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FELSPAR

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GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

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19 Felspar

Felspars are one of the most abundant rock-forming minerals in the earth's crust, comprising a complex series of aluminosilicates with varying amounts of potassium, sodium, calcium and rarely barium. Common amongst these are the potash felspars called orthoclase and microcline ($K_2O.Al_2O_3.6SiO_2$), sodium felspar called albite ($Na_2O.Al_2O_3.6SiO_2$) and calcium felspar called anorthite ($CaO.Al_2O_3.2SiO_2$). The sodium and calcium felspars form a continuous series of solid solutions and are together termed plagioclase felspars. Though felspars occur in a variety of colours, pink, brown and grey felspars are known to be common.

RESOURCES

As per the UNFC system, the total resources of felspar in the country as on 1.4.2010 are estimated at about 132 million tonnes of which 44 million tonnes (33%) are reserves and 88 million tonnes (67%) are remaining resources. In terms of grades, pottery/ ceramic grade accounts for 61%, others/unclassified & not-known grades 31% and glass grade for 8% of the total resources. By States, Rajasthan alone accounts for about 66% of the total resources followed by Andhra Pradesh (16%), Tamil Nadu (7%), Bihar (4%) and West Bengal (3%) (Table - 1).

EXPLORATION

Three pegmatites bodies are intermittently exposed near village Chotila Ki Bhagali which have dimension of about 1.5 km x 20-25 m. West of Village Kana Kola & North-West-West of Village Andor (150 m x 230 m), (200 m x 5-10 m) respectively. These pegmatities are mainly comprising quartz, felspar with minor amount of tourmaline & other mafic minerals. The granite which occured here is suitable for the masonry stone. A few isolated hillocks near village Morli, Barewara & Andor were mainly comprised impure quartzite which can be used as masonry stone. About 2 km North-West of village Andor a blockable granite was noticed over an area of 400 x 100 sq m. In addition to this Gravel & Bajri deposit suitable for construction were also seen near village Kandra, Chuli, Chotila, Panchdeol, Radbar and Pooalia, etc. Resources were not estimated.

Further, to investigate new potential area for felspar, DGM Rajasthan has done exploration over 1 sq km. RGM over 20 sq km and RMS over 150 sq km during the year 2011-12 near Village Dholi Dungari - Khenwal - Kalakot, Tehsil - Raipur, District Pali. Intrusive bodies of pegmatitites were mapped. The average width of bodies vary from 48 m x 40 m to 210 m x 100 m in this area. Mapping was done over area namely Kalakot, Kalab, Kalla, Balupura and Bhilan, mapping on scale 1:2000 over 2 sq km, 1:10,000 over 10 sq km and 1:50,000 over 150 sq km and 40 spot samples collected and chemical analysis of 10 samples were done. Exploration for felspar near Villages Buchara, Meena Ki Dhani, Kharab, Tehsil Kotputli, District Jaipur. Mapping on scale 1:4,000 over 10 sq km was also done and 82 spot samples were collected. DGM Rajasthan has also done exploration for felspar, around Villages Hemardai, Karnoo, Odas, etc. in Tehsil Disangan, District Ajmer over the area of 100 sq km and in Tehsil Sheoganj, District Sirohi with mapping on scale 1:10,000 over an area of 10 sq km and 1:2,000 over an area of 1 sq km and 9 samples were collected and sent for chemical analysis.

PRODUCTION & STOCKS

The production of felspar at 660 thousand tonnes in 2011-12 increased by 21% as compared to the preceding year.

There were 103 reporting mines in 2011-12 as against 85 mines in the previous year. Besides, the production of felspar was also reported from 93 mines as an associated mineral primarily with Asbestos, mica, quartz and wollastonite. Nine mines, each producing more than ten thousand tonnes annually, accounted for approximately 57% of the total production in 2011-12. Ten principal producers reported 61% of the total production during the year under review.

Rajasthan was the leading producing state contributing 63% of the total production followed by Andhra Pradesh (30%), Tamil Nadu (4%), Jharkhand (2%,), and the remaining 1% was contributed by West Bengal. (Table - 2 to 5).

The mine-head stocks of felspar at the end of the year 2011-12 were 289 thousand tonnes as against 230 thousand tonnes in the beginning of the year (Table - 6).

The average daily employment of labour strength in 2011-12 was 992 as against 793 in the previous year.

MINING & MARKETING

Felspar is won chiefly from pegmatites. Mining is carried out, generally, by opencast method. Significant output of felspar is obtained as an associated mineral during mining of quartz, mica and to some extent beryl. Bhilwara and Ajmer districts in Rajasthan and Mahaboobnagar and Nellore districts in Andhra Pradesh are the important mining areas in the country.

The pegmatite bodies are exposed by the removal of top soil and overburden. It is then broken either manually or by drilling and blasting.

Table – 2 : Principal Producers of Felspar 2011-12

Name and address of producer	Location of mine	
	State	District
Laxmi Marble & Granite (P) Ltd, Opposite Rly Station, Neem ka Thana, Sikar -332 713, Rajasthan.	Rajasthan	Sikar
Dolphin Feldspar Pvt. Ltd, 6-3-1239/2/A, 4th floor, Kotis Court, Rajbhavan Road, Somajiguda - 500 082, Hyderabad, Andhra Pradesh.	Andhra Pradesh	Mahaboob-nagar
Sibelco India Minerals Pvt. Ltd (Formelly Vijaya Gimpex Mining (P) Ltd), No. 8-2-293/k/311-312, Sriman Chambers, Kamalapuri Colony, phase-3, Hyderabad-500 073, Andhra Pradesh.	Andhra Pradesh	Mahaboob-nagar
Brij Kishore Yadav, 3301, Sutharkhana Mohalla, Sasirabad, Ajmer-305 601, Rajasthan.	Rajasthan	Ajmer
Seth pusa Lal, Mansinghka Pvt. Ltd, Pusa Niwas, Kashi Puri, Bhilwara - 311 001, Rajasthan.	Rajasthan	Bhilwara
Saurabh Modi, D-46B, Malviya Marg, C-Scheme, Jaipur-302 005, Rajasthan.	Rajasthan	Ajmer
MGK Trading House Pvt. Ltd, 119A, Krishna Street, Palaniappa Nagar, Valasara Wakam, Chennai-600 087, Tamil Nadu.	Andhra pradesh	Nellore
Sadhna Minerals, 1/1 16, Masthanvali Complex, Anil Nagar, N.H. - 5, Chilkur-524 412, By Pass Road, Gudur, Nellore, Andhra pradesh.	Andhra Pradesh	Nellore

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

(In tonne)

Grade/State	Reserves				Remaining Resources								
	Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	Total Resources (A+B)
		STD121	STD122			STD221	STD222						
All India : Total	**24,545,334**	**8,278,221**	**11,679,685**	**44,503,240**	**14,672,107**	**4,427,797**	**12,967,154**	**4,191,330**	**9,874,858**	**41,549,070**	**149,895**	**87,832,212**	**132,335,451**
By Grades													
Glass	2,127,308	413,588	610,399	3,151,295	1,530,128	389,984	3,732,761	103,662	107,681	1,736,097	24,050	7,624,363	10,775,658
Pottery/Ceramic	20,007,984	6,425,719	9,721,028	36,154,731	11,367,336	3,080,724	6,946,326	2,539,406	1,951,784	19,203,824	-	45,089,400	81,244,131
Others	702,228	106,195	218,541	1,026,964	478,077	17,139	181,017	203,637	51,876	350,587	1,800	1,284,133	2,311,097
Unclassified	617,465	1,202,352	623,834	2,443,651	1,025,842	704,054	1,371,461	85,003	143,852	12,767,336	-	16,097,547	18,541,198
Not-known	1,090,349	130,367	505,883	1,726,599	270,725	235,896	735,590	1,259,622	7,619,664	7,491,225	124,045	17,736,767	19,463,366
By States													
Andhra Pradesh	5,469,094	408,487	2,301,765	8,179,346	2,504,362	274,566	2,181,547	60,776	5,476,671	2,975,298	145,995	13,619,215	21,798,561
Bihar	-	-	35,147	35,147	-	-	-	-	4,195	4,871,499	-	4,875,694	4,910,841
Haryana	-	-	-	-	-	-	-	-	-	72,164	-	72,164	72,164
Jharkhand	5,675	-	274,971	280,646	-	40,766	279,433	32,510	120,388	881,045	-	1,354,142	1,634,788
Karnataka	119,525	69,575	107,055	296,155	-	-	-	25,000	135,133	177,300	3,900	341,333	637,488
Madhya Pradesh	-	-	-	-	-	-	-	-	-	339,851	-	339,851	339,851
Maharashtra	228,655	-	91,462	320,117	-	-	423,180	-	-	485,606	-	908,786	1,228,903
Meghalaya	-	-	-	-	-	-	-	-	-	37,449	-	37,449	37,449
Rajasthan	18,083,327	7,793,709	8,837,983	34,715,019	9,839,519	4,042,309	9,666,832	3,154,174	668,648	25,859,733	-	53,231,215	87,946,234
Tamil Nadu	613,184	6,450	31,302	650,936	2,328,227	70,156	416,162	18,870	69,822	5,447,875	-	8,351,112	9,002,048
Uttar Pradesh	-	-	-	-	-	-	-	-	-	200,000	-	200,000	200,000
West Bengal	25,874	-	-	25,874	-	-	-	900,000	3,400,000	201,250	-	4,501,250	4,527,124

Figures rounded off.

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

(Qty in tonnes; Value in ₹'000)

State	2009-10		2010-11		2011-12 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	**496997**	**98648**	**546472**	**154676**	**660371**	**212294**
Andhra Pradesh	214406	51429	208740	57878	196928	54018
Jharkhand	10778	1904	13315	2297	15648	2902
Karnataka	3100	651	1034	285	-	-
Rajasthan	265212	43083	306126	89127	415170	143878
Tamil Nadu	451	117	14555	3768	27594	9551
West Bengal	3050	1464	2702	1321	5031	1945

Table – 4 : Production of Felspar, 2010-11 & 2011-12
(By Frequency Groups)

(Qty in tonnes)

Production Group	No. of mines		Production for the group		Percentage in total production		Cumulative percentage	
	2010-11	2011-12	2010-11	2011-12	2010-11	2011-12	2010-11	2011-12
All Groups	**85(55)**	**103(93)**	**546472**	**660371**	**100.00**	**100.00**	**-**	**-**
Up to 500	37(17)	50(36)	7381	12571	1.35	1.90	1.35	1.90
501-1000	11(10)	13(18)	15737	22927	2.88	3.48	4.23	5.38
1001-3000	17(16)	15(19)	58219	64083	10.65	9.70	14.88	15.08
3001-5000	6(7)	8(13)	50890	82181	9.31	12.45	24.19	27.53
5001-10000	5(4)	10(5)	56836	100524	10.40	15.22	34.59	42.75
10001 & above	9(1)	7(2)	357409	378085	65.41	57.25	100.00	100.00

Figures in parentheses indicate number of mines of felspar with asbestos, mica, quartz & wollastonite.

Table – 5 : Production of Felspar, 2010-11& 2011-12
(By Sectors/States/Districts)

(Qty. in tonnes, value in Rs.'000)

State/District	2010-11			2011-12(P)		
	No.of mines	Quantity	Value	No.of mines	Quantity	Value
India	**85(55)**	**546472**	**154676**	**103(93)**	**660371**	**212294**
Private sector	82(55)	545317	154315	100(92)	657742	211224
Public sector	3	1155	361	3(1)	2629	1070
Andhra Pradesh	**20(22)**	**208740**	**57878**	**14(24)**	**196928**	**54018**
Kurnool	-	-	-	(1)	1700	1020
Mahaboobnagar	12(6)	153365	43940	8(4)	131376	37698
Nalgonda	2	5803	870	-	-	-
Nellore	5(15)	43582	11973	6(18)	62573	15054
Rangareddy	1(1)	5990	1095	(1)	1279	246
Jharkhand	**3(6)**	**13315**	**2297**	**3(6)**	**15648**	**2902**
Deoghar	(1)	4076	611	(1)	750	110
Dumka	(1)	2651	448	(1)	4723	948
Hazaribagh	1	885	134	1	1023	220
Jamtara	1	718	90	1	2290	286
Latehar	1(4)	4985	1014	1(4)	6862	1338
Karnataka	**2**	**1034**	**285**	**2***	**-**	**-**
Bengaluru	2	1034	285	2*	-	-
Rajasthan	**59(19)**	**306126**	**89127**	**83(35)**	**415170**	**143878**
Ajmer	30(12)	89391	21293	48(22)	109882	21414
Alwar	(1)	9	5	-	-	-
Bhilwara	21(3)	38107	7258	24(6)	71394	17336
Jaipur	(1)	4781	956	2(2)	5942	2111
Rajsamand	4(1)	9568	1367	4(1)	4761	722
Sikar	3	163218	57931	4(2)	218665	100975
Sirohi	1	387	151	1	3815	1085
Tonk	(1)	665	166	(1)	496	158
Uaipur	-	-	-	(1)	215	77

(Contd.)

Table- 5 (Concld.)

State/District	2010-11			2011-12(P)		
	No.of mines	Quantity	Value	No.of mines	Quantity	Value
Tamil Nadu	**1(7)**	**14555**	**3768**	**1(27)**	**27594**	**9551**
Coimbatore	-	-	-	(1)	300	180
Dindigul	(1)	16	5	(1)	4631	2431
Erode	-	-	-	(2)	49	18
Karur		-	-	(5)	136	72
Madurai	(2)	695	312	(1)	135	53
Nammakal	(4)	13723	3375	(5)	4293	1923
Salem	-	-	-	(11)	15189	3842
Tiruchirapalli	-	-	-	(1)	2770	993
Tiruvarur	1	121	76	1	91	39
West Bengal	**(1)**	**2702**	**1321**	**(1)**	**5031**	**1945**
Birbhum	(1)	2702	1321	(1)	5031	1945

Figures in parentheses indicate number of associated mines of felspar with asbestos, mica, quartz.& wollastonite.
** Reported labour and/or production of quartz.*

Table – 6 : Mine-head Stocks of Felspar 2011-12 (p) (By States)

(In tonnes)

State	At the beginning of the year	At the end of the year
India	**229515**	**288929**
Andhra Pradesh	187743	166978
Jharkhand	2808	2487
Karnataka	2690	2690
Madhya Pradesh	11	11
Maharashtra	3590	-
Rajasthan	31346	109027
Tamil Nadu	1238	7655
West Bengal	89	81

The broken materials are then sorted out and sized. Crushed felspar is separated mechanically by suitable screens to meet market requirements. The general demand is for 30/80 mesh, 100 mesh, 150 mesh, 180 mesh, 200 mesh and 250 mesh material. Washing is sometimes done to upgrade the product by removing clay, etc. The processed felspar is bagged and despatched to different consignees.

The processing of felspar involves usually flotation or magnetic separation to remove accessory minerals like mica, garnet, ilmenite and quartz. Silica in the form of quartz in pegmatites and silica sand in felspathic sand deposits are obtained as co-products of mining. Though in some applications, presence of silica is advantageous, most users require extremely pure and finely-ground grades of felspar. Glass grade felspar is usually the most coarse material. The filler application demands finely-ground material. A modern processing plant located at Kodthal in Mahaboobnagar district of Andhra Pradesh and 12 processing plants in Rajasthan cater to ceramics and glass industries.

USES

Potassium felspar obtained from pegmatites is used traditionally as a source for alumina and alkali in ceramic and glass industries which account for more than 90% consumption. It also finds use as functional filler in paint, plastic, rubber and adhesive; as a bonding agent in abrasives; and in the manufacture of artificial teeth, fertilizer and white cement. Certain varieties of felspar (like moonstone) are used as semi-precious stones.

In Ceramic Industry, felspar is used as fluxing agent which facilitates softening, melting and wetting of batch constituents. The flux controls the degree of vitrification of the ceramic body during firing. Potash felspar has technical advantages over sodium felspar. After clay, felspar is the biggest ingredient in the raw material batch for ceramic bodies. Typical felspar contents are < 25% in earthenware, 25-35% in sanitaryware, 15-30% in whiteware, 10-55% in floor and wall tiles and 30-55% in electrical porcelain. For Glass Industry, the alkali content in felspar acts as a flux, which not only facilitates lowering the glass batch melting temperature but also cuts production cost. The mineral is primarily added for alumina content which varies from 0.05% for flat glass, 8% for container glass, 11% for some speciality glasses and up to 18% for insulation fibreglass.

In the Abrasive Industry, plagioclase felspar is used as a mild abrasive material in scouring powders because of its semi-conchoidal fracture, although its hardness is 6 on Mohs' scale. In Refractory Industry, felspar is used as one of the batch constituents in the manufacture of acid-proof refractories. In Welding Electrode Industry, felspar is used as a flux which acts as an arc stabiliser and helps in weld-pool protection.

Physical properties like good dispersability, chemical inertness, stable pH, low free silica content and brightness of 89-95% improve the filler properties of finely-ground felspar materials.

SPECIFICATIONS

The BIS specifications of potash felspar and soda felspar for use in Glass and Ceramic industries are as per IS: 9749-2007. The producers prefer following specifications for the various ceramic products:

Sanitaryware

K_2O 11-14%, Na_2O 2-7%, SiO_2 62-68%, Al_2O_3 16-20%, Fe_2O_3 0.25% (max). The deleterious constituents are TiO_2 and MgO.

Insulators

K_2O 11-12.5%, Na_2O 2-3% (4% max), SiO_2 64.5-68%, Al_2O_3 17-21%, Fe_2O_3 0.48% (max) (but Fe_2O_3 less than 0.1% is accepted).

Ceramic Tiles

K_2O 9%, Na_2O 4%, Al_2O_3 18% (min), Fe_2O_3 1% (max), K_2O+Na_2O 14% (max). Both sodium and potassium felspars are used.

Crockeryware

K_2O 12-15%, Na_2O 3.69%, SiO_2 63.05%, Al_2O_3 19.56% and Fe_2O_3 0.10%.

Glass

The physical requirements specified are that of the material in powder form prepared from natural felspar which should be free from foreign matter; moisture shall not exceed 2% by mass; specific gravity should be between 2.5 and 2.7; PCE should be 8 to 10 orton (1,225 ºC -1,260 ºC), and fired-colour shall be glassy-white and free from specks.

However, the producers accept felspar analysing 10% $K_2O + Na_2O$, 64-68% SiO_2, 15-19% Al_2O_3 and 0.15% Fe_2O_3.

Refractory

There is no BIS specification for felspar for use in Refractory Industry. The Industry prefers potash felspar analysing 11 to 12% $Na_2O_3+K_2O$, 60 to 70% SiO_2, 20 to 24% Al_2O_3, 1.5% Fe_2O_3, 0.8% LOI, 4 to 6 orton PCE and 2.5 to 10 cm material.

Abrasive

Felspar in both powder and lump forms is used and white or pink mineral is preferred. As per the users in the organised sector, felspar analysing SiO_2 65%, Al_2O_3 18%, $Na_2O + K_2O$ 10% (max), Fe_2O_3 0.45%, MgO 0.5%, CaO 0.6% and LOI 2% (max).

Electrode

Potash felspar, analysing 12 to 14% K_2O, 1 to 3% Na_2O, 63 to 67% SiO_2, 17 to 20% Al_2O_3 and below 0.3% Fe_2O_3, is preferred.

INDUSTRY

Ceramic Industry in India is about a century old and has formed a sizeable industrial base. It comprises ceramic tiles, sanitaryware and crockery items. The industry has its base both in large and small-scale sectors with wide variance in type, size, quality and standard. Manufacturing units are spread all-over India. The state-of-the-art ceramic goods are manufactured in the country. The domestic technology is of international standard. During the last two decades, there has been a phenomenal growth in the field of technical ceramics to meet specific demands of industries like high alumina ceramic, cutting tools and other structural ceramics.

As per the data from Department of Industrial Policy & Promotion, Ministry of Commerce & Industries, there are at present 16 ceramic glazed tiles units in the organised sector with an annual installed capacity of 21 lakh tonnes. The production of ceramic tiles was estimated at 513 million sq m in 2012-13 as against 450 million sq m during 2011-12. This sector accounts for about 2.5% of the world ceramic tile production. The demand of ceramics is expected to increase with the growth in the Housing Sector.

Sanitary and pottery items are also produced by both large and small-scale sectors. Sanitaryware has been growing at 5% per annum during the last two years. There were 7 units of sanitaryware with an installed capacity of about 143 thousand tonnes per annum in the organised sector and about 210 units, with total 53,000 tonnes per annum capacity in the small-scale sector. The production of sanitaryware in 2011-12 was estimated at 530 thousand tonnes in the organised sector. There are 16 units of potteryware in the organised sector, having a total installed capacity of 43,000 tpy. In the small-scale sector, there are over 1,400 plants with a capacity of 3,00,000 tonnes per annum. The production of potteryware in 2011-12 was estimated at about 85 thousand tonnes in the organised sector.

Glass industry comes under delicensed category. The Indian glass industry consists of seven segments namely sheet and flat glass (NIC-26101); glass fiber and glass wool (NIC-26102); hollow glassware (NIC-26103); laboratory glass ware (NIC-26104); table and kitchen glassware (NIC-26105); glass bangles (NIC-26106) including other glassware (NIC-26109). Most of the glass demand in India currently comes from container glass, which accounts for 50% of the country's glass consumption by value. This type of glass is domestically produced and used for bottling soft drinks, alcholic beverages, food and pharmaceuticals.

The production of glasssheet, toughened glass, fiber glass, glass bottles during 2011-12 were 1,06,144.07 thousand sq m, 26,78,262.93 sq m, 42,669.84 tonnes, 12,71,919.58 tonnes, respectively, and during 2012-13 (up to November, 2012) have been 73,043.00 thousand sq m, 22,31,388.00 sq m, 29,356.00 tonnes and 8,79,733.00 tonnes, respectively.

CONSUMPTION

Felspar is used mainly in ceramic, glass and cement industries. Minor quantity of felspar is consumed by refractory, abrasive and electrode industries. Total consumption of felspar in 2011-12 was estimated at 452,100 tonnes in the organised sector. Of the total consumption, the Ceramic Industry accounted for 77%, Glass Industry about 14% and remaining 9% by cement, refractory, abrasive and electrode industries (Table - 8).

WORLD REVIEW

World resources of felspar are large and adequate enough to meet the anticipated world demand and hence quantitative data on resources of felspar in granites, pegmatites and felspathic sands have not been compiled. The world production of felspar was estimated at 20.87 million tonnes in 2011. Major producers were Italy (23%), Turkey (21%) and China (11%) (Table-9).

Table – 8 : Reported Consumption of Felspar 2009-10 to 2011-12 (By Industries)

(In tonnes)

Industry	2009-10	2010-11(R)	2011-12(P)
All Industries	**426700**	**439700**	**452100**
Abrasive	600(3)	600(3)	600(3)
Cement	15900(6)	29200(9)	38100(7)
Ceramic	356200(49)	349000(49)	348400(47)
Coal washery	++(1)	++(1)	++(1)
Electrode	200(11)	300(12)	300(13)
Glass	52800(50)	59400(51)	63900(46)
Refractory	1000(16)	1200(15)	800(10)

Figures rounded off. Data collected on non-statutory basis. Figures in parentheses denote the number of units in organised sector reporting consumption.*
*(*Includes actual reported consumption and/or estimates made wherever required).*

Table – 9 : World Production of Felspar (By Principal Countries)

(In '000 tonnes)

Country	2009	2010	2011
World Total	**20319**	**22724**	**20875**
Argentina	213	217	220[e]
China[(e)]	2400	2400	2400
Czech Republic	431	388	407
Egypt	354	406	210[e]
France	650	650	650
India	497	472	542
Iran	634	652	655[e]
Italy[e]	4700	4700	4700
Japan[(e)] @	700	650	600
Korea, Rep. of	623	496	384
Malaysia	410	455	379
Mexico	348	399	382
Poland	445	514	550[e]
Portugal	210	170	180
Spain	597	692	650[e]
Thailand	719	642	1041
Turkey	4000	6282	4478
USA	550	670	690
Vietnam	200	200	200
Other countries	1638	1669	1557

@ Including weathered granite felspar
***Source:** World Mineral Production, 2007-2011.*

FOREIGN TRADE

Exports

Exports of felspar (natural) increased marginally to 394 thousand tonnes in 2011-12 from 351 thousand tonnes in the previous year. Exports were mainly to Bangladesh (18%), Indonesia (18%) and UAE (12%). Exports value of felspar (cut & uncut) increased drastically to ₹ 5.87 crore in 2011-12 from ₹ 1.28 crore in 2010-11. Exports of felspar (cut & uncut) were mainly to USA (76%), Thailand (9%) and Germany (4%) (Tables - 10 to 13).

Imports

Imports of felspar (natural) increased drastically to 41,627 tonnes in 2011-12 from 20,409 tonnes in 2010-11. Imports were mainly from Thailand, China and Malaysia. In 2011-12, imports value of felspar (cut & uncut) also decreased drastically to ₹ 31.99 lakh from ₹ 65.31 lakh in the previous year. In 2011-12, imports value of uncut felspar was of ₹ 10.53 lakh and that of cut felspar was ₹ 21.46 lakh. Imports of felspar (uncut) were mainly from Madagascar and Tanzania, while, imports of felspar (cut) were mainly from Hong Kong and Madagascar (Tables - 14 to 17).

Table – 10 : Exports of Felspar (Natural) (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**351266**	**1187874**	**394277**	**1518048**
Indonesia	65179	217738	69808	286999
Bangladesh	70188	172041	71577	195090
Thailand	26551	98526	37134	160350
Vietnam	41976	167102	33646	158606
UAE	18714	54849	46204	140037
Iran	18889	75576	26887	136823
China	21140	83677	19932	95289
Malaysia	27200	100046	24671	90122
Chinese Taipei/ Taiwan	15187	60344	12144	59012
Turkey	19954	46611	24868	55675
Other countries	26288	111364	27406	140045

Table – 11 : Exports of Felspar (Cut & Uncut) (By Countries)

Country	2010-11		2011-12	
	Qty (t**)	Value (₹'000)	Qty (t**)	Value (₹'000)
All Countries	******	**12842**	******	**58669**
USA	**	3270	**	44605
Thailand	**	92	**	5106
Germany	**	2882	**	2497
Japan	**	-	**	1730
Chinese Taipei/Taiwan	**	605	**	1078
Hong Kong	**	3566	**	1067
Turkey	**	-	**	615
France	**	485	**	612
China	**	270	**	438
Israel	**	1246	**	25
Other countries	**	426	**	896

*** Quantity not given due to partial coverage. Value figures however have full coverage.*

Table – 12 : Exports of Felspar (Cut) (By Countries)

Country	2010-11		2011-12	
	Qty ('000 Carat)	Value (₹'000)	Qty ('000 Carat)	Value (₹'000)
All Countries	**226**	**12541**	**1082**	**51552**
USA	46	3247	738	41827
Thailand	++	92	76	5106
Germany	135	2882	164	2312
Japan	-	-	78	1036
Turkey	-	-	6	615
UK	-	-	16	316
Italy	++	106	2	186
Hong Kong	5	3566	1	107
Netherlands	-	-	1	29
Brazil	-	-	++	16
Other countries	40	2648	++	2

Table – 13 : Exports of Felspar (Uncut) (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**++**	**301**	**1**	**7117**
USA	++	23	++	2778
Chinese Taipei/Taiwan	-	-	++	1078
Hong Kong	-	-	1	960
Japan	-	-	++	694
France	-	-	++	612
China	++	270	++	438
UK	-	-	++	189
Germany	-	-	++	185
Russia	-	-	++	82
Singapore	-	-	++	32
Other countries	++	8	++	69

Table – 14 : Imports of Felspar (Natural) (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**20409**	**64063**	**41627**	**168923**
Thailand	18818	43693	38800	119993
China	49	596	1745	31638
Malaysia	882	10720	335	5549
Mongolia	500	7508	200	4340
USA	-	-	161	3091
Spain	114	1072	152	1696
Turkey	24	159	120	851
Pakistan	-	-	50	692
Saudi Arabia	-	-	21	352
Singapore	-	-	21	344
Other countries	22	315	22	377

Table – 15 : Imports of Felspar (Cut & Uncut) (By Countries)

Country	2010-11		2011-12	
	Qty (t**)	Value (₹'000)	Qty (t**)	Value (₹'000)
All Countries	**	**6531**	**	**3199**
Hong Kong	**	3203	**	1888
Madagascar	**	315	**	883
\Tanzania Rep.	**	-	**	310
USA	**	2050	**	117
Czech Republic	**	86	**	-
Italy	**	199	**	-
Thailand	**	531	**	-
Other countries	**	147	**	1

*** Quantity not given due to partial coverage. Value figures, however, have full coverage.*

Table – 16 : Imports of Felspar (Cut) (By Countries)

Country	2010-11		2011-12	
	Qty ('000 carat)	Value (₹'000)	Qty ('000 carat)	Value (₹'000)
All Countries	**3**	**3881**	**5**	**2146**
Hong Kong	1	553	5	1774
Madagascar	++	315	++	351
USA	1	2050	++	19
Sri Lanka	++	146	++	2
Other countries	1	817	-	-

Table – 17 : Imports of Felspar (Uncut) (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**1**	**2650**	**70**	**1053**
Madagascar	-	-	52	531
Tanzania Rep.	-	-	++	310
Hong Kong	1	2650	18	114
USA	-	-	++	98
Other countries	-	-	-	-