

MARBLE



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MINOR MINERALS 30.15 MARBLE

(FINAL RELEASE)

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30-15 Marble

Marble is a 'minor mineral' as defined under 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 re-crystallisation under conditions of thermal and regional metamorphism. In commercial parlance, all calcareous rocks capable of taking 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's 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

On the basis of available data, IBM has prepared a mineral inventory of marble reserves/ resources as per NMI database, based on UNFC system as on 1.4.2015 which is furnished in Table - 1. The total resources of all grades of marble have been estimated at 1,945 million tonnes. Of these, only about 4.5 million tonnes (0.23%) fall under 'Reserves' category and about 1941.3 million tonnes (99.77%) 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 63% resources are in Rajasthan, 21% in Jammu & Kashmir, in Gujarat 6% and in Chhattisgarh 4%. The remaining resources are distributed mainly in Maharashtra, Haryana, Uttarakhand and Sikkim in descending order.

PRODUCTION

As per Govt. of India Notification S.O. 423(E) dated 10th February 2015, 'marble' has been declared as 'Minor Mineral', hence, the production data is not available with IBM.

MINING AND PROCESSING

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.

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. After the block is toppled, it is again cut and dressed for getting a parallel-piped shape.

In the semi-mechanised operation, jackhammers, 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. Once the block is cut, it is toppled with the help of hydrobags, pneumatic pillows, air-jacks, etc. 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. To polish the tiles polishers, trimmer machines are used before being sold.

Table – 1 : Reserves/Resources of Marble as on 1.04.2015
(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	Inferred STD333		Reconnaissance STD334	Total B
All India : Total	-	4551	4551	104236	202003	72386	107129	1453386	2200	1941341	1945892
By Grades											
White Colour	-	-	-	72700	124504	81	-	133442	-	330727	330727
Off-Colour	-	-	-	31536	75364	48352	107129	809104	-	1071485	1071485
Unclassified	-	4551	4551	-	-	21870	-	505952	2200	530022	534573
Not-known	-	-	-	-	2136	2083	-	4888	-	9107	9107
By States											
Telangana	-	-	-	-	-	-	-	3	-	3	3
Chhattisgarh	-	-	-	-	-	-	-	83000	-	83000	83000
Gujarat	-	-	-	-	26571	45000	17129	34871	-	123571	123571
Haryana	-	-	-	-	1234	1602	-	19492	-	22328	22328
Jammu & Kashmir	-	-	-	-	-	-	-	412381	2200	414581	414581
Madhya Pradesh	-	4551	4551	-	-	-	-	-	-	-	4551
Maharashtra	-	-	-	-	324	81	-	57642	-	58047	58047
Rajasthan	-	-	-	104236	173875	25703	90000	837615	-	1231429	1231429
Sikkim	-	-	-	-	-	-	-	2382	-	2382	2382
Uttarakhand	-	-	-	-	-	-	-	6000	-	6000	6000

Rajasthan has more than 95% marble processors. Important processing centres in the State are Makrana, Jaipur, Alwar, Ajmer, Udaipur, Nathdwara, Rajsamand, Abu Road Banswara, Chittorgarh and Kishangarh.

Rajnagar is the world's largest marble producing area, large number of gangsaws units are located in the nearby town of Kishangarh to process the materials produced.

In Gujarat, processing units are 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.

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 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, Sikar district, Rajasthan.
6. Chocolate-brown or wood-finish marble from Mandaldeh, Chittorgarh district, Rajasthan.
7. Purple marble from Tripura Sundari, Banswara district, Rajasthan.
8. Blue marble from Desuri, Pali district, Rajasthan.

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, 2015-20, 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.27(RE-2015)/2015-20, dated 19.9.2015 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\$200 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 and shall operate on financial year basis. Monitoring and allocation of the quota shall be made by the Government of Bhutan. The combined annual quota for import of marble from Bhutan will be 5,882 tonnes as per Directorate General of Foreign Trade.

USES AND SPECIFICATIONS

Marble is used widely in buildings, monuments and sculptures. Its utility value lies

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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, whitening, 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 applications 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.

The existing Indian standards for marbles (blocks, slabs and tiles) are covered under IS:1130-1969 (reaffirmed in 2008).

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'. About more than 2000 processing units all over Rajasthan are generating around 5-6 million tonnes of slurry every year. 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. The major environmental problems due to marble slurry are listed below: by the processing plants at the nearest site available or in the notified areas marked for dumping near the plants. 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.

As per the project undertaken by Central Pollution Control Board on disposal option of marble slurry in Rajasthan, following gainful/productive use, options were explored to manage this huge inorganic & non-hazardous waste.

- i) Utilisation of marble slurry in cement manufacturing
- (ii) Production of synthetic gypsum through chemical reaction with marble slurry
- (iii) Utilisation in road construction
- (iv) Utilisation in low cost binder
- (v) In brick manufacturing and
- (vi) In mineral grinding plants.

For better utilisation of marble slurry, Government of Rajasthan have exempted the marble slurry from royalty.

WORLD SCENARIO

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 Turkey, Italy, Greece, Spain and Iran.

The world famous Carrara deposits in Italy have been worked over 2,000 years, and according to the statements of experts who have examined the mountains of marble in this locality, the quality of high-grade material yet to be excavated is so great that Carrara promises to supply the present rate of demand for its marbles for centuries to come.

FUTURE OUTLOOK

In the month of September, 2016, the Indian Government announced a new policy for the import of marble blocks which has far reaching consequences for the development of the marble industry in India. The new liberalised policy, while still maintaining high import duties, at last made it easy for anyone setting up a factory to import marble blocks. Previously, even to import the blocks of marble there had been so many restrictions and conditions that only a select few were able to navigate their way through the bureaucratic maze and obtain licence for importing marble. By bringing the import policy under a Open General Licence (OGL) category, a long standing demand from many stone companies wishing to set up new factories was finally fulfilled.

Being the fastest growing major economy in the world with a vast population and still a long way to go in development, the potential for growth of this industry in India is obvious. According to expert estimates the total market for marble in India is around 35 million tonnes per year and out of this imported marble currently accounts for only about 800,000 tonnes. Under the new policies the market for imported blocks could reach 5 million tonnes during the next 5 years according to some estimates assuming that 15 to 20% of the market for marble is in the premium segment. Premium segment here is defined as having price of more than ` 150/ square foot.

Before the new import policy was announced there was only one marble factory located in south of India. Currently there are around 30 new factories that are coming up, each with 1 or 2 marble gangsaws. The expectation is that more and more new marble gangsaws will be set up in the coming years mostly in the Hosur area, already well known for its granite processing industry.

As per the Report of the Working Group for 12th Five Year Plan, the demand for marble and other dimension stones, viz, granite, sandstone, etc. and stone products is anticipated to scale up 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, a state government agency has been recommended to be upgraded and redesignated 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 expected that given the right policy support, the total turnover of the sector would be 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 in 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.