Indian Minerals Yearbook 2012

(Part- III : Mineral Reviews)

51st Edition

FLUORITE

(FINAL RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

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February, 2014

21 Fluorite

Fluorite or fluorspar is the common name of the mineral having chemical composition calcium fluoride (CaF_2). It is a mineral with veritable bouquet of brilliant colours from hallmark colour purple to blue, green, yellow, colourless, brown, pink, black and reddish orange; and is rivalled in colour range only by quartz. The rich purple colour is by far the most famous and popular colour. It easily competes with the beautiful purple of amethyst. It is an important commercial source of fluorine. Fluorite plays a vital role in the manufacture of aluminium, gasoline, insulating foams, refrigerants, steel and uranium fuel.

Mainly two grades of fluorite are involved in consumption and trade, namely, the acid grade containing more than 97% CaF_2 and the sub-acid grade analysing 97% or less CaF_2. The sub-acid grade includes metallurgical and ceramic grades and is commonly known as metallurgical grade. Fluorite production in the country is scarce. At the global level, the country has less production. Production of fluorite in the country is reported from the states of Gujarat, Maharashtra and Rajasthan.

In addition to the natural fluorite production, synthetic fluorite is recovered as by-product during uranium processing, petroleum alkylation and stainless pickling. The by-product, fluorosilicic acid, obtained from phosphoric acid plants, while processing phosphate rock also supplements fluorite as a source of fluorine.

RESOURCES

As per the UNFC system, the total resources of fluorite in the country as on 1.4.2010 are estimated at 18.2 million tonnes. Out of these, 4.7 million tonnes are placed under reserves category (further classified into 4.6 million tonnes under proved category and 0.15 million tonnes under probable category). Remaining resources comprise 13.5 million tonnes.

By States, Gujarat accounts for 66% of the total resources having 12 million tonnes, followed by Rajasthan with 5.24 million tonnes (29%), Chhattisgarh 0.55 million tonnes (3%) and Maharashtra 0.42 million tonnes (2%). Gradewise, the resources are classified into marketable grade which accounted for (81%) of the total resources, low grade (17%) and unclassified grade (2%) (Table-1).

PRODUCTION, STOCKS & PRICES

The production of fluorite (graded) at 4,856 tonnes in 2011-12 substantially decreased as compared to that in the previous year due to temporary discontinuance of captive mine of GMDC owing to fluorite beneficiation plant not in operation since October 2010.

There were three reporting mines in 2011-12. The entire output was reported from public sector. Fluorite (graded) was reported from Maharashtra & Rajasthan and concentrate from Gujarat only (Tables - 2 to 4).

The mine-head stock of fluorite at the end of the year 2011-12 were 91,105 tonnes as against 96,891 tonnes at the beginning of the year (Table - 5).

The average daily labour employed in fluorite mines in 2011-12 was 81 as against 113 in the previous year. The domestic prices of fluorite are furnished in the General Review on 'Prices'.

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

(In tonnes)

Grade / State	Reserves				Remaining resources								Total resources (A+B)
	Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
		STD121	STD122			STD221	STD222						
All India : Total	**4566234**	**-**	**146082**	**4712316**	**673889**	**745390**	**529966**	**1713833**	**6218421**	**3474906**	**145183**	**13501588**	**18213904**
By Grades													
Marketable	4566234	-	146082	4712316	673889	586080	364766	-	5757010	2449903	145183	9976831	14689147
Low	-	-	-	-	-	3790	9680	1710348	445660	1000003	-	3169481	3169481
Unclassified	-	-	-	-	-	155520	155520	3485	15751	25000	-	355276	355276
By States													
Chhattisgarh	-	-	-	-	65889	153132	9288	185485	5573	126088	-	545455	545455
Gujarat	4280000	-	-	4280000	-	-	-	-	5723360	2001920	-	7725280	12005280
Maharashtra	261843	-	104737	366580	-	-	-	-	-	52369	-	52369	418949
Rajasthan	24391	-	41345	65736	608000	592258	520678	1528348	489488	1294529	145183	5178484	5244220

Figures rounded off.

Table – 2 : Producers of Fluorite, 2011-12

Name and address of producer	Location of mine	
	State	District
Maharashtra State Mining Corporation Ltd, Plot No. 7, Ajni Chowk, Wardha Road, Nagpur-440 015, Maharashtra.	Maharashtra	Chandrapur
Gujarat Mineral Development Corporation Ltd, Khanij Bhawan, 132 Ft. Ring Road, Vastrapur, Ahmedabad, Gujarat.	Gujarat	Vadodara
Rajasthan State Mines and Minerals Ltd, C-89-90, Janpath, Lal Kothi, Jaipur-313 001. Rajasthan.	Rajasthan	Jalore

Table – 3 : Production of Fluorite (Graded), 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	**105232**	**81558**	**59954**	**50147**	**4856**	**11782**
Gujarat	100237	60944	52920	15876	1920	576
Maharashtra	4931	20473	6469	32456	2740	10645
Rajasthan	64	141	565	1815	196	561

Table – 4 : Production of Magnestie, 2010-11 & 2011-12
(By Sectors/States/Districts)

(Qty. in tonnes; value in ₹ '000)

State/District	2010-11			2011-12(P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	**3**	**59954**	**50147**	**3**	**4856**	**11782**
Public sector	3	59954	50147	3	4856	11782
Gujarat	**1**	**52920**	**15876**	**1**	**1920**	**576**
Vadodara	1	52920	15876	1	1920	576
Maharashtra	**1**	**6469**	**32456**	**1**	**2740**	**10645**
Chandrapur	1	6469	32456	1	2740	10645
Rajasthan	**1**	**565**	**1815**	**1**	**196**	**561**
Jalore	1	565	1815	1	196	561

Table – 5 : Mine-head Stocks of Fluorite 2011-12 (P)
(By State)

(In tonnes)

State	At the beginning of the year	At the end of the year
India	**96891**	**91105**
Gujarat	88886	86107
Maharashtra	8005	4998

MINING

Ambadungar Fluorspar mine in Gujarat owned by GMDC is the largest fluorite mine in the country. Mining is carried out by opencast method, using heavy earth moving equipment of 0.9 cu m, 0.17 cu m hydraulic excavaters with 7 tonnes dumpers.

Maharashtra State Mining Corporation (MSMC) operates Dongargaon fluorite mines manually in Chandrapur district, Maharashtra. The run-of-mine was hand sorted for marketing.

RSMML carries out semi-mechanised opencast mining in Karara, Tavidar and Lakhawas areas in Jalore district, Rajasthan. Fluorite of different grade is obtained manually by hand breaking and sorting.

BENEFICIATION

Low grade fluorite produced is used after beneficiation in the industries. GMDC has a beneficiation plant of 500 tpd capacity located at Kadipani to produce acid grade (96% CaF_2) and metallurgical grade (90% CaF_2) fluorite. Upgrading the low grade fluorpar ore from 23-25% Caf_2 by flotation method. Besides, it has facility to produce MFC powder analysing 65 to 85% CaF_2 starch briquettes (81% CaF_2 min) and silicate briquettes (79% , CaF_2 min). Government of Gujarat has accorded approval for setting up beneficiation plant at Kadipani, district Vadodara in joint venture with M/s Gujarat Fluoro Chemicals Ltd Noida and M/s Navin Fluorine International Mumbai.

RSMML has a Pilot Beneficiation Plant located at Village Verdha, about 28 km from Dungarpur to process the mineral rejects (-20% CaF_2) lying in the mine. The plant has 10-15 tpd capacity to produce fluorite powder analysing 80-85% CaF_2. No production was reported in 2010-11.

The hand-picked high grade ore from Dongargaon mine of MSMC is beneficiated in a beneficiation plant by M/s SANBRO Corporation Ltd, situated at Waregaon, Koradi, Nagpur district, to produce fluorite concentrate.

CONSUMPTION

Fluorite consumption was 65,700 tonnes in 2011-12. The major consuming industry is the chemical industry which accounted for more than 78% of the total consumption reported. Industrywise consumption of fluorite is given in Table-6.

Table – 6 : Reported Consumption of Fluorite 2009-10 to 2011-12 (By Industries)

(In tonnes)

Industry	2009-10(R)	2010-11(P)	2011-12(P)
All Industries	**69900**	**97800**	**65700**
Alloy steel	2900 (9)	1900 (7)	1900 (7)
Aluminium	100 (3)	100 (3)	100 (3)
Cement	8900 (5)	9200 (3)	9200 (3)
Chemical	56000 (4)	84300 (5)	51400 (5)
Electrode	300 (5)	400 (6)	1700 (7)
Ferro-alloys	100 (3)	200 (3)	200 (3)
Foundry	100 (6)	100 (5)	100 (5)
Glass	100 (1)	100 (1)	100 (1)
Iron & steel	1400 (6)	1500 (6)	1000(7)
Refractories	++	++(1)	++(1)

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

SPECIFICATIONS

BIS has prescribed IS: 8587-1993 (First Revision, reaffirmed 2011) for acid grade fluorite for use in chemical industries, and IS: 4574-1989 (Second Revision, reaffirmed 2008) for fluorite in metallurgical industries.

USES

Acid grade fluorite is used as a feedstock in the manufacture of hydrofluoric acid (HF) and to produce aluminium fluoride (AlF_3). The major use of HF is for the production of a wide range of fluorocarbon chemicals, including hydrofluorocarbons (HFCs) hydrochlorofluorocarbons (HCFCs), and fluoropolymers. But, owing to environmental concerns, part of chlorofluorocarbons (CFCs) are replaced by HCFCs. HF is used in the manufacture of uranium tetrafluoride required to make nuclear fuel and fission explosives. It is also used in stainless pickling, petroleum alkylation, glass etching, oil & gas well treatment and as etcher/cleaner in electronic industry.

HF is used in the manufacture of a host of fluorine chemicals used in dielectrics, metallurgy, wood preservatives, herbicides, mouthwashes, decay-preventing dentifrices, plastics and water fluoridation.

AlF_3 manufactured from acid grade fluorite is used in electrolytic recovery of aluminium. On an average, world wide consumption of fluorides is about 21 kg for every tonne of aluminium produced. This ranged from 10 to 12 kg per tonne in a modern pre-baked aluminium smelter and about 40 kg in an old Soderberg smelter without scrubber.

Ceramic grade fluorite containing 85 to 95% CaF_2 is used in ceramic industry as a flux and as an opacifier in the production of flat glass, white or opal glass and enamels.

Metallurgical grade fluorite is used primarily as fluxing agent by steel industry. It is added to slag to make it more reactive through increased fluidity. Fluorite of different grades is used in the manufacture of aluminium, cement and glass fibres. It is also used in the melt shop by foundry industry.

INDUSTRY

Many fluorine-based chemicals like hydrofluoric acid, aluminium fluoride, cryolite, sodium silicofluoride and hydrofluorosilicic acid were produced by chemical and fertilizer industries in the country.

In addition to material produced indigenously, substantial quantity of high grade fluorite was also imported to meet the demand of the fluorine-based chemical industries.

The Tanfac Industries Ltd, is a joint sector company of TIDCO and Aditya Birla Group, at Cuddalore, Tamil Nadu. It is engaged in the manufacture of inorganic fluorine-based chemicals, such as, aluminium fluoride, anhydrous hydrofluoric acid, sodium silico fluoride, ammonium bifluoride, potassium fluoride, cryolite and various other fluorine-based chemicals. The company has an annual installed capacity of

16,500 tonnes of aluminium fluoride, 66,000 tonnes of sulphuric acid, 14,000 tonnes of hydrofluoric acid and 3,500 tonnes of speciality fluorines.

Navin Fluorine Industries Ltd, Surat, Gujarat, has an installed capacity of about 22,000 tpy of hydrofluoric acid. The Company produces a number of fluorine chemicals, namely, hydrofluoric acid, cryolite, aluminium fluoride and various other organic and inorganic fluorine-based chemicals.

Sterlite Industries (India) Ltd, a Vedanta Group Company, was planning to set up a high bulk density and low bulk density aluminium fluoride plant of 13,000 tpy capacity at or near Thoothukudi, Tamil Nadu as a joint venture. The plant will produce aluminium fluoride through hydro-fluorosilicic acid route.

Triveni Chemicals is engaged in manufacture of fluorides, fluoroborate, silico fluoride, etc. Similarly, Tarun Fluo-Chem Pvt Ltd, manufactures fluoroborates, fluorides, dilute hydrofluoric acid, fluoroboric acid, fluorotitanic acid, etc. Others who manufacture fluorine chemicals were : SB Chemicals and Jay Intermidiates & Chemicals (Vapi, Gujarat) and Madras Fluorine Pvt. Ltd, Chennai, etc.

Apatite and rock phosphate containing 3 to 4% CaF_2 was another useful source for recovery of fluorine. Coimbatore Pioneer Fertilizer Ltd has reported production of sodium silicofluoride in the past. Hydrofluorosilicic acid producing units were Rashtriya Chemicals & Fertilizer Ltd, Mumbai, whereas Dharamsi Morarji Chemical Co. Ltd, Ambernath, Maharashtra no longer report production of fluorine chemicals. . Aluminium fluoride was being produced by Southern Petrochemical Industries Corporation Ltd, Thoothukudi, Tamil Nadu with an installed capacity of 2,560 tpy.

SUBSTITUTES

Olivine or dolomitic limestone was used as substitute for fluorite in Iron & Steel industry. The by-product fluorosilicic acid from phosphoric acid production was used as a substitute in aluminium fluoride production.

ENVIRONMENT

Fluorine attracts environmental concern. Use of fluorine in drinking water has begun to wane. Fluorine is toxic in high concentration but beneficial in low concentration. Although fluorine has been under attack ever since its use in water in 1949, the only significant health problem with which it has been linked was `Fluorosis', a disease that involves health defects and bone lesions. This problem is caused by concentration of fluoride that is much higher than the permissible levels in municipal water supplies. As per Indian Standards, the permissible limit of fluoride in the drinking water is 1.5 mg/l. "Defluoridisation by adsorption" is a common economical and efficient method for removal of excess fluoride from drinking water. Electrolytic precipitation based on use of aluminium salts and by electrochemical route, etc. are the other few methods used for defluoridisation.

Fluorine is at the centre of controversy in chlorofluorocarbons (CFCs), which cause depletion of atmospheric ozone layer that protects the earth from ultraviolet radiation, a major cause of skin cancer. The hydrofluorocarbon (HFC) and hydrochlorofluorocarbon (HCFC) compounds, which have been developed as an alternative to CFC, require more hydrofluoric acid than CFC and are expected to boost fluorite consumption. These gases being greenhouse gases are being phased out. It is reported that even if CFC emission is stopped, the present level of these gases may take up to ten years to reach the upper atmosphere where they could persist for a century or more.

According to United Nations Environment Programme (UNEP) , an international agreement to curtail illegal trade in CFC and other ozone depleting chemicals came into effect on 10 November 1999. The agreement, which was authorised through an amendment to the Montreal Protocol in 1997, requires nations to create licensing system for international sales of ozone depleting chemicals. Further, as a part of the Montreal Protocol, 129 nations agreed on a three-year funding package to enable developing countries to continue their efforts to phase out CFC and other ozone depleting chemicals, and accordingly the Fund's Executive Committee approved major agreements with China and India to finance the shutdown of CFC production facilities in the two countries during the next ten years.

The United Nations Environment Programme (UNEP) has prepared a Montreal Protocol Handbook that provides additional detail and explanation of the provisions. CIESIN's Thematic Guide on Ozone Depletion and Global Environmental Change presents an in-depth look at causes, human and environmental effects, and policy responses to stratospheric ozone depletion.

WORLD REVIEW

World total reserves of fluorite were 240 million tonnes. World reserves are concentrated mainly in South Africa (17%), Mexico (13%) followed by China (10%) and Mongolia (9%) (Table - 7).

World production of fluorite in 2011 remained steady at 6 million tonnes. China (55%), Mexico (20%) and Mongolia (7%) were the principal producing countries (Table - 8).

Canada

Canada fluorspar Inc. and Arkema signed an agreement for reopening of the St. Lawrence flourspar mines located near St. Lawrence, New foundland & Labrador.

China

China remained the leading producer of fluorite with 3.3 million tonnes. The Chinese Government issued a new policy concerning hydrogen fluoride called industrial admittance conditions for hydrogen fluoride and was designed to protect fluorspar resource. The policy imposes conditions of captive mines, minimum capacity, etc. on new entrants and expansions and also bars purchase of fluorite from unlicensed companies.

Mexico

Mexico is the world's second largest producer after China, producing about 1.2 million tonnes of fluorite in 2011. Mexichem S.A.B. de C.V. (Tlalnepantla) announced that it had received permission to acquire Mexico's second leading fluorspar producer Florita de Mexico S.A. de C.V. (Mexico city) Florita de Mexico which, reported ly has more than 13 million tonnes of reserves mined high purity low arsonic fluorspar in the State of Coahuila. Mexichem intended to invest in the modernisation of Florita de Mexico's facilities and to insrease its annual production capacity.

Mongolia

During 2011, the Government had issued 139 mining licences and more than 700 exploration licences, and more than 120 entities were involved in some stage of the fluorspar mining industry. Eight companices operated or were constructing flotation mills. Mongolrostsvetmet LLC, USGS 2011, Boston International LLC (under construction), and Resource Min Korn LLC (under construction). The total capacity of these plants was 265,000 t/yr although only Mongolrostsvetment operated year round.

Namibia

The production of acid-grade fluorspar from Okorusu Fluorspar Pvt. Ltd, decreased to 94,000 tonnes in 2011 compared to 104 tonnes in 2010. The company which has always produced acid-grade fluorspar planned to commission a dense media separation plant to upgrade low grade fluorite ores.

South Africa

Sallies Ltd. (Pretoria) restarted fluorspar production at its Witkop Mine in March 2011, and by the end of June, had produced 32,000 wet metric tonnes of acid-grade fluorspar, and had exported 11,100 wet metric tonnes.

Sweden

Tertiary Minerals performed a resource definition drilling program and reported a maiden JORC compliant mineral resource in its Storuman fluorspar project in the Vasterbottens district. The results were an indicated and inferred mineral resource of 28 Mt grading 10.2% CaF_2 with 90% of the mineral resource reportedly in the "indicated" category.

A fluorspar mine capable of producing 100,000 tonnes per year of acid grade fluorspar with a mine life of 18 years, was feasible as per the study.

Table – 7 : World Reserves of Fluorite (By Principal Countries)

(In '000 tonnes)

Country	Reserves
World: Total (rounded)	**240000**
South Africa	41000
Mexico	32000
China	24000
Mongolia	22000
Spain	6000
Namibia	3000
Kenya	2000
Brazil	1000
Morocco	NA
Russia	NA
USA	NA
Other countries	110000

Source: *Mineral Commodity Summaries, 2013.*

Table – 8 : World Production of Fluorite (By Principal Countries)

(In '000 tonnes)

Country	2009	2010	2011
World: Total	**5800**	**5800**	**6000**
Brazil@	44	26	26
China(e)	3200	3300	3300
Iran	71	70(e)	**70**
Kazakhstan	66(e)	66	66
Kenya@	16	41	95
Mexico	1046	1067	1207
Morocco	72	90	79
Mongolia	460	367	404
Namibia	81	104	94
Russia(e)	240	250	250
South Africa	140	140	140
Spain	122	132	117
Other countries	242	147	152

Source: *World Mineral Production, 2007-2011.*
@ : Including beneficiated and directly shipped material.

Vietnam

Nui Phao polymetallic mining project was acquired by the Masan Group Corp, in 2011, Massan signed agreements for more than $200 million in additional project financing, commenced design work, acquired necessary equipment and began construction of earthworks and concerete works, and hired a mining contractor that started prestripping the orebody. Production was scheduled to begin in 2013 and would produce substantial amounts of bismuth, fluorspar, and tungsten, with lesser amounts of copper and gold. The mine was expected to produce an average of 207, 000 t/yr of acid-grade fluorspar.

FOREIGN TRADE

Exports

Exports of fluorite increased to 484 tonnes in 2011-12 from 390 tonnes in the previous year. Exports were mainly to Bangladesh (26%) and Kuwait (19%). Exports of aluminium fluoride were 3,361 tonnes in 2011-12 compared to 7,068 tonnes in the previous year. Exports were mainly to New Zealand (30%), UAE (55%) and Japan (14%). Exports of hydrofluoric acid in 2011-12 were 1660 tonnes against 1501 tonnes in the previous year. No exports of sodium fluoride were reported during 2010 - 11 & 2011-12 (Tables 9 to 11).

Imports

Imports of fluorite increased to 1.83 lakh tonnes in 2011-12 as compared to 1.61 lakh tonnes in the previous year. Imports were mainly from China (63%) and Kenya (20%). Imports of aluminium fluoride increased to 28,448 tonnes in 2011-12 from 13,988 tonnes in the previous year. Imports were mainly from China (90%). Similarly, imports of hydrofluoric acid also decreased to 1,061 tonnes in 2011-12 from 1,240 tonnes in the previous year. (Tables - 12 to 14).

Table – 9 : Exports of Fluorite (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹ '000)
All Countries	**390**	**4293**	**484**	**10939**
Bangladesh	-	-	126	2627
Israel	44	1023	52	1857
Brazil	-	-	39	1536
Kuwait	148	1324	92	1049
UAE	52	430	27	944
Indonesia	3	80	27	891
Philippines	-	-	20	770
Saudi Arabia	60	616	11	384
Kazakhstan	-	-	5	263
Kenya	-	-	8	259
Other countries	83	820	77	359

Table – 10 : Exports of Aluminium Fluoride (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹ '000)
All Countries	**7068**	**336250**	**3361**	**218050**
UAE	3264	113996	1865	86006
New Zealand	3216	169771	1012	80381
Japan	581	51904	469	50178
Philippines	-	-	10	822
Sweden	-	-	1	458
Germany	-	-	2	66
USA	++	8	1	41
Bangladesh	++	21	++	23
Thailand	-	-	++	22
UK	++	20	1	18
Other countries	7	530	++	35

Table – 11 : Exports of Hydrofluoric Acid (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹.'000)
All Countries	**1501**	**73834**	**1660**	**106472**
Korea, Rep. of	790	36449	946	52679
Singapore	99	8007	97	10797
Syria	45	2520	98	8616
Canada	130	5107	134	7844
Pakistan	-	-	88	6357
Philippines	53	3187	44	3603
USA	57	2352	54	3288
Turkey	55	2828	36	2831
Saudi Arabia	13	587	32	2295
UAE	14	783	41	2228
Other countries	245	12014	90	5934

Table – 12 : Imports of Fluorite (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹ '000)	Qty (t)	Value (₹ '000)
All Countries	**161925**	**2333963**	**183662**	**4639660**
China	134061	1958297	115701	3060930
Kenya	19288	276809	37115	920242
South Africa	-	-	14685	376003
Ukraine	-	-	2371	52659
Mongolia	2384	34388	2719	52658
Thailand	3383	24770	4635	42059
Germany	300	7360	1218	31396
UAE	226	2764	900	22867
Pakistan	1212	11903	1324	15597
Indonesia	-	-	500	14059
Other countries	1071	17672	2494	51190

Table – 13 : Imports of Hydrofluoric Acid (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹.'000)
All Countries	**1240**	**84867**	**1061**	**93803**
China	1189	79759	944	81308
Singapore	-	-	39	4440
Germany	3	210	26	3591
Chinese Taipei/ Taiwan	10	1072	31	2423
USA	1	373	19	1399
Netherland	-	-	2	551
Canada	-	-	++	67
Japan	++	309	++	16
Belgium	-	-	++	8
Other Countries	37	3144	-	-

Table – 14 : Imports of Aluminium Fluoride (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹.'000)
All Countries	**13988**	**659655**	**28448**	**2018783**
China	10879	525676	25712	1854202
Poland	-	-	720	60109
Indonesia	1895	73051	1100	46693
Jordan	-	-	604	39486
Italy	1214	60907	192	13438
Saudi Arabia	-	-	120	4848
UK	++	11	++	5
Other countries	++	10	++	2

FUTURE OUTLOOK

The resources of fluorite in India are limited and grades of fluorite produced do not meet the specifications of the chemical industry which is the bulk consumer of fluorite. Ambadungar Fluorspar Mine of GMDC is the only domestic source of acid grade fluorite, slightly inferior in quality with high phosphorus content. Hence, to meet the requirements, the domestic chemical industry will have to depend both qualitatively and quantitatively, on imported fluorite in the coming years, both for direct use and for blending with the domestic acid grade fluorite.

As per the Report of the Working Group for 12th plan period (2012-17) of the Planning Commission, the average total consumption of fluorite by all industries has been around 72,000 tonne per annum. The Working Group has estimated the apparent domestic demand of fluorspar at 185 thousand tonnes by 2011-12 and at 285 thousand tonnes by 2016-17 at 9% growth rate. The Working Group has recommended that cluster mining approach may be adopted in order to utilise the small deposits for further industrialisation of the mining area in the sector which will improve the workability of small mines. It has also suggested R&D for beneficiation and setting up of facilities to utilise fluorite from other parts of the country in the Chemical Industry.