

MAGNESITE



Indian Minerals Yearbook 2021

(Part- III : Mineral Reviews)

60th Edition

MAGNESITE

(ADVANCE RELEASE)

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

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19 Magnesite

Magnesite ($MgCO_3$) is a carbonate of magnesium. It is usually found repeated as an alteration product of serpentine ultramafic rocks and other magnesium-rich rock types formed by replacement of dolomite and dolomitic limestone, as bedded deposits and as irregular veins. Magnesite deposits in India, generally occur as crystalline mass, amorphous and massive. Calcium and silica are the most common impurities found in magnesite along with Fe_2O_3 and Al_2O_3 . It is a very important mineral for the manufacture of basic refractories, which could be 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 1,000 °C, and retaining 2 to 7% CO_2 as carbonate) and dead-burnt or refractory magnesite (magnesia obtained by calcining magnesite at high temperatures, 1,500 to 1,800 °C, usually containing less than 0.5% CO_2). Pure magnesite calcined at still higher temperatures (1,600–1,800 °C) to expel carbon dioxide completely is termed as 'periclase' (MgO) in the trade. The dead burnt magnesite and fused magnesia are used in Refractory Industry to manufacture various refractory products. The caustic magnesia or low calcined magnesite is used as animal feed stuff and in the manufacture of oxichloride cement. The Refractory Industry is the major consumer of magnesite.

RESERVES/RESOURCES

The total reserves/resources of magnesite as per NMI database, based on UNFC system, as on 1.4.2020 is about 459 million tonnes of which Reserves and Remaining Resources are 66 million tonnes and 393 million tonnes, respectively. Substantial quantities of resources are established in Uttarakhand (52%), followed by Tamil Nadu (34%) and Rajasthan (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 furnished in Table - 1.

EXPLORATION & DEVELOPMENT

The exploration and development details, if any, are covered in the Review on Exploration & Development under "General Review".

PRODUCTION

Production of magnesite in 2020-21 at 78 thousand tonnes decreased by 24% as compared to 103 thousand tonnes in the previous year. There were 11 reporting mines in 2020-21 as against 12 reporting mines in 2019-20. Five principal producers accounted for about 96% of the total output during the year 2020-21. Out of total production, about 61% of magnesite was contributed by the Private Sector and the remaining 39% by Public Sector during 2020-21.

Tamil Nadu is the major producing State with maximum contribution of 61% to the total output during 2020-21 followed by Uttarakhand and Karnataka.

Mine-head closing stocks of magnesite for the year 2020-21 was 67 thousand tonnes as against 62 thousand tonnes in the previous year.

The average daily employment of labour in magnesite mines during the year was 690 as against 811 in the previous year (Tables- 2 to 5).

MINING AND MARKETING

Magnesite is being worked by open-cast method by developing benches. In Salem area (Tamil Nadu), magnesite is found chiefly as encrustations, veins and stringers in ultrabasic rocks like dunite and peridotite. Stringers and veins occur irregularly in fractures of rocks giving rise to different patterns. Veins are broken and magnesite is sorted out manually. Major magnesite producing mines in Salem area belong to Tamil Nadu Magnesite Ltd (TANMAG a State Government Undertaking), Ponkumar Magnesite Mines, Mysore Minerals, Dalmia Magnesite Corporation (a Private Sector Enterprise) and SAIL Refractory Co. Ltd (a Central Government Undertaking).

**Table – 1 : Reserves/Resources of Magnesite as on 1.4.2020
(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	57934	6354	1782	80983	24858	40132	59010	59652	128104	309	393047	459118
By Grades												
High Grade	-	-	-	3277	27	1	2	-	28	-	3336	3336
Medium Grade	55835	6354	1659	75554	21443	5363	64	109	4436	-	106968	170818
Beneficial/Low	2032	-	122	886	1154	1446	648	31558	117580	264	153537	155691
High & Medium Mixed	-	-	-	6	173	2059	-	-	100	-	2339	2339
Medium & Low Mixed	-	-	-	-	429	29237	58271	27766	207	-	115910	115910
Others	6	-	-	1260	1448	2025	24	-	2501	-	7258	7264
Unclassified	-	-	-	-	-	-	-	-	83	-	83	83
Not-known	60	-	-	-	184	-	-	219	3170	45	3617	3677
By States												
Andhra Pradesh	-	-	-	-	-	-	-	-	80	-	80	80
Himachal Pradesh	-	-	-	-	-	-	-	-	298	-	298	298
Jammu & Kashmir	-	-	-	3210	740	-	-	-	150	45	4145	4145
Karnataka	997	30	-	802	247	270	88	10	2834	264	4516	5543
Kerala	-	-	-	-	-	-	2	-	38	-	40	40
Rajasthan	-	-	-	1030	1574	2045	-	149	49293	-	54091	54091
Tamil Nadu	48760	6324	-	71885	21695	3944	17	737	2124	-	100402	155486
Uttarakhand	8177	-	1782	4056	602	33873	58902	58756	73287	-	229476	239434

Figures rounded off

MAGNESITE

Table-2: Principal Producers of Magnesite, 2020-21

Name & address of producer	Location of mine	
	State	District
Almora Magnesite Ltd, Village Matela, P.O. Billori, Distt Bageshwar-263 630, Uttarakhand.	Uttarakhand	Bageshwar
S. Sundararajan, 5/22-A, Periyakollapatti Kannankuruchi, Post – Gorimedu, Distt Salem -636 008, Tamil Nadu.	Tamil Nadu	Salem
India Magnesia Product Limited, No. 11/239, Ramakrishna Road, Balaji Towers, 3 rd floor, Distt Salem – 636 007, Tamil Nadu.	Tamil Nadu	Salem
Dalmia Bharat Sugar and Industries Limited, Dalmiapuram, Tiruchirapalli Distt. Tiruchirapalli – 621 651, Tamil Nadu.	Tamil Nadu	Salem
Tamil Nadu Magnesite Limited 5/53, Omalur Main Road Jagirammapalayam, Salem-636 302, Tamil Nadu.	Tamil Nadu	Salem

**Table – 3: Production of Magnesite, 2018-19 to 2020-21
(By States)**

(Qty in tonnes; Value in ₹'000)

State	2018-19		2019-20		2020-21 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	146875	408287	102554	351947	78144	292653
Karnataka	9108	56368	7198	48309	6061	39419
Tamil Nadu	50644	198355	51147	222293	47646	208954
Uttarakhand	87123	153564	44209	81345	24437	44280

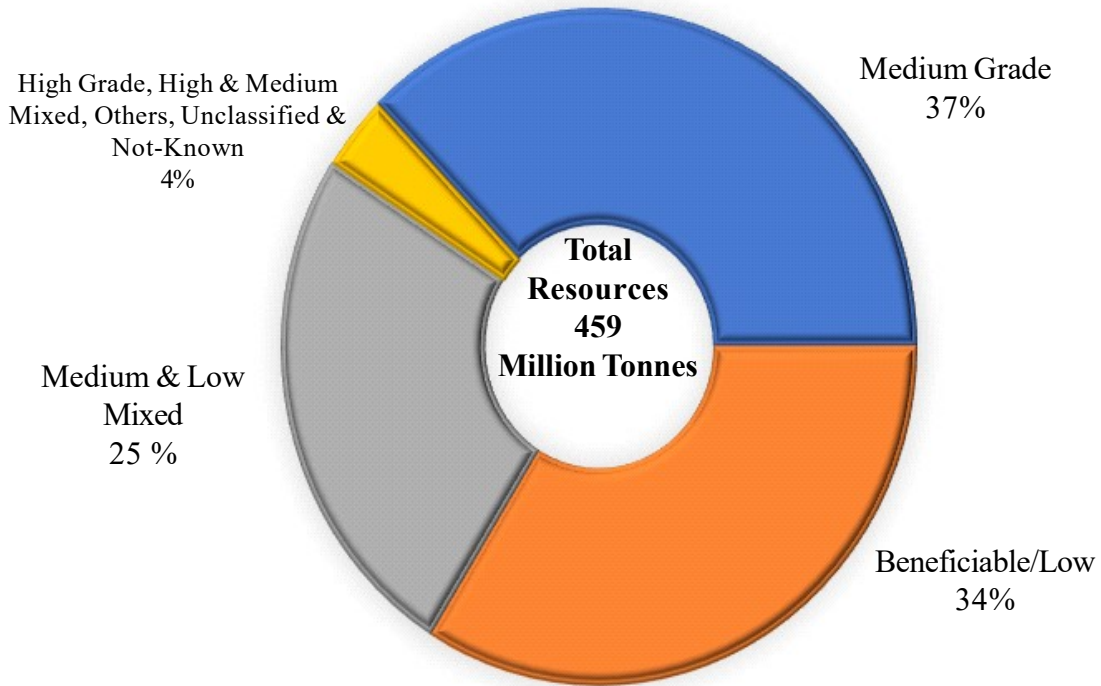
**Table – 4: Production of Magnesite, 2019-20 and 2020-21
(By Sectors/States/Districts)**

(Qty in tonnes; Value in ₹'000)

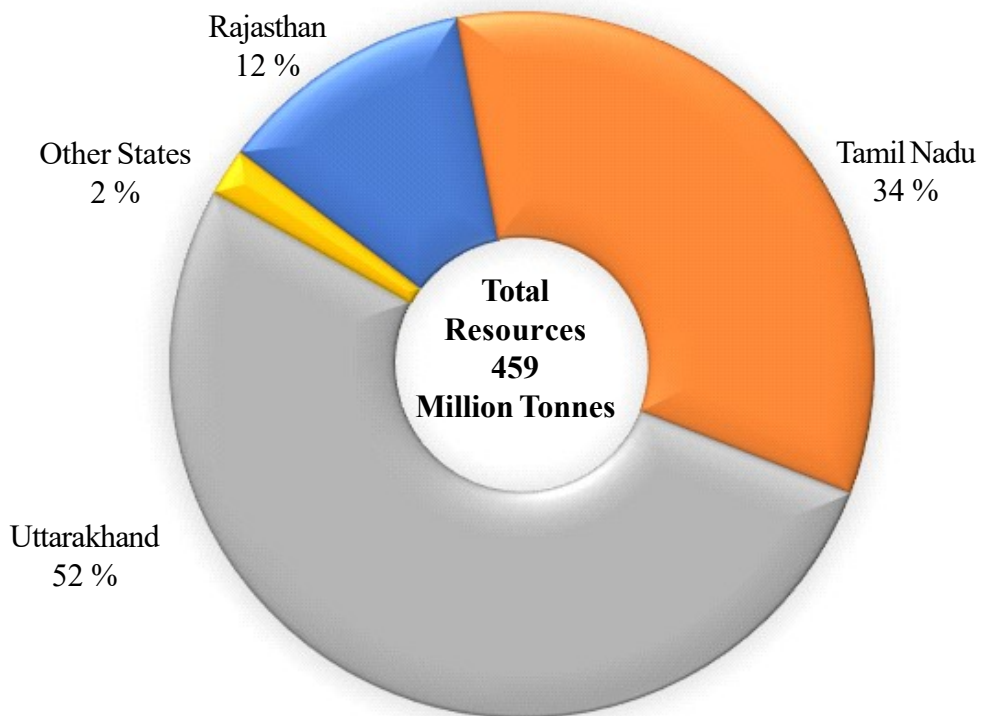
State/District	2019-20			2020-21 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	12	102554	351947	11	78144	292653
Public Sector	6	34956	76156	6	30620	75506
Private Sector	6	67598	275791	5	47524	217147
Jammu & Kashmir	-	-	-	1*	-	-
Udhampur	-	-	-	1*	-	-
Karnataka	3	7198	48309	3	6061	39419
Mysuru	3	7198	48309	3	6061	39419
Tamil Nadu	6	51147	222293	5	47646	208954
Salem	6	51147	222293	5	47646	208954
Uttarakhand	3	44209	81345	2	24437	44280
Bageshwar	1	32758	59357	1	24437	44280
Pithoragarh	2	11451	21988	1	-	-

MAGNESITE

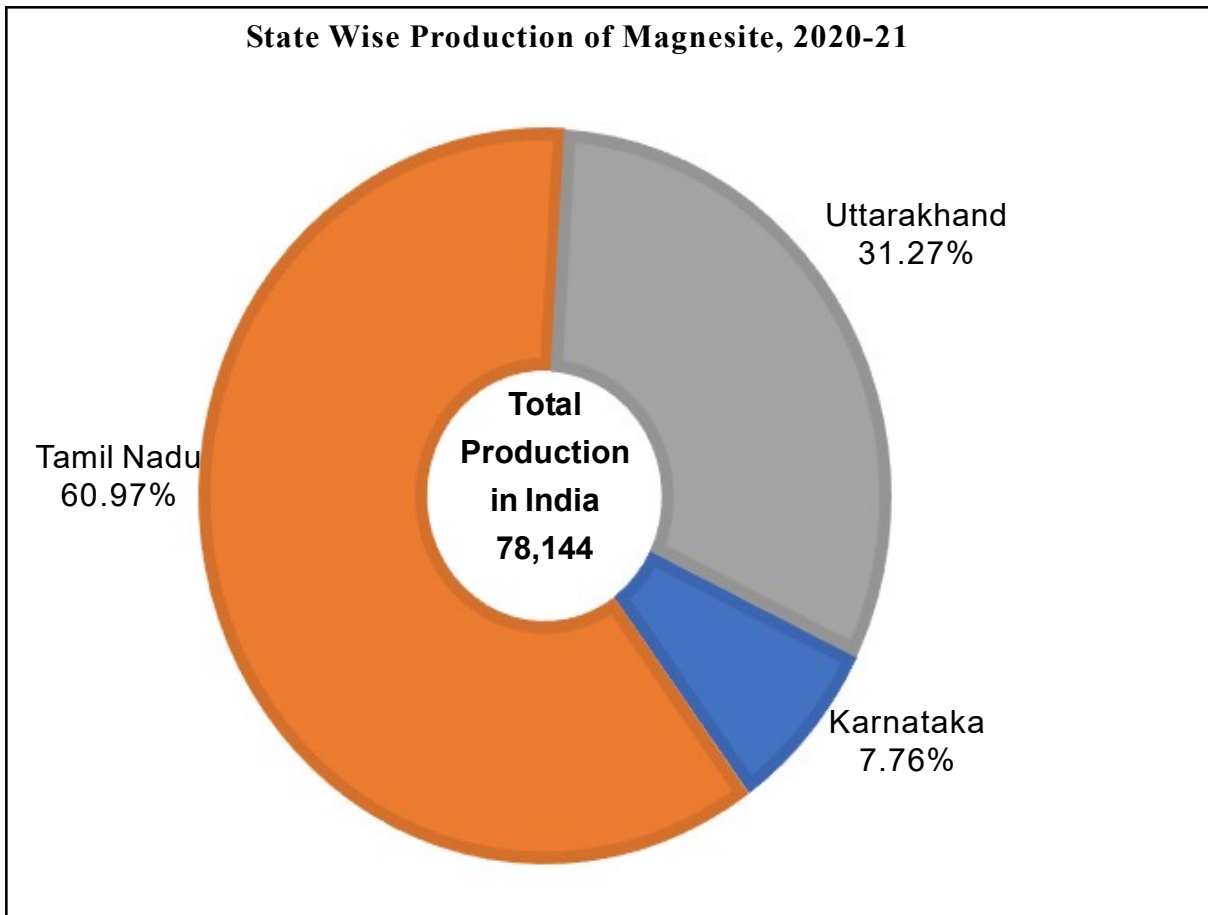
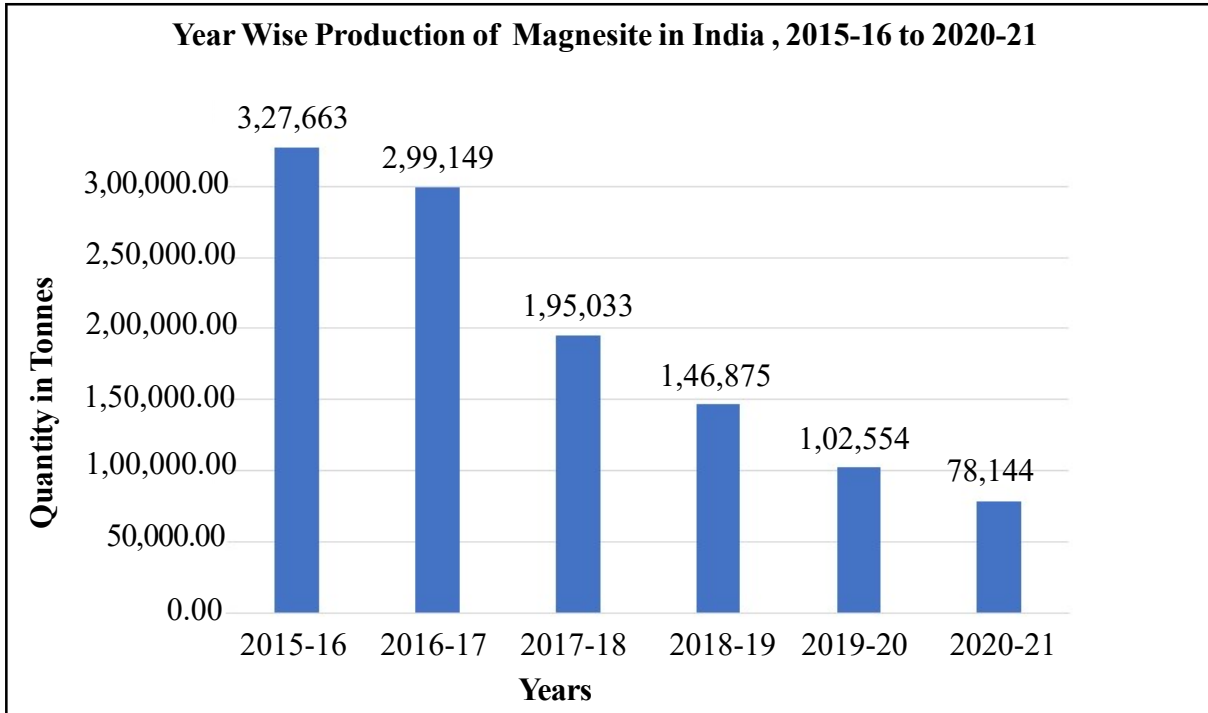
Grade Wise Resources of Magnesite as on 01/04/2020



State Wise Resources of Magnesite as on 01/04/2020



MAGNESITE



MAGNESITE

**Table-5: Mine-head Closing Stocks of Magnesite,
2019-20 & 2020-21
(By States)**

(In tonnes)

State	2019-20	2020-21 (P)
India	62122	67416
Jharkhand	1012	1012
Karnataka	5507	6223
Rajasthan*	30	30
Tamil Nadu	53158	53619
Uttarakhand	2415	6532

These mines are semi-mechanised as well as mechanised and uses compressors, wagon drills, jackhammers, power shovels, loaders, dumpers, dozers and pumps in their mining operations. Normally, Ammonium Nitrate Fuel Oil (ANFO) Mixture with 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. 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 and dead-burnt variety.

At TANMAG, the recovery of magnesite from blasted earth is about one in fourteen. After picking the magnesite, the remaining reject material is removed by mechanical operation using HEMM. TANMAG's annual crude magnesite production capacity is in the range of 75,000 to 1,00,000 tonnes.

USES AND SPECIFICATIONS

The major proportion (about 98%) of magnesite mined is used for conversion into 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. As per the Industries Department, Govt. of Tamil Nadu, Policy Note 2016-17, about 2.7 tonnes of raw magnesite and 220 litres of furnace oil is required to produce one tonne of Dead Burnt Magnesite (DBM). 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. As per the Industries Department, Govt. of Tamil Nadu, Policy Note 2016-17, about 2.7 tonnes of raw magnesite and 140 litres of furnace oil are required to produce one tonne of Caustic Calcined Magnesite (CCM). Caustic Calcined Magnesite is used in 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 is 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

Refractory Industry is one of the major consumers of magnesite in India. In the manufacture of refractories, deleterious constituents are SiO₂, CaO, Fe₂O₃ and Al₂O₃. The permissible limits for these

MAGNESITE

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.

Indian steel plants use domestic 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.).

Chemical Industry

The BIS has prescribed specification - IS : 3607-1979, First Revision, Reaffirmed 2010, for magnesite to be used in Chemical Industry.

CONSUMPTION

The consumption of magnesite in 2020-21 decreased to about 167 thousand tonnes from 180 thousand tonnes as recorded in the previous year. About 45% consumption was reported for calcination purposes followed by 39% for refractory purposes and 8% for ferroalloys purposes. The Chemical Industry consumed magnesite predominantly for producing magnesium sulphate. Magnesite consumption pattern by industries is shown in Table - 6.

The BIS has prescribed the IS specification (14303-1995, Reaffirmed 2011) for magnesite for use in Refractory Industry.

INDUSTRY

Dead Burnt Magnesite (DBM)

Raw magnesite when calcined at temperatures in the range of 1,660–1,800 °C in the rotary kiln, carbon dioxide gets expelled completely and a dense product 'Dead Burnt Magnesite' is obtained. Dead Burnt Magnesite refers to the magnesite that is chemically unreactive or 'dead', therefore, enabling it to be used in brick making or monolithic hearths without undue difficulty arising out of hydration or shrinkage.

Caustic Calcined Magnesite (CCM)

Low calcined magnesite also known as Caustic Calcined Magnesite is obtained by calcining magnesite in a shaft or rotary kiln at temperature

Table – 6: Estimated Consumption* of Magnesite 2018-19 to 2020-21 (By Industries)

(In tonnes)			
Industry	2018-19	2019-20(R)	2020-21 ^(P)
All Industries	194700	179900	167300
Calcination	58200	83300	75000
Chemicals	13100	12700	12500
Ferroalloys	17600	13600	13000
Refractories	80700	68500	65000
Others (foundry, iron & steel, paper, etc.)	25100	1800	1800

Figures rounded off.

** Includes actual reported consumption and/or estimates made from dispatches (as reported in form 'F'/'H', under Rule-45 of MCDR; 2017/1988) wherever required and due to paucity of data, coverage may not be complete.*

e: estimated

ranging between 800 °C and 1,000 °C. The incomplete dissociation causes retention of 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 °C and 3,000 °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.

As per the available information, presently there are seven major plants that manufacture Dead Burnt Magnesite, while there are four plants that produce calcined magnesite and one that produces fused magnesia (Table-7). By-product magnesium carbonate and other magnesium salts were also produced during salt manufacturing from sea water. Dalmia Magnesite Corporation and Tamil Nadu Magnesite Ltd are the major producers of DBM and caustic calcined grades.

As per Annual Report of National Mineral Development Corporation (NMDC) 2018-19, J & K Mineral Development Corporation Ltd, a subsidiary of NMDC has decided to set up a 30,000

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

Name of the plant	Location	Installed capacity (tpy)
Tamil Nadu Magnesite Ltd (TANMAG)	Salem, Tamil Nadu	30,000 (DBM) 19,500 (calcined magnesite)
Ramakrishna Magnesite Mines (Two Units)	-do-	21,600 (calcined magnesite)
SAIL Refractory Co. Ltd (Formerly, Burn Standard Co.Ltd)	-do-	54,000 (DBM) 18,000 (Calcined magnesite)
Dalmia Magnesite Corporation	-do-	72,000 (DBM)
Sri Ponkumar Magnesite Ltd	-do-	26,500 (DBM)
Almora Magnesite Ltd	Bageshwar, Uttarakhand	24,000 (DBM)
Minerals & Refractories	Haldwani, Uttarakhand	3,000 (DBM)
Hansaflon Plastochem Ltd	NA	1,500 (Fused magnesia)

TPA DBM plant at Panthal, Jammu. The Ministry of Environment, Forest and Climate Change granted Environment Clearance vide letter dated 03.05.2011. However, MoEF subsequent vide their letter dated 28.10.2016 had withdrawn the EC granted earlier status is maintained.

Sea Water Magnesia (SWM)

Sea water or lake bitters 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 need to be processed to obtain one kilogram of magnesia. The sea water magnesia can be used to manufacture Dead Burnt Magnesite, caustic magnesia and other magnesium compounds.

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 8,101 tonnes production of magnesium chloride and 24 tonnes of by-product magnesium sulphate in 2018-19. The production is normally reported from the salt pans in Jamnagar–Gandhidham, Gujarat.

Magnesium Metal

Magnesium metal is a fairly strong, silvery-white, light-weight metal (about one-third lighter than aluminium). It is traditionally produced in ingot form of approximately 7 kg each with purity close to 99.9%. Its chief applications are, in die casting (alloyed with zinc), to remove sulphur in the production of iron and steel, for production of titanium in the Kroll process. The other application field of magnesium is in electronic devices. Defence equipment and nuclear reactor materials also consume magnesium.

Magnesium technology and its commercial production in India are still at its infancy. India has developed silico-thermic reduction process as well as fused salt electrolytic process, with capacity of 600 t/year for each process. However, the cost of production is very high as compared to the landed cost of imported magnesium metal. Hence, its production has been stopped by one of the companies. The production is only about 15–20% of the rated capacity.

TRADE POLICY

As per import policy of ITC (HS) 2022 in schedule-1 and export policy of ITC (HS) 2022 schedule-2, Natural magnesite, fused magnesia, dead-burned (Sintered) Magnesia, whether are not containing small quantities of other oxides added before sintering; other magnesium oxide, whether or not pure are allowed freely without restrictions.

WORLD REVIEW

The world reserves of magnesite were 7,200 million tonnes in terms of magnesium oxide content, excluding large resources of magnesium-bearing substitutes, such as, dolomite, brucite and olivine. Further, magnesium compounds could be recovered economically from well & lake brines and from sea water. The latter, which contains 0.13% magnesium by weight, was a major source of magnesium metal and its compounds. Out of the total world reserves, the major share was that of Russia (32%) followed by China (14%), Slovalcia (5%), Australia (4%) Greece(4%) & Brazil (3%) (Table-8).

The world production of magnesite was at 28.31 million tonnes in 2020. China continued to

MAGNESITE

**Table – 8: World Reserves of Magnesite
(By Principal Countries)**

(In '000 tonnes of magnesium oxide (MgO) content)

Country	Reserves
World : Total (rounded off)	7200000
Australia	290000*
Austria	49000
Brazil	200000
China	1000000
Greece	280000
Russia	2300000
Slovakia	370000
Spain	35000
Turkey	110000
USA	35000
Other countries	2600000

Source: USGS, Mineral Commodity Summaries, 2021

**For Australia, Joint Ore Reserves Committee-compliant reserves were 37 million tonnes*

**Table-9: World Production of Magnesite
(By Principal Countries)**

(In tonnes)

Country	2018	2019	2020
World Total (rounded off)	29390053	29035289	28313481
China ^a	18500000	19000000	18000000
Russia ^a	2600000	2600000	2600000
Brazil ^c	1700000	1700000	1700000
Turkey	1958847	1496081	1560818
Australia ^d	288069	433712	820057
Austria	808239	691909	816370
Spain	738994	634580	626055
Slovakia	615500	615200	516900
Greece	464689	365792	275100
Other countries	1715715	1498015	1398181

Source: BGS, World Mineral Production, 2015-19.

** Estimated a: Years ended 20th March following that stated*

b: Officially described as magnesitic dolomite and brucite

c: Including beneficiated and directly shipped material

d: Year ended 30 June of that stated

e: Year ending 31st March following that stated.

f: Chloride produced from solution mining

g: Magnesium chloride

be the leading producer accounting for about 64% production, followed by Russia (9%) and Brazil (7%) and Turkey (6%). The world production of magnesite is furnished in Table-9. China, Brazil and Russia had the largest magnesite production capacity and accounted for about 86% of the total world production. The largest capacity of magnesite processing facilities in the world are in China and Russia. These countries accounted for about two-third of world magnesia from magnesite production capacity.

World capacity of primary magnesium production is about 2 million tonnes during 2017.

World production capacity for Caustic Calcined Magnesia was about 3.32 million tonnes/year and that of Dead Burnt Magnesite was about 8.62 million t/yr. Worldwide, over 98% raw ore producers convert DBM 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.

To provide a generalised view of the development in various countries, the country-wise description sourced from the latest available publication of magnesium metal Minerals Yearbook 'USGS' 2018 is furnished below.

Australia

Latrobe Magnesium Ltd. was conducting a bankable feasibility study for a 3,000-t/yr primary magnesium plant in the Latrobe Valley, Victoria, which would use fly ash having a high magnesium content as the feed material. The bankable feasibility study was expected to be completed by June 2019. Construction was expected to begin in December 2019 and take about 1 year to complete once started. Future expansion to 40,000 t/yr was being considered.

Canada

On October 22, an explosion and fire took place at Meridian's diecasting plant in Strathmore, Ontario, but damage to the plant was minimal. The plant was shut down for less than a week.

Quebec, to produce magnesium from asbestos mine tailings. Construction was expected to start in 2020 and be completed in about 18 months. The capacity of the first module would be 5,000 t/yr, and expansion to 50,000 t/yr was planned. In 2017, magnesium production started from a 25-kilogram-per-day pilot plant to produce ingot samples for testing by potential customers.

Mag One Products Inc. continued planning for the construction of a smelter near Danville, Quebec, to produce magnesium from asbestos mine tailings. The plant would have an initial capacity of 5,000 t/yr; and the total production capacity would be scaled to market demand. The plant would also have the capability to produce high-purity magnesium compounds with ferronickel and high-purity silica as by-products.

West High Yield Resources Inc. was preparing a mine permit application for its proposed Record Ridge project in British Columbia. The Company proposed building a mine and smelter to produce magnesium from a serpentine deposit. In June 2017, West High Yield presented the results of a micro-plant test prepared by Drinkard Metalox, Inc. (Charlotte, NC). Drinkard Metalox developed a nitric acid leach extraction process that could achieve a magnesium recovery rate of 98% and allow the production of multiple saleable products, such as, magnesium nitrate, high-grade magnesium oxide and nickel hydroxide.

China

China produced 8,60,000 t of magnesium in 2018, 8% less than that in 2017. Magnesium consumption in China was estimated to be 4,50,000 tonnes, 7% more than that in 2017. In 2018, total magnesium product exports from China were 4,10,000 t, 11% less than those in 2017.

Stricter environmental regulations for magnesium smelters and associated industries were cited for decreased production throughout the year. Ningxia Hui Autonomous Region started conducting stricter enforcement of environmental regulations in June.

Some coal mines decreased production in the last quarter of the year citing environmental regulations, which increased production costs and decreased output for some magnesium producers. Coal and magnesium producers in Shaanxi Province were particularly affected by these actions. Shaanxi Province was the leading producer of magnesium in China and a major producer of coal, which was used to power the magnesium smelters. Through the end of October, magnesium production decreased in Ningxia Hui Autonomous Region (58%), Shaanxi Province (9%) and Shanxi Province (34%) compared with production for the same period in 2017.

Century Sunshine Group Holdings Ltd (Hong Kong) continued increasing the capacity of its smelter in Hami, Xinjiang Uyghur Autonomous Region, to 45,000 t/yr from 15,000 t/yr. Dates for the completion and commissioning of the new capacity were not projected and would be dependent on market conditions.

Qinghai Salt Lake Magnesium Co. Ltd continued the startup of its 1,00,000-t/yr smelter in Golmud, Qinghai Province, that produced magnesium from lake brines. Construction was completed and trial runs were conducted in mid-2016. Commercial production started in October 2017, but technical issues interrupted the rampup. By May 2018, the smelter was delivering molten magnesium to Magontec Ltd (Australia) at its 56,000-t/yr casthouse adjacent to the smelter.

Turkey

In May, Esan Ecza1ba_1 Endüstriyel Hammaddeler San. ve Tic. A.S. shut down production from its 15,000-t/yr smelter in Eskisehir. High production costs and currency valuations were cited as the causes for the shutdown.

FOREIGN TRADE

Exports

The export of magnesite increased marginally by 0.44% to 5,477 tonnes in 2020-21 from 5,453 tonnes in the preceding year. Exports were mainly to Malaysia (46%), Bangladesh (13%), Singapore (7%) and China & UAE (5% each). Out of the total exports in 2020-21, those of fused magnesia were at 41 tonnes as compared to 55 tonnes in the

MAGNESITE

preceding year; non-calcined magnesite were at 220 tonnes as compared to 75 tonnes; other magnesite 3,468 tonnes as compared to 2,452 tonnes; and magnesium oxide 1,646 tonnes as compared to 2,152 tonnes in the preceding year. Exports of Magnesium and scrap were at 1,266 tonnes in the year 2020-21 as compared to 2,373 tonnes in the preceding year. Exports were mainly to Turkey (32%), USA (26%), Slovenia (20%), Netherlands (14%), Bhutan (4%) and UAE (2%). The total export of magnesium powder and flakes in 2020-21 was 1 tonne as compared to 12 tonnes in the preceding year. Magnesium & alloys wrought was negligible during 2020-21 as compared to 1 tonne in the preceding year (10 to 22).

Imports

The imports of magnesite (total) decreased marginally by 0.13% to 3,64,577 tonnes in 2020-21 from 3,65,053 tonnes in the year 2019-20.

Imports were mainly from China (61%), UAE (15%), Turkey (8%), Australia (7%) and Saudi Arabia (3%). Out of the total imports in 2020-21, those of fused magnesia were at 25,215 tonnes as compared to 16,325 tonnes in the preceding year; non-calcined magnesite were at 57,993 tonnes as compared to 63,874 tonnes in the previous year; other magnesite 25,379 tonnes as compared to 18,057 tonnes; magnesium oxide 63,442 tonnes as compared to 55,765 tonnes; and Dead burnt magnesite were at 1,33,034 tonnes as compared to 1,60,465 tonnes in the year 2019-20. Imports of magnesium & scrap were at 17,692 tonnes as compared to 16,493 tonnes in the preceding year. Imports were mainly from China (94%) and Hong Kong (3%). The total imports of magnesite powder and flakes in the year 2020-21 was at 2,657 tonnes as compared to 3,879 tonnes in 2019-20. The imports of magnesium & alloys wrought were at 278 tonnes during 2020-21 as compared to 264 tonnes in the preceding year (Tables-23 to 33).

**Table – 10: Exports of Magnesite : Total
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	5453	147073	5477	171020
China	175	11535	293	29547
UK	34	7308	105	27574
Bangladesh	652	21291	731	24355
Malaysia	2092	17725	2502	22498
Singapore	294	13320	367	19322
Thailand	245	14391	201	11300
Nigeria	10	178	196	3695
UAE	177	3028	247	3368
Nepal	88	2891	185	3151
Saudi Arabia	534	12084	96	2927
Other countries	1152	43322	554	23283

Figures rounded off

**Table – 11: Exports of Magnesia (Fused)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	55	2691	41	863
Saudi Arabia	40	599	35	647
UAE	++	93	++	130
Ethiopia	--	--	6	69
Singapore	--	--	++	11
Nepal	--	--	++	5
Sri Lanka	++	1	++	1
USA	++	9	++	++
China	15	1859	--	--
Bangladesh	++	52	--	--
Turkey	++	42	--	--
Other countries	++	36	--	--

Figures rounded off

MAGNESITE

**Table-12: Exports of Magnesite (Calcined)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	35	1111	100	2102
Nigeria	10	163	68	859
Australia	--	--	19	653
Vietnam	--	--	5	193
USA	2	203	1	144
Turkey	--	--	3	109
Spain	++	19	2	99
Nepal	23	703	2	45
Uganda	++	22	--	--
Germany	++	1	--	--

Figures rounded off

**Table-14: Exports of Magnesite: Dead Burnt Magnesite
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	684	10665	2	93
Australia	4	220	2	79
France	--	--	++	9
Nepal	--	--	++	5
Saudi Arabia	430	10254	--	--
Bangladesh	250	157	--	--
UAE	++	30	--	--
USA	++	4	--	--
Germany	++	++	--	--
Turkey	++	++	--	--

Figures rounded off

**Table-13: Exports of Magnesite (Non-calcined)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	75	1632	220	5202
Bangladesh	72	1355	193	3597
Djibouti	--	--	24	789
Saudi Arabia	1	23	3	752
Uganda	--	--	++	19
Indonesia	--	--	++	18
Kenya	++	31	++	16
UK	++	10	++	7
Nepal	++	10	++	4
Egypt	1	128	--	--
Vietnam	1	48	--	--
Other countries	++	27	--	--

Figures rounded off

**Table-15: Exports of Magnesium Oxide
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2152	103450	1646	119899
China	150	8777	293	29547
UK	34	7298	105	27567
Singapore	294	13320	367	19311
Bangladesh	226	15427	193	11473
Thailand	235	13984	166	10683
Italy	90	3538	68	2308
Ethiopia	447	14322	61	2155
Netherlands	175	3617	100	2089
Nepal	59	1974	45	1938
Cameroon	77	2530	44	1755
Other countries	365	18663	204	11073

Figures rounded off

MAGNESITE

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2373	294359	1266	143710
USA	2090	236443	332	43330
Turkey	++	22	410	30172
Netherlands	--	--	182	19689
Slovenia	--	--	250	17128
Bhutan	79	15388	48	10061
Nepal	4	2910	10	7133
UAE	33	10445	21	4497
Germany	++	4037	3	4344
Qatar	++	66	++	1228
Austria	++	32	++	903
Other countries	167	25016	10	5225

*Figures rounded off***Table-18: Exports of Magnesium Powders and
Flakes
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	12	5476	1	522
Myanmar	--	--	1	205
Malaysia	1	171	++	195
Korea	++	41	++	40
France	--	--	++	23
Tanzania	--	--	++	15
Canada	--	--	++	14
Singapore	--	--	++	10
Hong Kong	--	--	++	9
Swaziland	--	--	++	7
Australia	--	--	++	4
Other countries	11	5264	--	--

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2452	27524	3468	42861
Malaysia	2092	17702	2502	22498
Bangladesh	104	4300	345	9285
UAE	135	1565	245	2923
Nigeria	--	--	104	2200
Nepal	6	204	138	1154
USA	6	640	1	1081
Saudi Arabia	60	884	38	752
Syria	--	--	3	749
Thailand	10	407	35	617
Oman	--	--	24	556
Other countries	39	1822	33	1046

*Figures rounded off***Table-19: Exports of Magnesium & Alloys Wrought
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1	1096	++	585
UK	++	489	++	262
USA	--	--	++	242
Nigeria	--	--	++	79
Yemen Republic	--	--	++	2
Australia	++	345	--	--
Bhutan	1	199	--	--
Austria	++	32	--	--
Brunei	++	17	--	--
Botswana	++	13	--	--
Egypt	++	1	--	--

Figures rounded off

MAGNESITE

**Table-20: Exports of Magnesium & Alloys NES
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	392	48871	16	11713
Germany	++	4037	3	4344
USA	++	40123	10	2862
Qatar	--	66	++	1214
Austria	--	--	++	903
Sudan	--	--	2	651
Philippines	--	--	++	497
Sri Lanka	1	222	1	334
Czech Republic	++	45	++	258
Malaysia	++	162	++	177
Thailand	--	--	++	118
Other countries	30	4216	++	355

*Figures rounded off***Table-21: Exports of Magnesium Wire
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	1106	1	986
USA	++	710	++	568
Saudi Arabia	++	132	++	216
Australia	++	169	1	167
New Zealand	++	17	++	12
Israel	++	11	++	12
South Africa	++	15	++	11
Malaysia	++	33	--	--
Zimbabwe	++	9	--	--
Sweden	++	5	--	--
UAE	++	5	--	--
Other countries	++	++	--	--

*Figures rounded off***Table-22: Exports of Magnesium & Scrap
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1968	237810	1249	129904
USA	1729	195610	322	39658
Turkey	--	--	410	30172
Netherlands	--	--	182	19652
Slovenia	--	--	250	17128
Bhutan	76	14704	48	10061
Nepal	4	2907	10	7112
UAE	33	10374	21	4497
Uganda	--	--	3	469
Malaysia	++	21	1	423
Kenya	5	1355	2	365
Other countries	121	12839	++	367

Figures rounded off

MAGNESITE

**Table – 23: Imports of Magnesite : Total
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All countries	365053	9468163	364577	7657838
China	208474	3883022	221089	4071438
Australia	28420	2075811	25781	1140647
Turkey	24927	857499	28264	898836
Japan	2423	257553	2545	299721
Saudi Arabia	5039	122907	10626	228236
Ireland	15607	1215986	3692	163857
UAE	60512	159866	56124	146471
Greece	2823	104462	2675	107817
Israel	516	70725	904	103896
Netherlands	4017	252246	1384	85953
Other countries	12295	468086	11493	410966

*Figures rounded off***Table – 24: Imports of Magnesia (Fused)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	16325	823312	25215	1135547
China	14957	728865	23796	1033008
UK	207	26797	251	36436
Germany	241	18682	168	14923
Austria	711	23089	415	12020
Hong Kong	91	7655	246	10363
Greece	--	--	192	10301
Mexico	80	12741	60	10094
Russia	--	--	60	2620
Belgium	3	689	8	2292
Netherlands	--	--	15	1412
Other countries	35	4794	4	2078

*Figures rounded off***Table – 25: Imports of Magnesite (Non-calcined)
(By Countries)**

Country	2019-20 (R)		20120-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	63874	185153	57993	159537
UAE	57885	137363	49476	100380
Malaysia	55	359	2941	20114
Turkey	946	8011	1545	15323
Saudi Arabia	--	--	2227	8543
Oman	247	1254	825	5029
China	1277	7088	379	4574
Iran	1507	8242	550	3116
Greece	422	15126	44	1664
Japan	16	2741	6	648
Germany	++	126	++	142
Other countries	1519	4843	++	4

Figures rounded off

MAGNESITE

**Table-26: Imports of Magnesite (Calcined)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	50567	1645695	59514	919930
China	31062	341863	49453	529490
Saudi Arabia	3644	95404	3219	125976
Ireland	14164	1107007	2346	104929
Japan	44	4782	555	46546
Hong Kong	25	441	2008	26479
Spain	154	4995	757	25269
Austria	506	37031	437	19778
Turkey	96	7936	216	13572
Brazil	60	2499	180	8195
Netherlands	10	848	100	68882
Other countries	802	42889	243	12814

*Figures rounded off***Table-27: Imports of Magnesite: Dead Burnt Magnesia
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	160465	5018483	133034	3360002
China	102537	1842108	79856	1280794
Australia	27709	2052384	25350	1127409
Turkey	23083	833405	25620	851761
Netherlands	2880	176447	910	57624
Saudi Arabia	--	--	494	9021
USA	121	10087	101	8881
Jordan	27	792	243	5729
Brazil	325	19206	100	5317
Greece	371	11854	164	5093
Hong Kong	2678	56716	101	4161
Other countries	734	15484	95	4212

Figures rounded off

MAGNESITE

**Table-28: Imports of Magnesite (Other)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty	Value	Qty	Value
	(t)	(₹'000)	(t)	(₹'000)
All Countries	18057	587186	25379	680448
China	8831	233407	13512	398884
Greece	1513	50352	1839	67137
Ireland	1443	108979	1346	58928
UAE	2518	19113	6648	46090
Japan	654	44403	393	37216
Netherlands	1122	74544	350	19218
Turkey	802	8147	883	18180
Germany	7	2308	48	12232
Korea	496	24743	54	11287
Sri Lanka	--	-	241	4699
Other countries	671	21190	65	5677

Figures rounded off

**Table – 29 : Imports of Magnesium & Scrap
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty	Value	Qty	Value
	(t)	(₹'000)	(t)	(₹'000)
All Countries	16493	2943566	17692	2839776
China	15393	2762152	16603	2666630
Hong Kong	744	127596	501	80745
Br Virgin Is	--	--	377	57013
UAE	140	23489	160	26769
Singapore	29	4868	20	3612
Sweden	--	--	25	3532
Israel	--	--	6	1053
Japan	1	323	++	300
Germany	--	--	++	122
Taiwan	75	12234	--	--
Other countries	111	12904	++	++

Figures rounded off

**Table –30 : Imports of Magnesium Oxide
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty	Value	Qty	Value
	(t)	(₹'000)	(t)	(₹'000)
All Countries	55765	1208334	63442	1402374
China	49810	729691	54093	824688
Japan	1679	202417	1551	212529
Israel	516	70725	904	103896
Saudi Arabia	1388	27168	4686	84696
Mexico	619	55781	531	43110
USA	326	24817	304	26992
Germany	131	18128	171	24475
Greece	347	20829	316	19349
France	22	8418	42	19152
Belgium	115	24584	44	17890
Other countries	812	25776	800	25597

Figures rounded off

MAGNESITE

Table – 31 : Imports of Magnesium & Alloys: Wrought (By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	264	72811	278	85883
China	241	68561	113	48769
Hong Kong	20	3717	158	31833
Japan	--	--	2	2481
Bulgaria	--	--	3	1768
Netherlands	--	--	1	579
Italy	3	518	1	453
Germany	++	15	--	--
Other Countries	++	++	++	++

Figures rounded off

Table – 32 : Imports of Magnesium & Alloys NES (By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	4044	768815	5214	1195416
China	4037	733445	5115	880335
Hong Kong	--	--	70	229632
Macao	--	--	9	51643
UK	1	26611	++	22039
Spain	2	721	17	4733
Austria	2	2553	3	4061
Taiwan	1	3162	++	1605
Bulgaria	--	--	++	1078
Germany	++	352	++	214
Korea	++	107	++	42
Other countries	1	1864	++	34

Figures rounded off

Table – 33: Imports of Magnesium Powder & Flakes (By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	3879	723333	2657	482988
China	3835	675021	2369	383378
Belgium	--	--	57	57052
Turkey	--	--	149	26023
Russia	--	--	66	12039
Germany	++	124	16	4395
USA	++	29	++	67
Japan	++	588	++	26
UAE	++	--	++	8
France	44	47520	--	--
UK	++	48	--	--
Other Countries	++	3	++	++

Figures rounded off

encouraging as it rides on the prospects of the Cement and Steel Industries, the growth of which is projected to show an upward trend in the near future. The demand for magnesite is, therefore, likely to grow correspondingly.

As Indian magnesite generally contains either high silica or high lime, the need for beneficiation concomitantly arises.

Beneficiation methods of magnesite at economic cost which could yield high-grade material is probably a viable way to meet the demand for magnesite in the future.

India's Refractory Industry is set to continue its expansion and is likely to benefit from the Government's series of measures pitched specifically to stimulate the infrastructure development in the country. As the demand for magnesite is expected to rise, significant steps to explore and exploit magnesite to meet the future demand would be the right way forward.

FUTURE OUTLOOK

The Refractory Industry that consumes magnesite to a large extent is experiencing a range of challenges. However, in India, the demand for refractories is not only promising but also