

MARBLE



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MARBLE

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GOVERNMENT OF INDIA
MINISTRY OF MINES
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Marble is a 'minor mineral' as defined in Clause (e) of Section 3 of Mines and Minerals (Development & Regulation) Act, 1957. The term "marble" is derived from the Latin word *Marmor* which in turn is said to have been coined from Greek word *Marmorous*, meaning shining stone. It is known for its pleasant colours, smooth and uniform texture, moderate hardness, amenability to be quarried into big blocks, smooth & shiny polished surface and silky feel. Marble occupies a unique position among other dimension stones because of its aesthetic value.

In terms of geological definition, it is a metamorphosed limestone produced by recrystallisation under condition of thermal and also regional metamorphism. In commercial parlance, all calcareous rocks capable of polish are classed as marbles. Furthermore, serpentine rocks, containing little calcium or magnesium carbonates, if attractive and capable of taking good polish are also classed as marbles. The calcareous stones like onyx, travertine and some limestone have also been classed as marbles. Marble is not a prime export commodity like the dimension stone, granite. Its internal demand has always remained high and most of the production added with recent increase in imports is consumed within the country. Marble is

the most preferred stone in India among all dimension stones. Most of the units in the marble industry are in the small scale sector.

RESOURCES

The occurrences of marble have been reported from many states, viz, Rajasthan, Gujarat, Haryana, Andhra Pradesh, Madhya Pradesh, Jammu & Kashmir, Maharashtra, Sikkim, Uttar Pradesh and West Bengal. Among the above states, marble deposits of economic importance are localised in Rajasthan, Gujarat, Haryana, Andhra Pradesh and also in Madhya Pradesh as per the recent reports.

Rajasthan has the distinction of having the best among Indian resources of good quality marble. Out of 32 districts, 20 districts have marble in one or the other form. The important regions of marble occurrences in Rajasthan are:

- i) Udaipur - Rajsamand - Chittorgarh region;
- ii) Makrana - Kishangarh region;
- iii) Banswara - Dungarpur region;
- iv) Andhi (Jaipur) - Jhiri (Alwar) region; and
- v) Jaisalmer region.

The important deposits of marble in Rajasthan are given in Table - 1.

Table - 1 : Important Deposits of Marble in Rajasthan

Sl.No.	Name of deposit	District
i)	Agaria, Amet, Kilwa, Morwad, Dharmita, Katre, Parvati Koyal, Morchana, Arana, etc.	Rajsamand
ii)	Makrana, Borawad (White), Chosira Dwagri (Pink), Kumari	Nagaur
iii)	Kesariaji (Rikhabdeo), Odwas	Udaipur
iv)	Babarmal (Devimata), Rajnagar	Udaipur
v)	Tripura Sundari-Talai-Odabagi-Bhimkund-Vithaldeo, Prithvipura, Paloda, etc.	Banswara
vi)	Andhi, Bhainslana, Todi-ka-Bas	Jaipur
vii)	Jhiri, Sariska, Rajgarh, Badampur, Moti-Dungri, etc.	Alwar
viii)	Selwara-Dhanwar-Koteswar	Sirohi
ix)	Jahazpur, Kekri, Manoharpur, Asind, Banera, Shahpura	Bhilwara
x)	Kalyanpur-Narwar-Sardhana	Ajmer
xi)	Patan-Rampura, Kela-Dungari	Sikar
xii)	Dagota	Dausa
xiii)	Umar	Bundi
xiv)	Sabla, Nandli-dad, Peeth, Manpur, Dachki, etc.	Dungarpur
xv)	Mandal, Deh	Chittorgarh
xvi)	Pachori Chadi, Moriya Munjar, etc.	Jodhpur
xvii)	Bar-Sendra Sarangwa, Sevari, Kundal	Pali
xviii)	Dunkar, Bidasar, Dujara	Churu
xix)	Moosagar, Amarsagar, Habur, Naripa	Jaisalmer

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The marbles of Rajasthan are in various colours and shades. The Makrana area is famous for pure white crystalline marble. Other varieties found in Makrana area are Albata, Adanga, Dongri Pink, etc. The marble from Rajsamand area is mined extensively. It is off-white and greyish-white. The internationally acclaimed variety of green marble comes from Rikhabdeo-Kesariaji area, 60 km away from Udaipur. The green marble has various shades of green with white and black network and patches. The marble from Babarmal is pink and is marketed as Indian Pink. It is a fine-grained hard marble having black and white bands. The marble from Bhilwara is white to off-white, fine to medium-grained hard marble having black and white bands. The marble from Banswara is white to off-white dolomitic marble and is soft. It is used generally for cladding purpose. The white to greyish-white marbles of Jaipur area are being sold under the trade name Andhi Pista, a white marble having green laths of serpentine; onyx; Indo-Italian and Black Marble. The Bhainslana marble is dark-black.

Gujarat has vast resources of marble in Banaskantha, Bharuch, Vadodara, Kachchh and Panchmahal districts. The Ambaji area in Banaskantha district and Chinchpura area in Vadodara district are the main producing centres. The white marble of Ambaji is known for its amenability to carving. Other deposits in Banaskantha district are Jarivav, Kumbharia, Kateswar, Bheroj and Khikla. Marble of Vadodara district occurs in various shades, viz, green, white, pink and cream. Marble of Bharuch varies in colour from black to green and red. The yellow marble of Kachchh is thin-bedded, sometimes fossiliferous and blockable deposits occur at Bhulawara-Chinchpura belt.

In Haryana, marble deposits are located in the district of Mahendragarh. Most important localities are Antri-Beharipur, Zainpur, Chappra-Bibipur, Nangaldurgu, Islampur and Dhanota-Dhancholi. Marble of this area occurs in variegated colours and banded forms. It enjoys the reputation as 'Patiala Marble' with black and white bands.

Of late, the world-famous marble rocks 'Bhedaghat' near Jabalpur in Madhya Pradesh have attracted entrepreneurs from Rajasthan. The extension of these rocks in between Jabalpur and Katni is being quarried. The marble from these areas

is exploited for its off-white, fine-grained, banded attributes. A number of quarries are under operation.

Marble deposits of Maharashtra are of calcitic and dolomitic type which are located in the areas of Katta-Hiwara, Kadbikhera, Sakaritola, Pauni, Chorbaoli, Deolapar, Mansar, Kandri, Chargaon, Junewani villages in Nagpur district. In Katta-Hiwara, the marble is light-pink to grey in colour. The marble of Kadbikhera-Sakaritola is pink calcitic marble while the marble deposits of Mansar and Kandri areas are dolomitic type.

In Uttarakhand, thick impersistent bands of white marble occur in massive limestone in Pithoragarh district.

In Mirzapur district of Uttar Pradesh, two marble deposits at Hingha and Geria are of good quality and can yield blocks for limited requirement.

In Jharkhand, huge deposits of marble are available in Semra-Salatua and adjoining areas of Palamau. Pink marble occurrences are reported from Hesadih area, Singhbhum district.

The marbles of Khammam area of Andhra Pradesh are white and green. Occurrences of pink, purple, yellow and variegated marbles are reported in Cuddapah, Kurnool and Anantapur districts. The dolomitic marble of Cuddapah, Kurnool and Anantapur districts is other upcoming resource centre for off-white, coloured, greyish-black marbles which take good polish and are being exploited by private entrepreneurs.

On the basis of available data, IBM has prepared a mineral inventory of marble reserves and resources as per UNFC system as on 1.4.2010 which is furnished in Table - 2. The total resources of all grades of marble are placed at 1,931 million tonnes. Of these, only about 276 million tonnes (14%) fall under 'reserve' category and about 1655 million tonnes (86%) under 'remaining resources' category. Gradewise, about 27% resources fall under unclassified and not-known grades, 55% under off-colour grade and 17% under white colour grade. The available data on marble resources reveal that about 64% resources are in Rajasthan and 21% in Jammu & Kashmir. The remaining resources are distributed mainly in Gujarat, Chhattisgarh, Maharashtra, Haryana, Uttarakhand and Sikkim in descending order.

Table – 2 : Reserves/Resources of Marble as on 1.04.2010
(By Grades/States)

(In 000' tonnes)

State/Grade	Reserves			Remaining resources					Total resources (A+B)	
	Proved STD111	Probable STD121 STD122	Total A	Feasibility STD211	Pre-feasibility STD221 STD222	Measured STD331	Indicated STD332	Interred STD333		Reconnaissance STD334
All India : Total	103736	172661	98 276495	-	29842 72289	-	107129	1445708	-	1654968 1931463
By Grades										
White Colour	72700	124504	- 197204	-	- 81	-	-	133442	-	133523 330727
Off Colour	31036	48059	- 79095	-	27805 48352	-	107129	809104	-	992390 1071485
Unclassified	-	-	-	-	- 21870	-	-	498512	-	520382 520382
Not-Known	-	98	98 196	-	2037 1986	-	-	4650	-	8673 8869
By States										
Andhra Pradesh	-	-	-	-	-	-	-	3	-	3 3
Chhattisgarh	-	-	-	-	-	-	-	83000	-	83000 83000
Gujarat	-	-	-	-	26571 45000	-	17129	34871	-	123571 123571
Haryana	-	-	-	-	1234 1602	-	-	19492	-	22328 22328
Jammu & Kashmir	-	-	-	-	-	-	-	404703	-	404703 404703
Maharashtra	-	324	- 324	-	- 81	-	-	57642	-	57723 58047
Rajasthan	103736	172337	98 276171	-	2037 25606	-	90000	837615	-	955258 1231429
Sikkim	-	-	-	-	-	-	-	2382	-	2382 2382
Uttarakhand	-	-	-	-	-	-	-	6000	-	6000 6000

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Figures rounded off.

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PRODUCTION

The total production value of marble increased to ₹ 1518 crore in 2010-11 from ₹ 1279 crore in 2009-10. Rajasthan alone accounted for about 89% output value followed by Gujarat 9%, and Madhya Pradesh 2%. Value of production for Andhra Pradesh & Jammu & Kashmir is negligible (Table - 3).

MINING AND PROCESSING

Mining of marble or, for that matter, any dimension stone is different from conventional mining practices. In conventional mining method, mined out minerals are obtained in small-size fractions whereas in dimension stone mining, large-size intact blocks without minor cracks or damages are extracted.

Marble mining in India is quite old and has been perfected by trial and error method for extracting larger blocks by manual means. Advent of advanced mining machinery and improved methods of cutting and mining have largely transformed the marble mining methods and have led to increased production. Presently, mining of marble is done by manual, semi-mechanised and mechanised means. But in general, majority of mines adopt the semi-mechanised method of mining. The various stages in mining marbles are as follows:

The removal of overburden is generally carried out with heavy earth-moving machinery. In some cases, the weathered zone is removed by drilling holes by jackhammers and slim drill

machines. These holes are charged with explosives and under controlled blasting methods, the overburden material is loosened out. It is then removed using heavy earth-moving machinery, such as excavators, tippers and loaders.

After removal of overburden and capping, the marble is exposed at suitable places. After studying the topography and keeping in view the further development of quarry, a key block is marked for removal or for quarry front cut. At this stage, it is necessary to study the joint or fracture pattern in order to ascertain recovery of large-size block.

In manual operation, a line of shallow holes is made and by driving in wedges with feathers by continuous hammering, a fracture is developed along the already drilled holes, and the block is made free from all the sides. The block thus freed from the in situ rock is either pulled by chains or pulley system or is pushed by driving logs, etc. After the block is toppled, it is again cut and dressed for getting a parallel-piped shape.

In the semi-mechanised operation, jack-hammers, slim drills, line drilling machines are used for drilling holes in a predetermined line. The remaining operation is more or less similar to manual mining except for lifting and pulling where cranes, winches, dozers, etc. are used. But in the above mentioned processes, the wastage is high and the size of the blocks recovered is small and seldom free from defects. However, to overcome these problems, the quarry front cut is made by using slim drill machines, diamond wire saw, quarry master, diamond belt saw machines and chain saw machines.

**Table – 3: Value of Production of Marble, 2008-09 to 2010-11
(By States)**

(Value in ₹'000)

State	2008-09	2009-10	2010-11 (P)
India	11399144	12794100	15180412
Andhra Pradesh	176	170	138
Gujarat	341411	422610	1362488
Jammu & Kashmir	76	96	539
Madhya Pradesh	288084	290965	344304
Rajasthan	10769397	12080259	13472943

Source: State Governments.

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The slim drill machines and quarry masters are used to drill holes through which diamond wire saw is passed and the block is cut by continuous motion of the diamond wire saw. Once the block is cut, it is toppled with the help of hydrobags, pneumatic pillows, air-jacks, etc. The blocks cut this way are of exact sizes with minimum losses. The lifting and loading of blocks are done by Derrick cranes and using various types of loaders.

Processing of marble is done in two stages. The first stage of processing involves cutting the blocks into 2 to 3 cm thick slabs by using gang saws, wire saws and circular saws. In marble tile plant, the required thickness of tiles is 10 or 12 mm. For cutting, circular saws are used. In general, the slabs are sold as it is but in case of tiles, they are polished using various pneumatically-operated or other polishing machines, such as, line polishers, trimmed and cut to size, buffed and chamfered using different types of machines before being sold.

Rajasthan has about 95% processing capacity in the country. There are a number of gang saws and many automatic tiling plants that are in operation. Important processing centres in the State are Makrana, Jaipur, Alwar, Ajmer, Udaipur, Nathdwara, Rajsamand, Abu Road and Kishangarh. The capacity for marble slab production in the state is around 1,000 million sq ft per annum and for polished tiles, it is 3,000 million sq ft. In Gujarat, there are about 22 processing units located at Ahmedabad, Ambaji and Vadodara. India has a rich tradition of processing stones and carving jalis, pillars, garden furniture, floral and other design by expert craftsmen. The craftsmen have developed their art using manual means and simple tools. Presently, art collectors from world over seem to demand hand-carved articles produced especially in Makrana. Congruent with this trend, Stone Fairs are regularly organised in Rajasthan to promote stone artifacts produced and to provide the necessary impetus to sculptors and craftsmen.

CLASSIFICATION

A variety of marbles are produced and marketed under various trade names. On the basis of colour, shade and pattern. These are i) Plain

White Marble, ii) Panther Marble, iii) White-Veined Marble, iv) Plain Black Marble, v) Black Zebra Marble, vi) Green Marble, vii) Pink Adanga Marble, viii) Pink Marble, ix) Grey Marble and x) Brown Marble.

In addition, many new varieties of marble have been brought into the folds of classification especially after opening of new mining areas. The important new types other than the ones classified by BIS are given below:

1. Yellow marble from Jaisalmer.
2. Pista marble (amphibolite variety) from Andhi-Jhiri belt, Jaipur, Alwar and Dausa districts, Rajasthan.
3. Brown green and golden ultramafics from Dunkar, Churu district, Rajasthan.
4. Chocolate-brown and English teak wood marble from Jodhpur district, Rajasthan.
5. Parrot green marble from Jhilo in Sikar district, Rajasthan.
6. Chocolate-brown or wood-finish marble from Mandaldeh, Chittorgarh district, Rajasthan.
7. Purple marble from Tripura Sundari in Banswara district, Rajasthan.
8. Blue marble from Desuri in Pali district, Rajasthan.

The marbles have also been classified by their genesis and chemical composition as under:

i) Calcite Marble: It is a crystalline variety of limestone containing not more than 5% magnesium carbonate. Colour and designwise, it may vary from grey to white to any colour, and even figurative light- brown to pink.

ii) Dolomitic Marble: It is a crystalline variety of limestone containing not less than 5% or more than 20% magnesium carbonate as dolomite molecules.

iii) Dolomite Marble: It is a crystalline variety of dolomite containing in excess of 20% magnesium carbonate as dolomite molecules. It has variegated colours and textures. As the whiteness increases, the lustre and translucency

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increases to an extent that it starts resembling with onyx. The main advantage of this marble is availability of exotic colours and patterns and its low maintenance cost. Marbles of Banswara in Rajasthan and Chhota Udaipur in Gujarat belong to this category.

iv) Siliceous Limestone: It is a limestone containing high silica with smooth appearance due to fine-grained texture. It is difficult to cut and polish this type of marble but once polished, it gives a pleasant look. It is available in several colours and designs. The pink marble of Babarmal and Indo-Italian variety from Alwar belongs to this category.

v) Limestone: Several varieties of limestone are being exploited and used as marble. The Oolitic limestone of UK, Black Marble of Bhainslana, Katra & Sirohi and Golden-yellow Marble of Jaisalmer belong to this category. This type requires frequent maintenance in the form of polishing as they are non-metamorphosed and hence are softer in nature.

vi) Serpentine or Green Marble: This marble is characterised mainly by the presence of a large amount of serpentine mineral. It has various shades of green varying from parrot-green to dark-green and is known for having varying degrees of veinlet intensities of other minerals, chiefly carbonate of calcium and magnesium. Most of the green marbles from Gogunda, Rikhabdeo, Kesariyaji and Dungarpur belong to this category. This marble is mostly used for panelling. The darker variety of this marble, which is so dark-green that it looks like black, has been termed as Verde Antique.

vii) Onyx: It is a dense crystalline form of lime carbonate deposited usually from cold water solutions. It is generally transparent to translucent and shows a characteristic variegated colour layering due to mode of deposition. Such type of marble is found in Kupwara district in Jammu and Kashmir. It is used for making decorative articles.

viii) Travertine Marbles: It is a variety of lime-stone regarded as a product of chemical precipitation from hot springs. The depositional

history has left exotic patterns, when this is cut into thin slabs and polished it become translucent.

POLICY

The Central Government has notified Marble Development and Conservation Rules, 2002 (notified on 15.5.2002) for conservation, systematic development and scientific mining of marble with a purpose to provide a uniform framework that would be applicable throughout the country. The maximum period for which a lease may be granted shall not exceed thirty years and minimum period shall not be less than twenty years. Further, no lease is to be granted unless there is mining plan duly approved by the State Government or any person authorised in this behalf by that Government. Normally, the minimum area of the lease to be granted should not be less than 4 hectares and maximum area shall not exceed 50 hectares.

As per the Export-Import Policy, 2009-14, and the Foreign Trade Policy thereunder, the imports of crude or roughly-trimmed, marble & travertine blocks, slabs and ecaussine & calcareous monumental or building stone are restricted while imports of alabaster are freely allowed under heading No. 2515. On the other hand the import of items falls under ITC(HS) Code 68022110 to 68022190 are freely allowed. The Ministry of Commerce and Industry, Deptt. of Commerce, vide notification No.65 (RE-2010)/2009-14. S.O.1802(E), dated 4.8.2011 has amended in the Schedule I (Imports) of the ITC(HS) Classification of Export and Import items. After amendment the entry would read as "Import permitted freely provided cif value is US\$60 and above per square metre".

Import of marble, classified under chapter 25 and 68 from Bhutan shall be subjected to a combined annual quota of 10 lakh sq.ft (5,882 tonnes). The quota came into effect from the date of this Notification (i.e.No.69 (RE - 2010)/2009-14 dated 1.9.2011 and shall operate on financial year basis. Monitoring and allocation of the quota shall be made by the Government of Bhutan. The annual quota for import of marble from Bhutan will be 5,882 tonnes as against 1,847 tonnes previously as per Directorate General of Foreign Trade.

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USES AND SPECIFICATIONS

Marble is used widely in buildings, monuments and sculptures. Its utility value lies in its beauty, strength and resistance to fire and erosion. Marble has its application in interior and exterior wall cladding, interior and exterior paving, fireplace facing and hearth, lavatory tops, residential and commercial counter tops, table tops, statues and novelty items. The other non-conventional uses of marble are in toothpaste, paint, whiting, agricultural lime, etc.

Different marble varieties are used basically as both interior and exterior vertical wall cladding and flooring. Their use as structural elements (masonry), statues, epitaphs, graves, etc. is quantitatively less with funeral art accounting for the largest percentage. In interior application such as for floors, marble is used in the form of 20 mm thick cut-to-size slabs. The slabs are also used for interior and outer facings, stairs, table tops, kitchen platforms, etc. The tiles in sizes ranging from 10 x 10 cm to 60 x 60 cm are used for floors, dadoes and for skirting in thickness ranging from 10 to 20 mm. The selected marble blocks free from cracks and other inclusions are used for making artifacts, such as carved figures, handrails and balustrade for staircases, jalis, fire places, flower vases and many other pieces of art.

Indian standards for marbles (blocks, slabs and tiles) IS:1130-1969 (reaffirmed in 2008) are summarised as under:

i) Classification: Marble shall be classified as white and coloured categories.

ii) General requirements: Marble shall be free from foreign inclusions and prominent cracks.

iii) Sizes: Marble blocks shall be supplied in lengths ranging from 30 to 250 cm, widths 30 to 100 cm and thicknesses 30 to 100 cm. The slabs shall be supplied in lengths ranging from 70 to 250 cm, widths 30 to 100 cm and thicknesses from 20 to 150 mm. The tiles shall be supplied preferably in sizes of 10 x 10 cm, 20 x 20 cm, 30 x 30 cm, 40 x 40 cm, 50 x 50 cm and 60 x 60 cm with thickness ranging from 18 to 24 mm in the same piece.

Other sizes as agreed upon by supplier and purchaser may also be supplied.

iv) Physical properties: The physical properties of blocks, slabs and tiles shall conform to the requirements, as given under:

Physical Properties of Marble

Sl. No.	Characteristic	Requirement	Method of Test
1)	Moisture absorption after 24 hours immersion in cold water	0.4% max. by weight	IS : 1124-1974
2)	Hardness	3 min.	Mohs' scale
3)	Specific gravity	2.5 min.	IS : 1122-1974

v) Workmanship: The edge of slabs and tiles shall be true. The finishes shall be sand and/or abrasive-finish, honed-finish or polished-finish.

ENVIRONMENT

The environmental degradation during mining of marble is akin to any opencast mining activities, i.e., degradation and removal of top soil, mined out pits disturbing local flora & fauna and water table of the area. In addition, the rejected blocks, unsized blocks and rubbles generated from mining of blocks and from overburden when dumped unsystematically pose serious hazards.

Recently, utilisation of smaller blocks in tiling plant has created a new way for judicious utilisation of the mineral resource.

The processing waste of marble cutting plants comes out in the form of 'Marble Slurry'. This marble slurry is being dumped by the processing plants at the nearest site available or in the notified areas marked for dumping near the plants. When this slurry dries up, it leads to serious environmental pollution. The major environmental problems due to marble slurry are listed below:

- 1) The slurry when dumped on open land affects adversely the productivity of the land as it reduces the porosity and prevents ground water recharge.
- 2) Areas with dumped slurry cannot support vegetation.
- 3) After drying, the finer fraction of slurry becomes airborne and causes serious air pollution which is not only detrimental to human beings but also to vegetation and machinery.

The TIFAC (Technology Information Forecasting and Assessment Council) in collaboration with Regional Research Laboratories and Central Building Research Institute (CBRI), Roorkee, have found many uses of slurry by developing masonry cement, distempers, tiles, cellular concrete, gypsum plaster- based plane/fibre-reinforced boards and blocks.

WORLD REVIEW

Resources of natural stones are substantial in the world and almost every country produces dimension stones. Major exporting countries of marble in the world, are China, Italy, India, Spain, Turkey, Greece, Brazil and Portugal.

FOREIGN TRADE

Exports

Exports of marble (total) decreased sharply to 325,241 tonnes in 2011-12 from 521,723 tonnes in the previous year. Out of total marble exported in 2011-12, exports of dressed marble was 241,571 tonnes, and exports of other marbles was 83,670 tonnes. Exports were mainly to China (27%), Egypt (16%) and Nepal (14%) (Tables - 4 to 6).

Imports

Imports of marble (total) increased marginally to 635,962 tonnes in 2011-12 from 512,169 tonnes in the previous year. Imports of dressed marble at 532,346 tonnes shared 84% imports in 2011-12 while the remaining 16% imports were of other marbles. Main suppliers of marble were Italy (46%), followed by Turkey (19%), China (8%), Vietnam(6%), and Oman (5%) (Tables 7 to 9).

Table – 4 : Exports of Marble : Total (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	521723	3265467	325241	3861834
China	82740	777607	88546	760016
Egypt	41935	357022	51370	583257
USA	8199	245510	10626	436904
Nepal	41028	251836	46141	309796
UAE	205199	170023	10284	191155
Italy	35018	152965	12908	180267
Hong Kong	33468	196949	20983	122506
Saudi Arabia	5359	89140	7329	101579
Algeria	4894	57791	5349	69058
Poland	1294	33319	1890	62422
Other countries	62589	933305	69815	1044874

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**Table – 5 : Exports of Marble (Dressed)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	258436	2098145	241571	2426156
China	79137	719732	85781	724034
Nepal	37098	242000	43382	298698
Egypt	30973	209942	28667	256890
USA	2995	92629	5100	231948
Hong Kong	33468	196927	20978	121551
Italy	29731	52037	8804	97994
UAE	6989	99242	4476	94704
Germany	2024	26207	2395	41156
Poland	343	9727	1211	34556
UK	1338	23764	1951	33615
Other countries	34340	425938	38826	491010

**Table – 7 : Imports of Marble :(Total)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	512169	10320860	635962	14466429
Italy	201393	3817669	295055	5814271
Turkey	135298	2187663	121542	2125136
China	40652	1375278	51567	2094655
Oman	26647	721818	30517	1064930
Sri Lanka	8243	324137	12399	622756
Vietnam	30525	481221	38377	595781
Egypt	21957	350643	24461	484160
Greece	7059	189634	7649	331375
Spain	13102	246687	9218	219601
USA	690	19439	5601	136975
Other countries	26603	606671	39576	976789

**Table – 6 : Exports of Marble (Others)
(By Countries)**

Country	2010 -11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	263287	1167322	83670	1435678
Egypt	10962	147080	22703	326367
USA	5204	152881	5526	204956
UAE	198210	70780	5808	96451
Italy	5287	100928	4104	82272
Saudi Arabia	3100	56352	5697	74166
Russia	1577	33731	1882	49634
Algeria	3058	36233	3544	43821
Turkey	2457	37436	2502	42097
Pakistan	2586	32258	3354	40539
Kuwait	975	17208	2550	36205
Other countries	29871	482435	26000	439170

**Table – 8 : Imports of Marble (Dressed)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	427558	7273477	532346	9762692
Italy	185546	3216369	272798	4767596
Turkey	127156	1989780	115441	1895149
China	8936	254726	19359	637982
Vietnam	28651	403520	37774	569263
Oman	17472	383407	13689	394337
Egypt	20801	311682	21633	381111
Spain	11039	184123	7833	148528
Sri Lanka	1373	54702	2838	127220
USA	475	12618	4880	95195
Greece	4919	95199	3689	89556
Other countries	21190	367351	32412	656755

**Table – 9 : Imports of Marble (Others)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	84611	3047383	103616	4703737
China	31716	1120553	32208	1456674
Italy	15847	601300	22257	1046676
Oman	9175	338412	16828	670593
Sri Lanka	6870	269436	9561	495536
Greece	2140	94434	3960	241818
Turkey	8142	197882	6101	229988
Egypt	1156	38961	2828	103049
Spain	2063	62563	1385	71072
Germany	317	15450	1029	42110
USA	215	6821	721	41780
Other countries	6970	301571	6738	304441

FUTURE OUTLOOK

As per the Report of the Working Group for 12th Plan, Planning Commission of India, the demand for marble and other dimension stones, viz, granite, sandstone, etc. and stone products is anticipated to grow at around 15% CAGR. A similar rate of growth in exports can also be achieved with the help of suitable policy framework, infrastructure and other facilities which are expected to be provided to the industry. The Working Group has recommended that there is a strong need for well-planned, concerted and dedicated efforts towards export promotion of Indian stones. The emphasis needs to be on popularisation of Indian stones in both the traditional markets and exploration of new avenues by strengthening the activities of the Centre for Development of Stones (C-DOS) in Rajasthan by upgrading it into a national centre of excellence. Centre for Development of Stones (C-DOS), Rajasthan, which is a state government agency has been recommended to be upgraded and re-designated as a National agency for technology/ skill upgradation, market development

support etc. for marble. A separate national agency is required to be established in southern India for development of granite and other stones. The Working Group has stressed on the alternative option for exporting granite and marble in processed form to maximise export earnings to develop and promote artifacts and special decorative and ornamental items of high value addition. There is tremendous skill in the country, which can be explored and supported with special incentives. This can certainly bring about substantial foreign exchange addition, as well as significant employment generation.

The Working Group has observed that the present investment in dimensional stone industry in India is estimated at ₹ 20,000 crore. It is expected that, given the right policy support, the total turnover of the sector estimated to be around ₹ 30,000 crore (2009-10) will increase to over ₹ 40,000 crore by 2012-13, and double every five years considering an estimated growth rate of 15%. To sustain this growth, it is estimated that investment in this sector will have to go up to about ₹1,07,500 crore by 2022-23 (including foreign investment).

The Working Group has also made the following suggestions :

In order to promote the dimension stone industry by taking country as a whole there is a need to have a suitable rate of royalty in all the states.

Initiatives need to be taken in the form of fiscal measures as customs and excise duties to encourage import of dimension stones rather than finished products. This will encourage value addition and transfer of technology in the field of dimension stones in the country, which will contribute employment generation and foreign exchange earnings for GDP growth.

The dimensional stone sector should be given the status of industry so that it can qualify for the fiscal benefits, like financial incentives, low cost loans, etc.