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FLUORITE

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GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

Indira Bhavan, Civil Lines,
NAGPUR – 440 001

PHONE/FAX NO. (0712) 2565471
PBX : (0712) 2562649, 2560544, 2560648
E-MAIL : cme@ibm.gov.in
Website: www.ibm.gov.in

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12 Fluorite

Fluorite is a very popular mineral, and it naturally occurs in all colours of the spectrum. It is one of the most varied coloured mineral in the mineral kingdom, and the colours may be very intense and most electric. Pure fluorite is colourless and the colour variations are caused by various impurities. 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.The rich purple colour is by far the most famous and popular colour. It is an important commercial source of fluorine. Fluorite plays a vital role in the manufacturing Industry and major consuming industries are chemical, cement, iron & steel, electrode, etc. It is also used in the production of synthetic cryolite without which aluminium extraction is not possible.

Fluorite is commonly deposited by hydrothermal solution sourced from igneous intrusions. The mineralisation occurs as veins or replacement deposits either by the filling of cavities and fissures or by the replacement of the host rock, typically carbonates.

Mainly two grades of fluorite are involved in consumption and trade, namely, the Acid grade (acidspar) containing more than 97% CaF_2 and the Sub-acid grade analysing 97% or less CaF_2. The Sub-acid grade includes Metallurgical (60 to 85% CaF_2) and Ceramic (85 to 95% CaF_2) grades and is commonly known as Metallurgical grade (metspar). Fluorite production in the country is meagre when compared with the world production.

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.

RESERVES/RESOURCES

As per NMI database, based on the UNFC system, the total reserves/resources of fluorite in the country as on 1.4.2020 has been estimated at 20.99 million tonnes. Out of these, 0.40 million tonnes are placed under Reserves category (of which 0.23 million tonnes are under Proved category and 0.18 million tonnes under Probable category). The Remaining Resources comprise 20.59 million tonnes.

By States, Gujarat accounts for 68% of the total reserves/resources having 14.35 million tonnes, followed by Rajasthan with 5.60 million tonnes (27%), Chhattisgarh 0.54 million tonnes (3%) and Maharashtra 0.49 million tonnes (2%). Gradewise, the resources are classified into Marketable grade which accounted for 82% of the total resources followed by low grade (15%) and Unclassified grade (2%) (Table-1).

EXPLORATION & DEVELOPMENT

The exploration and development details, if any, are covered in the Review on Exploration & Development under "General Reviews".

PRODUCTION & STOCKS

The production of fluorite (graded) at 1,052 tonnes in 2020-21 decreased substantially by 20% as compared to the previous year.

There was only one reporting mine in both the years 2020-21 as well as in 2019-20. The entire output was reported from one Public Sector mine which is located in district Chandrapur of Maharashtra owned by Maharashtra State Mining Corporation Ltd. The mine-head closing stocks of fluorite (graded) was 97,818 tonnes in 2020-21 as against 97,749 tonnes in 2019-20 (Tables-2 to 5).

The average daily labour employed in fluorite mines in 2020-21 was 44 which was same in the previous year.

The domestic price of fluorite is furnished in the General Review on 'Prices'.

Table – 1 : Reserves/Resources of Fluorite as on 1.4.2020 (P)
(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	**228393**	**163860**	**11988**	**404241**	**9340556**	**771934**	**768573**	**1727945**	**6239589**	**1578067**	**161575**	**20588239**	**20992480**
By Grades													
Marketable	228393	163860	11988	404241	9313407	586080	384943	14112	5778178	509522	145183	16731425	17135666
Not Known	-	-	-	-	27149	26544	218430	-	-	43542	16392	332057	332057
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	-	-	-	-	8630000	-	-	-	5723360	1920	-	14355280	14355280
Maharashtra	222282	163860	-	386142	-	-	-	-	-	100000	-	100000	486142
Rajasthan	6111	-	11988	18099	644667	618802	759285	1542460	510656	1350059	161575	5587504	5605603

Figures rounded off

Table – 2 : Producer of Fluorite 2020-21

Name and address of producer	Location of mine	
	State	District
Maharashtra State Mining Corporation Ltd, Plot No. 7, Ajni Square, Wardha Road, Nagpur-440 015, Maharashtra.	Maharashtra	Chandrapur

Table – 3 : Production of Fluorite (Graded), 2018-19 to 2020-21 (By States)

(Qty in tonnes;Value in ₹'000)

State	2018-19		2019-20		2020-21 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	**1079**	**8117**	**1315**	**8844**	**1052**	**7897**
Maharashtra	1079	8117	1315	8844	1052	7897

Table – 4 : Production of Fluorite 2019-20 & 2020-21 (By Sector/States/Districts)

(Qty in tonnes; Value in ₹'000)

State/District	2019-20			2020-21 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	**1**	**1315**	**8844**	**1**	**1052**	**7897**
Public Sector	1	1315	8844	1	1052	7897
Gujarat	-	-	-	-	-	-
Vadodara	-	-	-	-	-	-
Maharashtra	**1**	**1315**	**8844**	**1**	**1052**	**7897**
Chandrapur	1	1315	8844	1	1052	7897

Table – 5 : Mine-head Closing Stocks of Fluorite, 2019-20 & 2020-21 (By States)

(In tonnes)

State	2019-20	2020-21 (P)
India	**97749**	**97818**
Gujarat	84371	84372
Maharashtra	13378	13446

MINING

Maharashtra State Mining Corporation (MSMC) operates Dongargaon fluorite mines in District Chandrapur, Maharashtra. Mining is carried out by semi-mechanised opencast method. The run-of-mine is hand sorted for marketing of fluorite (graded).

BENEFICIATION

Fluorspar is beneficiated by hand sorting followed by gravity concentration methods, such as, heavy media, jigs and tables in order to separate calcite and silicate mineral impurities. 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 by upgrading the low-grade fluorspar ore from 23–25% CaF_2 by flotation method. Besides, it has facility to produce MFC & MET grade powder analysing 75 to 85% CaF_2 & 85 to 92.5% CaF_2, respectively and other products, such as, starch briquettes (81% CaF_2 min.) and silicate briquettes (79% CaF_2min.). As per annual report of GMDC 2020-21, the Government of Gujarat has accorded approval for setting up beneficiation plant of 40,000 MTPA capacity at Kadipani, district Vadodara, in joint venture with Gujarat Fluoro Chemicals Ltd, Noida and Navin Fluorine International, Mumbai. Based on pilot test report, Global tender will be floated for selection of EPC contract. Valuation report for Kadipani assets has been received, on which basis, land will be leased to JV Company and asset transfer will be carried out in favour of JV Company.

CONSUMPTION

The apparent consumption of fluorite was about 3,24,704 tonnes in 2019-20, as against the 2,64,752 tonnes in 2018-19.

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, an important ingredient used for producing 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 as a flux in electrolytic recovery of aluminium. On an average, worldwide 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. The addition of 10–30% Ceramic grade fluorspar to glass makes it opaque, white and opalescent. It is also used in the manufacture of magnesium, some manganese chemicals and welding rod coating.

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 are 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 Tami Nadu Industrial Development Corporation (TIDCO) and Aditya Birla Group at Cuddalore, Tamil Nadu. It is engaged in the manufacture of fluorine chemicals, such as, aluminium fluoride, anhydrous hydrofluoric acid, sodium silicofluoride, ammonium bifluoride, potassium fluoride, and various other fluorine-based chemicals. The Company has an annual installed capacity of 15,600 tonnes each of aluminium fluoride and anhydrous hydrogen fluoride, 67,200 tonnes of sulphuric acid, 14,000 tonnes of hydrofluoric acid and 3,400 tonnes of speciality fluorides,Though the Company's sales performance had decreased by 10% due to reduction in sale price of sulphuric Acid,due to spurt in the volume and realization of one of its Value-Added Products (VAP),Earnings before Depreciation,Interest and Tax (EBDITA) had gone up by 25% compared to previous year.

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.

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. Similarly, hydrofluorosilicic acid was reportedly produced by Rashtriya Chemicals & Fertilizer Ltd, Mumbai, whereas Dharamsi Morarji Chemical Co. Ltd, Ambernath, Maharashtra no longer reported production of fluorine chemicals.

Aluminium fluoride is produced by Southern Petrochemical Industries Corporation Ltd, Thoothukudi, Tamil Nadu, with an installed capacity of 2,560 tpy.

SUBSTITUTES

Olivine or dolomitic limestone can be used as substitute for fluorite in Iron & Steel industry. The by-product fluorosilicic acid from phosphoric acid production could also be 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 over chlorofluorocarbons (CFCs), which causes 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 greenhouse gases are being phased out in stages. 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 10th 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.

The use of the low global warming Potential (GWP) hydrofluroolefins refrigerant HFO-1234 yf is suggested as a preferred replacement of HFC- 134a by both the U.S. Environmetal protection Agency and the EU. Daimler in Europe has opted for CO_2 based air conditioning refrigerant in its 2017 Mercedes E and S class cars.

WORLD REVIEW

The world total reserves of fluorite fluorspar were at 320 million tonnes.World reserves are concentrated mainly in Mexico (21%), China & South Africa (13% each), Mongolia (7%) and Spain (3%) (Table- 6).

World production of fluorite in 2020 decreased marginally by 3% to 6.50 million tonnes as compared to 6.70 million tonnes in the previous year (Table-7).

China (66%), Mexico (14%), South Africa (5%) Spain & Vietnam (3% each) and Mongolia (2%) were the principal producing countries of fluorite in 2020.

To provide generalised view of the development in various countries, the countrywise description as sourced from the latest available publication of Minerals Yearbook 'USGS 2017' is furnished below :

Canada

Canada Fluorspar Inc. (CFI)(St.Lawrence, Newfoundland and Labrador) continued development of its project in Newfoundland and Labrador Burin Peninsula. CFI's resources totalled 8.8 million tonnes of fluorspar from four vein deposits, including the AGS, Blue Beach North, Director and Tarefare veins, which together had an average grade of 39% CaF_2. The mine officially opened in August, and construction continued on the 2,00,000-metric-ton-per-year flotation mill. Ore from three open pits would be stockpiled until the mill is commissioned. First production of acid-grade concentrate was expected in early 2018.

Morocco

Groupe Managem (Casablanca) reported acid-grade concentrate production of 56,395 tonnes from the El Hammam Mine operated by Samine, a 15% decrease from that of 2016. In response to the decrease in Acid-grade concentrate production, the Company increased production of Metallurgical-grade fluorspar for use in the cement market by more than five times that of 2016.

South Africa

in July, 2016, SepFluor Ltd began construction on the Nokeng Mine and milling project in Rust de Winter, Gauteng Province. Nokeng is located in the Bushveld Complex directly south of the Minersa Group's Vergenoeg Mine, the country's only operational fluorspar mine. Open pits would be developed at two of three fluorspar-haematite deposits that make up the Nokeng Mine—the Outwash Fan, which has an average ore grade of 22.7% CaF_2, and Plattekop, which has an average ore grade of 38.2% CaF_2. A processing plant with a capacity of 1,80,000 tonnes/year of Acid-grade fluorspar and 30,000 tonnes/year of Metallurgical-grade fluorspar was designed to accommodate different types of ore. The estimated life of the mine was 19 years, and first production was expected in early 2019.

Vietnam

Nui Phao Mining Co. Ltd produced Acid-grade fluorspar as well as bismuth, copper, and tungsten concentrates from its Nui Phao polymetallic mine in Thai Nguyen Province in northern Vietnam. The Company had reported increased production of fluorspar each year since the mine went into operation in 2014. The production increases were attributed to the implementation of successive capital upgrades to increase ore throughput and enhance recovery rates, particularly in the tungsten and fluorspar processing circuits. Mill recovery rates of fluorspar increased to 57% in 2017 from 49% in 2016, which resulted in an 8% increase in fluorspar production.

Table – 6 : World Reserves of Fluorspar Fluorite (By Principal Countries)

(In '000 tonnes)

Country	Reserves#
World: Total (rounded)	**3,20,000**
Burma	NA
Canada	NA
China	42,000
Germany	NA
Iran	3,400
Mexico	68,000
Kazakhstan	NA
Mongolia	22,000
Morocco	210
Pakistan	NA
South Africa	41,000
Spain	10,000
USA	4,000
Vietnam	5000
Other countries	1,20,000

Source: *USGS, Mineral Commodity Summaries,2022*
 # Measured as 100% calcium fluoride

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

(In tonnes)

Country	2018	2019	2020
World Total	**6400000**	**6700000**	**6500000**
China*	4000000	4300000	4300000
Mexico	1182058	1231465	914597
South Africa*	242000	210000	320000
Vietnam	238702	238003	219920
Mongolia	101200	156100	127300
Spain	176188	145185	185958
Morocco	87874	73240	70000*
Iran(c)	89102	49705	50000
Kazakhstan	100000*	87800	88000*
Other countries	142923	171129	184488

Source : *BGS, World Mineral Production, 2016-20*

**) Estimated*

c) Year ended 20 March following that stated

FOREIGN TRADE

Exports

Exports of fluorite decreased by 63% to 474 tonnes in 2020-21 from 1,368 tonnes in the previous year. Exports were mainly to Indonesia (53%), Philippines & Oman (9% each), Jordan (6%), Brazil, Qatar & Bangladesh (4% each) and UAE (3%). While, exports of aluminium fluoride increased by 50% to 2,045 tonnes in 2020-21 as compared to 1,362 tonnes in the previous year. Exports were mainly to UAE (88%), Japan (6%) and Turkey (5%). Exports of hydrofluoric acid decreased by 22% to 1,931tonnes in 2020-21 as compared to 2,474 tonnes in the preceding year (Tables- 8 to 10).

Imports

Imports of fluorite decreased marginally by 8% to 2.21 lakh tonnes in 2020-21 as compared to 2.40 lakh tonnes in the previous year. Imports were mainly from South Africa (64%), Thailand (12%),Vietnam (8%),and China (6%). Imports of aluminium fluoride however, increased substantially by 52% to 61,225 tonnes in 2020-21 from 40,362 tonnes in the previous year. Imports were mainly from China (37%), Italy (22%), Qatar (12%), Mexico (11%) and UAE (9%). While imports of hydrofluoric acid more than doubled to 2,095 tonnes in 2020-21 from 969 tonnes in the preceding year. Imports were mainly from China (48%), Sri lanka (23%) and Germany (20%) (Tables- 11 to 13).

Table – 8 : Exports of Fluorite (By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**1368**	**51562**	**474**	**22436**
Indonesia	466	24719	249	13604
Philippines	44	2155	44	2297
Brazil	47	3334	17	1218
Qatar	25	1173	21	1099
Jordan	16	676	28	1069
UAE	++	25	14	621
Bangladesh	47	1237	20	570
Oman	-	-	44	488
Israel	-	-	10	478
Togo	-	-	6	255
Other countries	723	18243	21	737

Figures rounded off

Table – 9 : Exports of Aluminium Fluoride (By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**1362**	**120976**	**2045**	**187158**
UAE	1100	101073	1800	170576
Japan	140	14362	120	13790
South Africa	122	5481	24	1277
Turkey	-	-	100	1245
UK	-	-	1	135
Belgium	-	-	++	120
Germany	++	9	++	9
Kuwait	-	-	++	6
Bhutan	-	-	++	++
Singapore	++	33	-	-
Other countries	++	18	-	-

Figures rounded off

Table – 10 : Exports of Hydrofluoric Acid (By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**2474**	**237996**	**1931**	**164258**
Thailand	650	74802	489	56720
USA	357	33221	544	36901
Saudi Arabia	269	30388	202	22211
Turkey	280	15783	348	18792
Singapore	90	19004	36	7998
Japan	55	5204	87	6720
Australia	143	7720	91	4186
Korea Rp	-	-	16	1981
Spain	17	1302	23	1918
Indonesia	-	-	18	1554
Other countries	613	50572	77	5277

Figures rounded off

Table – 11 : Imports of Fluorite
(By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**239589**	**7225937**	**220573**	**6090596**
South Africa	89467	2700348	141117	3858569
Thailand	35719	1132821	27492	696512
Vietnam	7989	224040	16980	540087
China	82424	2482331	14089	433550
Canada	72	2461	4015	119504
Hong Kong	2176	58172	3680	102833
Morocco	9612	329740	3127	94265
UAE	4041	89781	3534	74254
Spain	2106	42152	1778	45304
Netherlands	3279	97955	1100	33761
Other countries	2704	66136	3661	91957

Figures rounded off

Table – 12 : Imports of Hydrofluoric Acid
(By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**969**	**89459**	**2095**	**177923**
China	616	59287	1016	86508
Germany	76	7328	424	40235
Sri Lanka	-	-	487	38386
Taiwan	276	20971	167	12173
USA	++	179	++	307
Spain	++	18	++	134
Japan	1	1069	1	102
Belgium	++	96	++	78
Swedan	++	438	-	-
UK	++	65	-	-
Other countries	++	8	-	-

Figures rounded off

Table – 13 : Imports of Aluminium Fluoride (By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**40362**	**3791019**	**61225**	**4805867**
China	19842	1930671	22846	2014359
Italy	5832	559817	13284	1156118
Mexico	2500	306144	7000	576887
UAE	-	-	5324	494244
Hong Kong	-	-	2484	245723
Indonesia	4320	377171	1140	103653
Qatar	221	2798	7496	94853
Jordan	6015	449707	1020	74328
Lithuania	-	-	600	42817
Sri Lanka	-	-	23	2220
Other countries	1632	164711	8	665

Figures rounded off

FUTURE OUTLOOK

The major driving factors for fluorite market are the growing Chemical Industry and increasing use of fluorite in Cement, Iron & Steel, Glass Industries. The Chemical Industry and Glass Industry account for the major share of the fluorite demand globally. As per TANFAC Annual Report 2020-21,Global Fluorochemical market is estimated around 5 million tonnes in 2020 (US$ 20 billion) and expected to grow at a CAGR of 3.5% and reach USD 26 billion by 2026. Asia Pacific accounted for significant share of the global market and expected to reach USD 4 billion by 2026. The growing industrialisation in emerging economies like China, India and South East Asian countries will continue to increase demand for refrigerants. The rapidly growing demand of air-conditioning and refrigeration systems in the domestic and industrial sectors is expected to drive the growth for fluorochemicals.

Due to pandemic, the demand for fluorochemical in health care sectors have increased during the year and with significant spend in R&D, it is expected use of fluorine compound in the manufacture of pharma products will increase in future. Added to this the growing preference for electric vehicles will also drive the demand for fluorochemicals. However, the industry will face challenges like increased regulatory restrictions from the Governments, environment scrutiny due to growing environment concerns, etc., China is one of the largest Fluorine producing and consuming countries in the world and the market size is expected to grow to USD 5 billion by 2026. Auto industry is expected to make a strong comeback Worldwide with the impending launch of electric vehicles which will strengthen demand of fluorochemicals in the production of aluminium and electric components.

Indian Chemical industry, 6th largest in the world, is expected to contribute around 7% to India's GDP. Specialty chemicals alone constitutes 45% of the

Indian Chemical Market and expected to grow at CAGR 10% till 2025 from the current level of USD 30 billion.

In India, the market growth of fluorochemicals is driven by downstream sectors like Automobile, Air Conditioning, Refrigeration, Construction, Cold Storage and Pharma / Life Science segments, Life Science segment has emerged one of the key drivers over the years. India is expected to become 4th largest chemical producer in the world by 2030,benefitting from rising export opportunities, stability of prices, faster end user industry growth and low penetration of specialty chemicals.

As per USGS report, improvements in steel making technology have also reduced the unit consumption of fluorite per unit tonnes of steel produced. In less developed countries, the quantity of fluorite used as a flux in steel making continues to be much higher, but further efficiency improvements are expected to moderate growth.

As on 01.04.2020, the resources of fluorite in India are20.99 million tonnes which is considered to be limited. 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.