	-	-

**Table – 16 : Exports of Magnesium Oxide
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	4682	64505	5796	101903
South Africa	627	9319	1377	25604
Netherlands	495	5380	890	16669
Bahrain	546	7609	702	12343
Latvia	216	3192	528	8092
UAE	557	7341	495	7496
Saudi Arabia	569	7969	444	7018
Tanzania Rep. of	-	-	250	6783
Indonesia	527	5873	374	4752
Russia	144	2185	128	2312
Egypt	68	1176	85	2138
Other countries	933	14461	523	8696

**Table – 17 : Exports of Magnesite (Other)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	5219	121989	5082	35169
UAE	335	5652	808	13349
Malaysia	2000	7934	2485	10084
Thailand	-	-	82	1584
Nigeria	170	2059	76	1488
Kenya	20	314	557	1215
Saudi Arabia	29	456	60	1125
Bangladesh	35	543	620	1080
Sudan	162	3519	70	943
Tanzania Rep. of	-	-	60	873
Nepal	5	34	16	776
Other countries	2463	101478	248	2652

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**Table – 18 : Exports of Magnesium & Scrap
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	87	9232	303	43335
Luxembourg	-	-	44	11933
Turkey	++	31	50	6972
UAE	++	905	44	6057
UK	++	119	26	2951
Japan	-	-	15	2074
Sudan	++	784	++	1958
Netherlands	-	-	22	1952
Kenya	-	-	7	1565
Iran	42	440	6	1075
Malaysia	4	897	3	798
Other countries	41	6056	86	6000

**Table – 19: Imports of Magnesite : Total
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	54929	1590290	72475	2279369
China	24363	551660	32838	874885
Ireland	15209	476329	22363	780397
Japan	4862	209956	6682	283561
Australia	1874	44674	2068	58512
USA	961	49227	840	47621
Netherlands	1980	66724	872	37225
Turkey	200	4127	1102	29362
UK	497	28262	497	25466
Israel	228	20468	186	17479
Pakistan	408	3690	2026	14742
Other countries	4347	135173	3001	110119

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**Table – 20 : Imports of Magnesia (Fused)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	7869	244338	11141	408030
China	6113	190332	10974	398505
Mexico	20	1630	120	8885
Netherlands	300	10578	45	484
Australia	143	1779	1	102
Japan	370	12213	1	54
Other countries	923	27806	-	-

**Table – 21: Imports of Magnesite (Calcined)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	13239	415407	14702	516151
Ireland	9915	315254	14033	496203
Czech Rep.	180	5176	200	7611
China	100	4075	180	4684
Spain	262	5894	179	4012
Korea Rep.	-	-	40	1598
Canada	-	-	40	1505
Japan	357	10151	10	290
Pakistan	-	-	20	247
Other countries	2425	74857	++	1

**Table – 22 : Imports of Magnesite (Not Calcined)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	478	11829	2375	19330
Pakistan	220	1362	1850	12575
UK	62	2803	99	3258
China	-	-	100	612
Egypt	-	-	100	612
Slovakia	-	-	100	612
Italy	4	97	100	599
Japan	191	7500	6	538
Australia	-	-	20	514
Netherlands	-	-	++	10
Other countries	1	67	-	-

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**Table – 23 : Imports of Magnesite : Dead-Burnt Magnesia
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	16579	320044	16104	345444
China	14205	256968	12242	251206
Turkey	200	4127	1100	29234
Netherlands	500	19340	375	17021
Australia	1144	27097	829	15784
Greece	75	1886	220	5948
Slovakia	76	1530	260	5577
Germany	–	–	208	4549
Vietnam	–	–	148	3099
Belgium	–	–	97	3014
Hong Kong	–	–	124	1932
Other countries	379	9096	501	8080

**Table – 24 : Imports of Magnesite (Other)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	10500	328451	16899	593572
Ireland	5126	154829	6874	235031
Japan	3191	108710	6008	206780
China	311	8589	1628	62176
Australia	587	15798	1218	42112
Netherlands	680	21341	397	17187
USA	5	1373	356	13957
Malaysia	–	–	105	4428
Korea Rep	–	–	38	2396
UK	36	2095	24	1861
Spain	107	2617	81	1641
Other countries	457	13099	170	6003

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**Table – 25 : Imports of Magnesium Oxide
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	6264	270221	11254	396842
China	3634	91695	7714	157701
Japan	753	71381	603	74880
Ireland	–	–	1456	49163
USA	956	47854	484	33664
UK	396	23073	266	18424
Israel	228	20468	186	17479
Germany	64	5969	66	8225
France	7	2291	70	4841
Italy	18	877	41	4327
Mexico	10	693	57	3593
Other countries	198	5920	311	24545

**Table – 26 : Imports of Magnesium & Scrap
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	11151	1566701	11976	2070948
China	10292	1408427	11007	1841787
Germany	1	843	167	26178
UK	54	13703	21	24796
USA	71	17287	100	23775
China	–	–	124	18831
Switzerland	8	4878	31	17499
Belgium	–	–	74	16457
Korea Rep. of	43	10085	101	16200
Russia	459	78607	28	17443
Austria	6	10007	6	10921
Other countries	217	22864	317	57061

FUTURE OUTLOOK

Indian refractory industry, where more than 90% magnesite is used, is experiencing range of challenges. Demand for refractories is promising with India's cement and steel industries growth.

There is need to explore and exploit magnesite for future demand. The consumption

of magnesite in the organised sector has increased because of higher consumption reported by ferro alloys industry. The apparent domestic demand of magnesite is estimated at 403,000 tonnes by 2011-12 and at 622,000 tonnes by 2016-17 at 9% growth rate as per the report of the Sub Group, Planning Commission of India.