

GRANITE



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GRANITE

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

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Granite technically refers to a light-coloured granulose plutonic rock composed of felspars, plagioclase, quartz (35% approx.) and minor amounts (45% approx.) of mafic minerals, such as biotite, hornblende, pyroxene, iron oxides, etc. But, in the commercial parlance, the term granite has become synonymous with all those crystalline rocks which have pleasing colours, strength to bear the processes of quarrying and cutting & polishing and are used commonly for decorative purposes. Being more resistant to wear and tear as well as weathering, granite is most sought-after stone to be used as building as well as decorative stone. The fascination for granite is due to its taking mirror-like polish, high compressive strength, longevity and beauty. India possesses enormous deposits of all types of dimension stones. It is one of the largest producers of dimension stones in the world. The dimension stone industry employs over one million workforce. This industry plays a vital role in the economy of states like Tamil Nadu, Andhra Pradesh, Karnataka and Rajasthan. Rural economy of many developing states like Madhya Pradesh, Uttar Pradesh, Odisha and North-Eastern States is dependent on this industry.

The granite used for decorative purposes is a costly material in comparison with other materials. Hence, its utilisation and trade within the country has been at a low profile compared with the exports.

RESOURCES

India is endowed with abundant resources of a wide variety of granite comprising over 200 shades. As on 1.4.2010, resources of granite dimension stone of all types are estimated at 46,230 million cubic metres. Of these resources, 264 million cubic metres (less than 1%) fall in reserves category while remaining 45,966 million cubic metres or about 99% fall in resources category.

Of the total granite reserves, about 36 million cubic metres of all grades fall under proved category while 228 million cubic metres fall under probable category.

Ninety four percent reserves relate to coloured granite and the balance about 6% to black granite. About 98% reserves are located in Rajasthan, Odisha and Karnataka with a share of 42%, 30% and 26%, respectively.

Statewise breakup of total resources reveals that Karnataka & Rajasthan with about 20% each resources followed by Jharkhand (19%), Gujarat (18%), Andhra Pradesh (5%) and Madhya Pradesh (4%) together account for 86% resources. Gradewise classification reveals that about 7% of the total resources fall under black granite while 92% under coloured granite. About 1% resources are of unclassified grade.

The details of reserves/resources as on 1.4.2010 are given in Table-1.

PRIME VARIETIES OF INDIAN GRANITE

In the world market, there are nearly 300 varieties of granite. India supplies about 200 varieties. Out of these, prime varieties represent a wide spectrum of colour, texture and structure. These prime varieties have substantial resource base. Commercial names of granite are derived from area, colour, patterns, etc.

Karnataka specialises in the production of Ruby red, chilly red, cera grey, Kanakpura multicolour, Himalayan blue and Sira grey varieties of granite. Andhra Pradesh is famous for Black Galaxy, Srikakulam blue and black varieties of granite while Tamil Nadu is abundant in Jet-black and Tippu-white, Kashmir-white and Paradiso sea green varieties of granite. Odisha specialises in pink granite, silver grey, sea weed green, chilka blue, grey wave varieties of granite. Availability of varieties of granite in various states is given in Table- 2.

EXPLORATION & DEVELOPMENT

Keeping in view the increasing demand in both domestic and international markets for new varieties, DMG, Government of Rajasthan was engaged in exploration activities. The details of work carried out by the State Directorate are summarised in Table - 3.

Table – 1 : Reserves/Resources of Granite (Dimension stone) as on 1.4.2010
(By Grades/States)

(In thousand cubic metres)

Grade/State	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	35741	201377	26574	263692	38462	51990	8234	837325	2063964	42499338	467296	45966608	46230300
By Grades													
Black Granite	6936	6060	3909	16906	-	45690	1	50934	466039	2572581	23538	3158783	3175688
Coloured Granite	28805	195316	22665	246786	38462	6300	8233	786391	1276125	39843847	443518	42402875	42649661
Unclassified	-	-	-	-	-	-	-	-	321800	82911	240	404951	404951
By States													
Andhra Pradesh	-	-	-	-	-	-	-	-	-	2405890	-	2405890	2405890
Assam	-	-	-	-	-	-	-	-	800	583150	-	583950	583950
Bihar	-	-	-	-	-	-	-	-	179000	698612	-	877612	877612
Chhattisgarh	-	-	-	-	-	-	-	-	-	50057	-	50057	50057
Gujarat	-	-	-	-	-	-	-	-	-	8501947	-	8501947	8501947
Haryana	-	-	-	-	-	-	-	-	-	34000	-	34000	34000
Jharkhand	-	-	-	-	-	-	-	-	651300	8197110	26930	8875340	8875340
Karnataka	26363	19389	21836	67587	-	-	-	238	1231625	8012784	25659	9270306	9337893
Kerala	140	-	-	140	-	-	-	-	99	2570	-	2669	2808
Madhya Pradesh	-	160	-	160	-	-	-	-	-	1885924	108000	1993924	1994084
Maharashtra	-	-	-	-	-	6300	-	486925	-	665622	-	1158847	1158847
Meghalaya	-	-	-	-	-	-	-	-	-	-	286467	286467	286467
Odisha	-	80000	-	80000	-	-	-	330328	-	1432492	240	1763060	1843060
Rajasthan	5581	100380	4500	110461	38462	-	-	-	-	9021742	20000	9080204	9190665
Tamil Nadu	-	1448	238	1686	-	45690	8234	7	-	503818	-	557749	559435
Uttar Pradesh	-	-	-	-	-	-	-	-	-	494819	-	494819	494819
West Bengal	3658	-	-	3658	-	-	-	19827	11140	8802	-	29768	33426

Figures rounded off.

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Table – 2 : Varieties of Granite in Various States

State	Variety
Andhra Pradesh	Black Galaxy, Srikakulam blue, Steel grey, Paradiso, Anantapur grey, Silver Galaxy, etc.
Bihar	Tiger skin, Mayurakshi blue, Sawan rose, English teak, black-cheeta, etc.
Gujarat	Sonabadi grey, Balaram pink, Ajapur Galaxy, Godhra grey, Maharaja tiger-black, etc.
Haryana	Steel-grey porphyry, Purplish granite porphyry, Deep pink.
Karnataka	Ruby red, Fish Belly, Himalayan blue, Sira grey, Red multi, Tumkur porphyry, Hassan green, Magadi pink, Tiger black, etc.
Kerala	Tropical green, Paradiso, Kerala white, etc.
Maharashtra	Grey silk, Light pink, Jhansi red, etc.
Madhya Pradesh	Multicoloured, Black granite, etc.
Odisha	Berhampur blue, Silver grey, Seaweed green, Chilka blue, Red pearl, Jeypur and Keonjhar black, etc.
Rajasthan	Mokalsar green, Nagina green, Rosy pink, Blue Pearl, Chima pink, Bala flower, Platinum-white, etc.
Tamil Nadu	Kashmir white, Rawsilk, Paradiso, Pink multi, Colombo Juparana, Tiger skin, Kunnam black, Turaiyur blue, etc.
Uttar Pradesh	Ruby red, Jhansi red, Grey granite, Black granite, etc.
West Bengal	Bero pink porphyry, Streaky gneiss, Purulia black, Birbhum pink, Spotty black, etc.

Table – 3 : Details of Exploration for Granite during 2011-12

Agency/ State/ District	Location/ Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
DMG, Rajasthan							
Jalore	Bhinmal &	1:10,000	10.00	-	-	-	Granite of Ratanagar n/v Tavab has been delineated. Total 32 plots have been notified for leasing.
	Raniwara	1:2,000	3.0	-	-	-	

PRODUCTION

Granite is declared as a “Minor Mineral,” under the MMDR Act, 1957 and falls under the purview of the State Governments. Therefore, precise data on production of granite are not available. The production of granite compiled from the data received from various states is given in Table-4.

Major production of granite in raw as well as processed form is generally from Tamil Nadu, Karnataka, Andhra Pradesh, Rajasthan, Gujarat, Uttar Pradesh and Odisha.

The important granite producing centres in Tamil Nadu are Dharmapuri, Erode, Madurai, Salem, Virudhunagar and Vilupuram districts.

In Rajasthan, production centres are mainly spread in the districts of Jalore, Pali, Sirohi, Barmer, Ajmer, Jaisalmer, Jhunjhunu and Jodhpur. Karnataka is another important producer of granite varieties occurring in the districts of Bengaluru, Mysore, Gulbarga, Hassan, Raichur and Kolar. However, production data are not available from this State. The occurrences of granite have been reported from three districts of Uttar Pradesh, namely Lalitpur, Mahoba and Banda. However, almost all the production comes from Lalitpur district. In Andhra Pradesh, important mining areas are located in the districts of Chittoor, Anantapur, Kurnool, Prakasam, Srikakulam, Warangal, Karimnagar and Khammam.

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The granite resources of Gujarat are localised in the districts of Mehasana, Banaskantha, Sabarkantha, Panchmahal, Dahod, Vadodara, Amreli, Bhavnagar and Kachchh. Bihar, Kerala, Odisha and West Bengal also produce granite.

Details regarding production of processed granite are not available. However, it is presumed that the processed material exported can be taken as production level in the country with addition of 5 to 15% for internal use. It may be mentioned here that the country is in a position to produce the required quantity of granite to meet demand of both domestic as well as export markets.

MINING

Production of blocks of considerable size and weight is a special feature of granite mining. The process and equipment used for granite mining differ considerably from those used for mining other minerals. The mining of granite involves two

important stages of operation: one is actual block splitting either from sheet rock or boulder and the other operation involves many items of works, such as removal of weathered zone or overburden, opening of faces, lifting of cut blocks, transportation and many other ancillary work before and after the block splitting.

The block splitting from the sheet rocks or boulders is mainly done manually or in some cases by semi-mechanised methods, whereas the other operations, such as removal of overburden, lifting and transportation of cut blocks, etc. are carried out by mechanised method. There are a very few mines which adopt the modern method of block splitting by using flame-jet burner and diamond wire saw for cutting. Heavy-duty derrick cranes of capacity to handle 50-tonnes blocks from a depth of more than 60 m has brought revolution in granite quarrying by way of more output with less cost. The percentage recovery of granite is quite low and it varies from 5 to 15% because of unscientific mining method.

**Table – 4 : Production of Granite, 2008-09 to 2010-11
(By States)**

(Value in ₹'000)

State	Unit	2008-09		2009-10		2010-11 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value
India	-	-	18127523	-	18526785	-	26531579
Andhra Pradesh	cu m	761078	15463740	648789	13994677	919000	21435632
Chhattisgarh	cu m	-	-	-	-	477	568
Gujarat	tonne	64909	24693	102222	32192	78732	32649
Jammu & Kashmir	tonne	56	13	69	16	92	22
Karnataka	cu m	142887	1612651	228533	2486396	268438	2914183
Kerala	cu m	737	29480	1109	47687	1068	32044
Madhya Pradesh	tonne	-	-	44424	113336	56043	148603
Rajasthan	tonne	358213	493766	760594	1339802	757620	1294141
Tamil Nadu	cu m	170725	353180	174819	362679	234192	473737
Uttar Pradesh	cu m	24000	150000	24000	150000	26667	200000

Source: State Governments.

Note: 1. Figures have been repeated wherever necessary, due to non-availability of data.

2. This table does not contain data with reference to Daman & Diu, Gujarat, Haryana, Manipur, Meghalaya, Nagaland, Odisha and West Bengal due to non-receipt of data for consecutive three years.

'Water Jet Cutting', technique is used as a modern and scientific mining method to enhance the recovery of dimensional blocks. In this technique, water with tremendous pressure is passed through an orifice to form a jet. This jet is used to cut into the primary blocks as well as secondary blocks. The cutting loss in this process is minimum and there is no damage to adjacent block as in case of blasting.

PROCESSING INDUSTRY

The processing of granite in India is an age-old phenomenon and started in a small way in 1930s when some trimmed blocks as kerbstones were exported to UK. Since then, semi-hand-worked or hand-polished granite tomb stones found their acceptability in UK. Granite processing basically involves sawing or cutting of raw blocks into the tiles/slabs of required size & thickness and polishing of sawn-off surfaces. Other ancillary functions involve edge cutting, milling, boring and contouring for enhancing the quality and price of production. In India, the processing industry is in three sectors; namely, small-scale units, medium-scale units and 100% export-oriented units (EOU). The processing industry of granite in the country has been developed over the years. The share in exports of processed material has increased.

Centre for Development of Stones (CDOS), registered as a non-profit making society, is the common facilities centre for the entire stone industry, including granite being developed under the National Programme for Development of Stone Industry in India (NPDSI), which is a joint effort of Govt. of India, and United Nations Industrial Development Organisation (UNIDO). CDOS was set up as an autonomous organisation by Govt. of Rajasthan and Rajasthan State Industrial Development & Investment Corpn. Ltd (RIICO) at Jaipur, with an objective to develop, promote and support the dimensional stone sector and related industries in India. It also has testing centre for testing of stones as per international standards.

USES & SPECIFICATIONS

Uses

Granite is the most sought-after building stone since long. In the ancient times, the granite pillars and beams were preferred material to support the huge structures of temples and palaces and for making protective walls around them. With the invention of modern tools of greater hardness and polishing ability, the use of granite has rather increased for aesthetic values. The modern motorised tools of tungsten carbide and brazed diamond have enabled the user to cut & polish granite as per the specifications of the building sector. Presently, cut and polished granite slabs of 20 mm thickness are preferred for flooring, while tiles of 10 or 12 mm thickness are used for cladding. In addition to this, gravestones and monuments of various shapes and sizes are also in vogue. Because of the flexibility of the cutting tools, many artifacts of granite for decorative purposes are being made.

Granite also finds its application in making garden furniture, such as benches, fountains and many other articles which are used for landscaping and/or decorative purposes. The cut-to-size small blocks are used as cobblestone, kerbstone, road sidings and many other innovative uses.

Crude granites are utilised for structural purpose after little dressing & sizing whereas processed granites are used mostly in the construction of buildings and monuments and for interiors and exterior facing. Because of its superior wear resistance and non-denting quality, granite is used for various meteorological and engineering instruments, such as surface plates, straight edges, parallels, cubes, V blocks and work-mounting tables of co-ordinate measuring machines.

The surface plates are used as flat datum surface whenever precise measurements of dimensions and geometrical relationships are to be carried out. For this purpose, harder variety of granite is required so that it can bear the high-degree of grinding, polishing and calibration for achieving flat surface. It has been found that granite which is to be used for surface plates should have a close grain size, homogeneity, high density and hardness, uniform colour and low moisture absorption. The granite should be free from flaws.

Specifications

The properties of granite which are normally valued for exploitation are compressive strength, tensile strength, density, p-wave velocity, etc. For the marketability, other requirements like colour, texture, granularity, size, water absorption, porosity, hardness, moisture content, etc. are also essential. Raw blocks should be free from normal defects like fractures, joints, shears, hairline cracks, segregation, veins, etc.

The snippets of BIS specifications for granite are given below:

IS: 3316 - 1974 (First Revision; Reaffirmed 2008) Specifications for Structural Granite

This standard covers section, grading and strength requirements of structural granite for various constructional uses. The general requirements as per the specifications are that granite shall be free from flaws, injurious veins, cavities and similar imperfections that would impair its structural integrity and would affect adversely its strength and appearance. The strength requirements as per IS: 3316-1974 are as follows:

- i) The compressive strength when tested according to IS: 1121 (Part 1) -1974 (Reaffirmed 2008) shall not be less than 1,000 kg/cm².
- ii) The true specific gravity when tested according to IS:1122-1974 (Reaffirmed 2008) shall not be less than 2.6.
- iii) The water absorption when tested according to IS: 1124-1974 (Reaffirmed 2008) shall not be more than 0.50%.

The shape of slabs shall be rectangular or square and of specified dimensions with a tolerance in length and breadth shall be 12 mm and thickness 1 mm. The dimensions of blocks for masonry shall be as specified. The tolerance shall be allowed 15 mm for facing blocks.

IS:14223 (Part 1) - 1995; (Reaffirmed 2012) Specifications for Polished Building Stones: Part I Granite

This standard covers physical properties and finish requirements of polished granites used for various purposes. The general requirements as per the specifications are that the granite should be free from all imperfections and deleterious minerals that may interfere with the appearance, strength, structural integrity and its amenability to take good polish. Imperfections are mostly imparted by the textural variations which is a function of degree of uniformity and the distribution of the constituent minerals. Hairline cracks/joints, flower, moles, knots, white and dark lines due to segregation of light-coloured minerals in multicoloured granite and ferromagnesium minerals in light-coloured granites are considered to be the imperfections. Granite should be free from deleterious minerals, such as pyrite, marcasite, biotite, chlorite and ilmenite which interfere with the colour and appearance on weathering and also affect polishing characteristics.

The shapes of the slabs shall be rectangular or square and of specified dimensions with a tolerance in length and breadth shall be +2 mm and thickness +1 mm. The bottom face may be rough but the top surface shall be fine-polished and joint faces shall be dressed with the top surface without hollowness and spalling off.

The physical properties of granite shall conform to the requirements given in Table-5. Surface of the polished granite shall be mirror-finish without any hairline crack. The polish on the surface shall be checked with glassometer and shall not be less than 95%.

On the international scene, with the formulation of European Economy, the CEN Norm has come into force. As per CEN TC 246, various standards of stones have been formulated. The objectives of these standards are to oblige the companies to have the tests of the different stones being commercialised so as to allow the users the choice of the stone with desired physical characteristics according to its use. It is mandatory for every company doing business with European Union to mark their product with 'CE' marking from March 2004 onwards.

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Table – 5 : Physical Properties of Granite as per IS : 14223 (Part 1) -1995 (Reaffirmed 2012)

Sl. No.	Characteristic	Requirements	
		Pink granite	Multicoloured & grey granites
1	Moisture content (%) (max)	0.15	0.15
2	Dry density (m/v)	2.58 to 2.63	2.60 to 2.68
3	Apparent specific gravity (min)	2.75	2.75
4	Water absorption (%) (max)	0.50	0.50
5	Porosity (%)	1.02 to 2.50	1 to 2
6	Compressive strength (kg/cm ²)	1000-1500	1300-2200
7	Tensile strength (kg/cm ²) (min)	90	90
8	Shear strength (kg/cm ²)	280-425	300-540
9	Hardness (Mohs' scale)	6 to 7	6 to 7
10	Hardness (Schmidt No.)	80-100	85-110
11	Hardness (Shore No.)	50-60	46 to 61
12	Ultrasonic pulse velocity	5000	5000
13	Resistance to wear	Not greater than 2 mm, on an average and 2.5 mm for any individual specimen	Not greater than 2 mm, on an average and 2.5 mm for any individual specimen

POLICY

Granite being a 'Minor Mineral' under the MMDR Act, 1957, the grant of various mineral concessions for granite is administered under the Minor Mineral Concession Rules of the respective State Governments. However, the Granite Conservation and Development Rules, 1999 aims at uniform rules for conservation, systematic development and scientific exploitation of granite resources. GCDR, 1999 inter alia, provides for:

Prospecting Licences (PL) prior to granting mining lease; Period of PL; Minimum and maximum period of mining lease and for renewals; Minimum and maximum area of lease; Preparation of scheme of prospecting; Mining Plan to be prepared for grant of mining lease; etc.

As per the export-import policy for 2009-14 and the Foreign Trade Policy thereunder, the imports of granite monumental and building stone falling under heading No. 2516 (whether or not roughly trimmed or cut, by sawing or otherwise, into blocks or slabs of a rectangular shape) are restricted. On the other hand, worked granite blocks/tiles under sub-heading 680223 can be imported freely. There are no restrictions on exports of granite and items under Chapter 25 and Chapter 68.

ENVIRONMENT

The mining of granite, started initially in the bouldery zone, had little damage to the environment. As more and more blocks in huge sizes were required to meet the demand, the sheet rock was approached by making cut in the ground and by removing top soil or overburden, which resulted in general degradation of environment.

Environmental problems are similar to any opencast mining operations. The blasting and movement of heavy vehicles generate dust and aggravate air pollution in addition to noise pollution.

The processing of granite requires huge quantities of water for cutting and polishing. In some cases, kerosene and lime water are used as coolants for cutting purpose. Although most of the kerosene and lime is recycled, there are always chances of mixing these coolants with natural water courses.

Sludge generated during cutting needs proper disposal to avoid increased silting and pollution of the natural waterways.

For abating environmental pollution, guidelines have been spelt out in GCDR, 1999. The technology for making artificial stone called

Terrazzo will prove to be a boon for the utilisation of waste generated during mining and processing.

WORLD REVIEW

World dimension stone production including granite is estimated to be around 115 million tonnes in 2010. The principal producers by volume were: China, Turkey, India, Iran and Italy which accounted for about 73% of the global production.

China

China is the main producer in the world and USA the main customer of granite. There are four main regions for natural stone production and handling imports and exports: the provinces of Shandong, Fujian, Sichuan and Guangdong. The key centres of Chinese stone processing have been created mainly in Shandong, Fujian and Guangdong. Their chief function is to process local and imported materials into products for decorative interior finishing. Large quantities of natural stones are also imported for processing into gravestones for the Japanese and Korean markets.

Brazil

Brazil is the largest producer of natural stone in the world and well-known for producing prime varieties like Juparna, Classico and Tijuca black, from quarries located at the outskirts of Rio. Major areas of production are in Minas Gerais where multicoloured granite is produced. The yellow Veneziano variety of granite is produced in Victoria State. The production of granite was estimated at 60 million cu m during 2011.

More than half the Brazilian production is being exported, mostly to the North American market. In terms of weight, around half the Brazilian natural stone exports include rough blocks of granite.

Italy

Italy has a broad, in-depth know-how of stone quarrying and processing based on centuries of experience, but in the mass production segment, it has been overtaken by China, India, Iran and Brazil. Production of granite was estimated 1.6 million tonnes in 2011.

USA

The natural stone market in USA has grown strongly in the past years and gradually become second most important consumer of natural stone after China.

In USA, dimensional granite was produced to the tune of 653,000 tonnes in 15 states, mainly in Georgia, Massachusetts, North Carolina, South Dakota and Maine. Besides, USA imported dimension stones from Brazil (44%), China (21%), India (15%) and Italy (12%) in terms of value.

FOREIGN TRADE

Exports

Granite is an important commodity amongst ores and minerals which is being exported from the country. It is mainly traded in the form of crude or roughly trimmed blocks; as cut blocks and slabs; and as polished blocks and tiles. The export value of granite (total) increased to ₹ 6,381 crore in 2011-12 from ₹ 5,593 crore in 2010-11 and contributed about 3.64% of all-India exports of minerals & ores, next only to diamond & iron ore exports. The share of granite (others) was 49% at ₹ 3,124 crore that of crude or roughly trimmed blocks was about 36% at ₹ 2,288 crore followed by granite (polished blocks/tiles) with 11% at ₹ 702 crore, and granite (cut blocks/slabs) 4% at ₹ 267 crore. China was the most important buyer for granite and its share in the total value of exports of granite was 30%, followed by USA (15%), Germany and Italy (5% each) (Tables - 6 to 10).

Imports

In 2011-12, imports of granite (total) increased to 64,982 tonnes from 5,5554 in the previous year. Out of the total imports, 30,660 tonnes were of crude and roughly trimmed granite, 3,399 tonnes of cut blocks/slabs, 2,965 tonnes of polished blocks/tiles and 27,958 tonnes of other granite. Granite was mostly imported from China (36%) and Norway (21%) (Tables - 11 to 15).

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**Table – 6 : Exports of Granite : Total
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	4500060	55933193	4605078	63815357
China	2690541	19035178	2585683	19198118
USA	264430	7423991	291565	9344382
Germany	69299	2477867	93361	3092733
Italy	216532	2876820	205243	2879124
Turkey	104241	2286845	118550	2771883
UK	50780	1900908	71070	2332351
Belgium	83348	1790339	89527	2013303
UAE	88895	1717174	99849	1850978
Hong Kong	191591	1406816	174825	1716824
Chinese Taipei/ Taiwan	137486	1014337	169633	1647199
Other countries	602917	14002918	705772	16968462

**Table – 7: Exports of Granite
(Crude or Roughly Trimmed)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2996561	17502596	2992760	22882720
China	2284154	12326125	2306773	16685826
Chinese Taipei/ Taiwan	129627	883194	154076	1370106
Italy	160256	1156523	154045	1335783
Hong Kong	183167	1296566	139006	1317586
Belgium	47254	345955	54868	486846
Vietnam	24263	216207	40040	339209
Thailand	21515	185755	21682	216352
USA	5857	52829	5384	170819
Poland	14909	107336	20777	167000
Spain	35170	294992	18001	151397
Other countries	90389	637114	78108	641796

**Table – 8 : Exports of Granite
(Cut Blocks/Slabs)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	316207	2146831	365418	2672156
China	200447	1312175	231404	1683146
Hong Kong	6215	59616	30622	267850
USA	72740	367278	51335	235898
Chinese Taipei/ Taiwan	4145	68369	6703	109153
Italy	1435	16993	6365	55968
UAE	7652	103430	9361	55919
Vietnam	162	1692	3302	46591
Germany	4276	24694	6487	33720
UK	3359	27710	3354	31233
Sri Lanka	1151	17089	1952	19875
Other countries	14625	147785	14533	132803

**Table – 9 : Exports of Granite (Others)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	804972	25441395	995724	31238867
USA	151186	5745205	193767	7478182
Turkey	99075	2227264	115946	2725432
Germany	44447	1797818	66519	2373149
UK	40136	1659769	58500	1993228
UAE	67189	1352383	77377	1554582
Belgium	27808	1129627	26898	1222318
Italy	36989	1210957	36111	1195331
Netherlands	24777	1018235	24729	1086937
Poland	28299	793143	34575	1020266
Canada	18728	784658	19856	818516
Other countries	266338	7722336	341446	9770926

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**Table – 10 : Exports of Granite
(Polished Blocks/Tiles)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	382320	10842371	251176	7021614
USA	34647	1258679	41079	1459482
China	199166	5236852	41584	739793
Germany	14355	619574	17655	667023
Nigeria	16378	355713	20133	432771
Netherlands	6419	284156	8237	324349
Belgium	7476	307660	6995	300024
UK	5848	203109	7444	295077
Italy	17852	492348	8722	292043
Saudi Arabia	7473	133614	13451	260001
Poland	7805	208556	9163	250570
Other countries	64901	1742110	76713	2000481

**Table – 12 : Imports of Granite
(Crude or Roughly Trimmed)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	31300	578086	30660	733666
Norway	14837	263604	11304	255942
Brazil	4936	89012	6547	175223
China	64	1371	1111	41367
South Africa	2368	33221	1901	35096
Angola	1071	19341	1747	35078
Italy	1024	28928	1018	30348
Ukraine	608	14798	1294	29530
Finland	3100	38560	1849	21844
Madagascar	897	28411	678	20314
Germany	-	-	726	15287
Other countries	2395	60840	2485	73637

**Table – 11: Imports of Granite: Total
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	55554	1163349	64982	1600947
China	12426	262965	23299	539674
Norway	17452	323873	13419	303124
Brazil	6562	127325	7023	208460
Italy	3457	121606	2653	94353
Madagascar	897	28411	2467	71789
South Africa	2815	42873	2394	47852
Angola	1183	21606	2147	42983
Finland	4098	54203	2799	36598
Ukraine	1177	23615	1403	35930
Saudi Arabia	1762	53813	764	23622
Other countries	3725	103059	6614	196562

**Table – 13 : Imports of Granite
(Cut Blocks/Slabs)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2375	41510	3399	74268
Norway	42	657	1608	34734
Finland	381	7229	546	8532
Angola	-	-	400	7905
Italy	810	11009	251	6669
Madagascar	-	-	156	6369
Canada	-	-	261	6056
South Africa	-	-	85	2253
USA	94	5112	88	1668
Germany	-	-	4	82
Other countries	1048	17503	-	-

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**Table – 14 : Imports of Granite
(Polished Blocks/Tiles)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	6207	157985	2965	87554
China	1778	53204	652	20130
Norway	2096	45792	457	11655
Namibia	-	-	314	7586
South Africa	351	8198	286	6826
Ukraine	148	2829	109	6400
Netherlands	-	-	88	5541
Madagascar	-	-	199	5427
Finland	40	1582	330	5330
Turkey	-	-	200	4821
Brazil	760	20262	72	1918
Other countries	1034	26118	258	11920

**Table – 15: Imports of Granite (Others)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	15672	385768	27958	705459
China	10584	208390	21536	478177
Italy	1562	80030	1364	55966
Madagascar	-	-	1434	39678
Brazil	272	7102	404	31320
Oman	140	3496	255	12994
Saudi Arabia	952	25839	405	11549
Portugal	-	-	172	11354
Namibia	-	-	530	6638
Vietnam	48	1475	147	6180
USA	118	5725	75	5242
Other countries	1996	53711	1636	46361

FUTURE OUTLOOK

India possesses one of the best granite deposits in the world having excellent varieties comprising over 200 shades. India accounts for over 20% of the world resources in granite. The total granite resources in India as on 1.4.2010 are: 46,230 million cu m. As per the Report of the Working Group for 12th Plan (2012-17), the Indian stone production during 2009-10 was 35,342 thousand tonnes, and in value terms, the estimated turnover of the Indian Dimensional Stone market in 2009-10 was of the order of ₹30,000 crore out of which the southern states accounted for ₹18,000 crore, Rajasthan ₹7000 crore, and the rest of India ₹5000 crore. Granite alone accounts for 2/3rd of the value of production.

As per the Report, the growth is continuing and the demand for granite, marble, sandstone and other dimensional stones 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. Alternative option for exporting granite and marble in processed form to maximise export earnings is 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 thereafter, 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).