Emkay©

Your success is our success

DECODING THE FLUORINE CHEMISTRY

Fluorine containing sophisticated compounds will see a massive upcycle

Chinese companies have scaled up capacities, but largely for commodities

Indian companies stand to benefit from growing innovator interests

Specialty Chemicals

Decoding The Fluorine Chemistry

Emkay
Your success is our success

Sector Report | **Fluorochemicals** | **October 15, 2023** | **NIFTY 50: 19,751**

Organic fluorine molecules are increasingly becoming ingredients of newer agrochemicals, pharmaceuticals, and electronic chemicals. Earlier, Chlorine and Hydroxyl groups were used due to their abundant availability and ease of handling. This was mainly because fluorine imparts desirable properties such as metabolic and thermal stability, increased bioavailability, and lipophilicity in fluorinated compounds, making their applications much more attractive for different end-uses. Fluorine handling is challenging, given its high reactivity; only a limited number of players have fluorine handling experience and are now reaping the benefit of the structural acceptance of fluorinated compounds. In the new products pipeline, fluorine penetration has surged to 50% from 30% for agrochemicals and to 40% from 20-25% for pharmaceutical molecules, over the last few years. Sophisticated molecules that are more heterocyclic and complex in nature are expected to be at the forefront of this structural shift.

Meet Vora
meet.vora@emkayglobal.com
+91 22 6624 2474

Meet Gada
meet.gada@emkayglobal.com
+91 22 6612 1235

Fluorine-containing sophisticated compounds will see a massive upcycle

Based on our interactions with several global experts in fluorine chemistry, the structural shift in fluoro-agrochemicals and fluoro-pharmaceuticals will be more skewed towards sophisticated molecules. Sophisticated molecules are more heterocyclic, possibly, with a pyrazole or pyridine ring attached to them. Companies that already have basic building blocks in place and are integrated across the value chain will be able to penetrate such molecules much faster. De-risking the key raw material (RM)/building block will be crucial for companies, going ahead. We believe some Indian companies have such capabilities and are well-positioned to capitalize on these opportunities.

Chinese companies have scaled up capacities, but largely for commodities

The past five years have seen aggressive capacity expansions by Chinese players in fluorine chemicals. Such expansions have been largely skewed towards commodity-grade fluorine chemicals. China has ~65% share of the global hydrofluoric acid (HF) capacity. Chinese players have increased their overall refrigerant-gases capacity by 50% over FY18-20 and nearly doubled their fluoropolymers capacity over FY21-23. They have also pushed up their fluorine containing fine-chemical capacities by ~2x, a large part of which is towards commodities or basic building blocks. China's self-sufficiency in refrigerants, fluoropolymers and fluorine fine chemicals is over 200%. Policies related to the protection of fluorspar resources are gradually tightening in China, and supervision is increasing.

Indian companies stand to benefit from growing innovator interests

Navin Fluorine (NFIL), SRF, and Gujarat Fluorochemicals (GFL) have developed competencies in fluorine chemistry over the past few decades. Anupam Rasayan (Anupam) with its strategic acquisition of Tanfac has secured access to the key RMs and is gradually ramping up its fluorination capabilities. Most of these players have announced huge capex plans, totaling ~Rs200bn over the next 5 years, especially in their fluorine business, indicating a long growth runway. We believe contract manufacturers with established fluorine building blocks, integrated value chains, and expertise in synthesis at all scales will be in a sweet spot to capture such opportunities. We initiate coverage on the sector with a BUY on SRF/Anupam, HOLD on NFIL, and SELL on GFL.

Rating, Target Price and Valuation

	Rating	CMP (Rs)	TP (Rs)	Upside (%)	P/E (x) FY25E	P/E (x) FY26E	EV/EBITDA (x) FY25E	EV/EBITDA (x) FY26E
SRF	BUY	2,255	2,700	20	30.7	24.1	17.7	14.7
Anupam Rasayan	BUY	884	1,050	19	30.5	21.8	17.7	13.5
Navin Fluorine	HOLD	3,692	4,050	10	29.0	25.8	20.4	17.4
Gujarat Fluorochemicals	SELL	2,860	2,500	(13)	30.9	26.5	20.6	17.5

Source: Company, Emkay Research

Investment Thesis

Fluorinated molecules: To see multi-year upcycle

Based on our interactions with global experts on fluorine chemistry, sophisticated molecules that are more heterocyclic in nature, we will see a massive upcycle. Fluorinated molecules have gained interest in the fields of agrochemical, pharmaceutical, and electronic chemicals. Presently, about 30% of the commercial agrochemicals are fluoro-agrochemicals and around 20% of the commercial pharmaceuticals are fluoro-pharmaceuticals. Penetration of fluorine in molecules under the pipeline over the last few years has been on the rise and we believe the trend will continue going forward. Within the portfolio of fluorinated molecules, complex molecules with more targeted and advanced applications will be sure winners.

Companies around the world with rich experience in handling fluorine and backward integration across the value chain are reaping the benefits of this structural shift. India imports several fluorinated building blocks and key intermediates today, but we see several opportunities for manufacturing these in-house, given the enhancement in capabilities of Indian companies over the last few years. *The key for players is: i) developing the right method of fluorination, ii) developing the right building block, iii) capability to handle higher volumes, iv) portfolio leaning towards more sophisticated molecules, v) entering the right life-cycle phase of the molecule, vi) being backward integrated, and vii) de-risking the final end-use of the entire portfolio.*

Refrigerants: Phase down-led cycles to continue

Vintage refrigerants are being phased out by new-age refrigerants, which have both—low global warming potential (GWP) and ozone-depleting potential (ODP). The Montreal Protocol provides a broad framework for phase-down of refrigerant gases which was further accelerated by the Kigali amendment. All countries have committed to legally binding targets, which mandate gradual reductions in hydrofluorocarbon (HFC) consumption & production, starting from 2019 for developed countries and from 2024 for developing countries.

There is a strict factual connection between measures targeting refrigerant gases and their prices that lead to cycles. Following the economic law of demand and supply, higher ambition in the phase-down scheme of HFCs would automatically trigger higher prices of these substances. HFCs with a higher GWP will find it harder to access the market, and their prices will surge by 5-6x compared with those of low-GWP gases. Moreover, quotas will need to be used for purchasing a reduced bucket of available substances, and the higher the GWP of a substance, the higher the cost.

We believe USA has seen this upcycle in FY23 and prices of high-GWP gases will largely start correcting from Jan-24, post the first major cut in consumption/production from 90% to 60%. India is on the verge of seizing quotas from Jan-24 to Dec-26 for baseline determination, and capacities will largely peak by Dec-23, leading to Indian players selling more volumes for seizing their higher share of quotas from Jan-24.

Fluoropolymers: Strong visible demand, albeit long gestation

Fluoropolymers are seeing high growing potential from use in sunrise industries like EV batteries, solar panel manufacturing, and semiconductors, which is propelling fluoropolymer capacities at a rapid pace across China, India, and the USA. Within the fluoropolymers portfolio, we believe PTFE (polytetrafluoroethylene) is matured and will likely post a mid-single-digit growth going forward. PVDF (polyvinylidene fluoride) will be the next big fluoropolymer, propelled by the rising demand for EV batteries and solar panels. PFA (perfluoroalkoxy alkane) will also clock good growth, on the back of increasing use in semi-conductor applications.

Perceiving such demand, Chinese players have added huge capacities in all fluoropolymers and will be the dominant players driving the market. Currently, they are present in the basic commoditized grade, but based on our industry interactions, they have plans to enter value-added grades. Moreover, capacities in fluoropolymers are being created by natural extension of HCFCs' phase-out. The fluoropolymers business is characterized by long gestation, as fluoropolymers are not catalog products. Establishing the basic grade takes time and it is only after this that players are equipped to move up the chain for value-added products. A structural ban on PFAS is being contemplated by European countries to protect their environment, as some studies show the negative impact of fluorine deposits emitted during the fluoropolymer manufacturing process. While this is still under review and will see a decision in CY25, we believe alternatives will be found for replaceable applications, while essentials will stay put.

Indian companies in a sweet spot

We believe Indian companies involved in fluorination are in a sweet spot, boosted by i) their decadal experience in handling fluorine, ii) backward-integrated capacities with established building blocks, and iii) the move of global innovators towards finding an alternate supplier, besides China. We initiate coverage on the Specialty Chemicals sector with a BUY recommendation for SRF (Master of all trades) and Anupam (Moving in the right direction), a HOLD on NFIL (Fluorinating spot-on), and a SELL on GFL (Leader in fluoropolymers, expanding in adjacencies). We prefer SRF and Anupam among our coverage universe, owing to:

- **SRF** is an absolute leader in the space, with a presence across the value chain and complete backward integration. We are more bullish on the company's specialty chemicals portfolio; based on our analysis and industry interactions, we derive that SRF has the capability of handling some of the most complex molecules globally. Its world-class R&D facility and a strong pipeline of molecules will aid its leap into the specialty chemicals universe. Further, we acknowledge that there is no significant business leadership churn in SRF. While there may be near-term hiccups in FY24, on higher agro channel inventory and correction in ref gas prices, we believe it will be the best time to BUY into SRF on FY24 dips.
- **Anupam**, after the acquisition of Tanfac, has secured supply to key RMs and is aggressively building up its core R&D strength. It has plans to double its R&D team in FY24, with a focus on the fluorination portfolio. Anupam's emphasis on targeted agro/pharma molecules and decades of client relationships will drive synergies with its existing portfolio. It has signed numerous LOIs over the last few quarters which provide strong long-term revenue visibility. For Anupam too, there is no significant business leadership churn; we recommend a BUY on FY24 slowdown-led dips to gain from the contributions of LOIs over FY25-26E.
- **NFIL** has, in the last 3-4 years, scaled up its businesses with a focus on specialty chemicals, post-change in business leadership in FY19. This drove strong revenue & earnings growth over FY19-23 for NFIIL. But we do not like its excessive historical business leadership churn. The recent exit of MD raises some concerns about medium-term growth, and the new MD may take some time to attune to the structural path of the business; hence, we recommend a HOLD on NFIL and staying watchful of further developments in senior leadership.
- **GFL** is a leader in fluoropolymers and is foraying into battery chemicals; however, FY23 was a significantly high-growth year for the company's other businesses which will normalize going forward. We believe PTFE is a matured market and GFL will take some time to ramp up capacity utilization in new fluoropolymers, owing to the long gestation, which will be further elongated by the FY24 slowdown. We believe some part of this business rationalization is yet to be factored into the stock price and, hence, recommend a SELL on GFL. Our turning constructive on the stock is contingent on any strong ramp-up in their new fluoropolymers business (PVDF, PFA, FKM) which we believe is still some time away.

Exhibit 1: Peer valuations

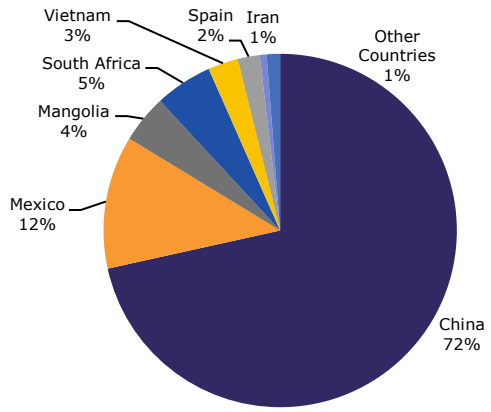
Peers (Domestic)	Ratings	P/E (x)			EV/EBITDA (x)			RoE (%)		
		FY24E	FY25E	FY26E	FY24E	FY25E	FY26E	FY24E	FY25E	FY26E
SRF	**BUY**	**37**	**31**	**24**	**21**	**18**	**15**	**16**	**17**	**18**
Anupam Rasayan	**BUY**	**46**	**30**	**22**	**23**	**18**	**13**	**8**	**11**	**15**
Navin Fluorine International	**HOLD**	**39**	**29**	**26**	**28**	**20**	**17**	**20**	**23**	**22**
Gujarat Fluorochemicals	**SELL**	**35**	**31**	**26**	**24**	**21**	**17**	**15**	**15**	**15**
Aarti Industries	NR	37	25	21	18	14	12	9	12	14
Atul	NR	40	31	23	25	20	16	10	12	15
Camlin Fine Sciences	NR	17	11	12	16	22	7	13	17	19
Clean Science & Technology	NR	51	40	28	37	28	21	25	26	30
Deepak Nitrite	NR	32	23	20	21	16	13	20	22	22
Fine Organic Industries	NR	35	33	29	25	24	21	25	22	21
Galaxy Surfactants	NR	27	24	21	18	16	14	17	17	17
Laxmi Organic Industries	NR	40	28	33	22	16	16	12	15	12
Neogen Chemicals	NR	62	41	32	32	23	17	13	17	18
P I Industries	NR	34	29	25	25	21	18	19	19	18
Rossari Biotech	NR	31	23	21	16	13	13	15	17	NA
Sudarshan Chemical Industries	NR	28	18	14	13	10	9	12	16	17
Vinati Organics	NR	42	32	25	32	24	19	18	21	22

Source: Bloomberg, Emkay Research; Note: Standalone numbers for Anupam Rasayan

Table of contents

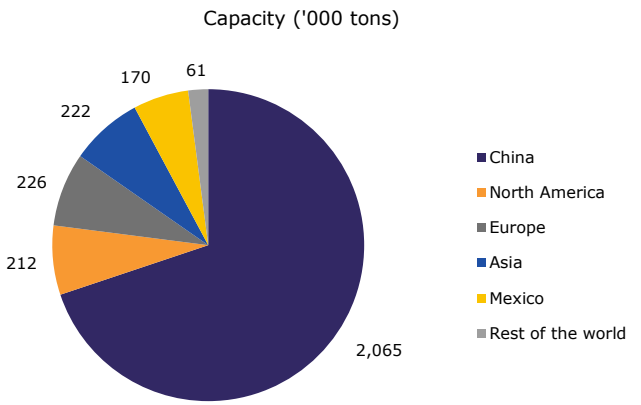
Story in Charts

Exhibit 2: China leads the world's fluorspar production



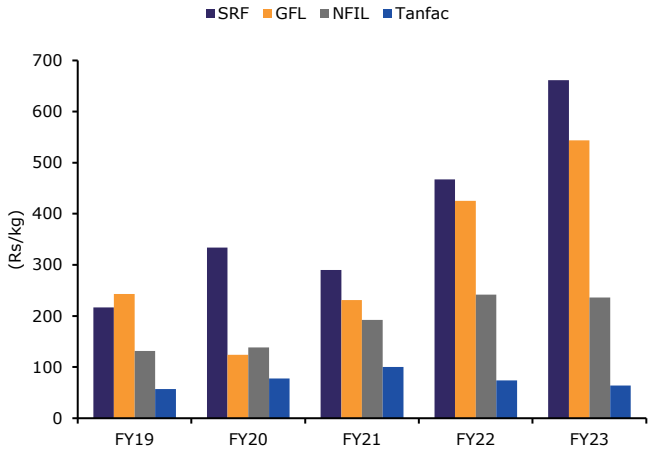
Source: Industry, Emkay Research

Exhibit 3: Global HF capacity stands at ~3mn ton in 2023



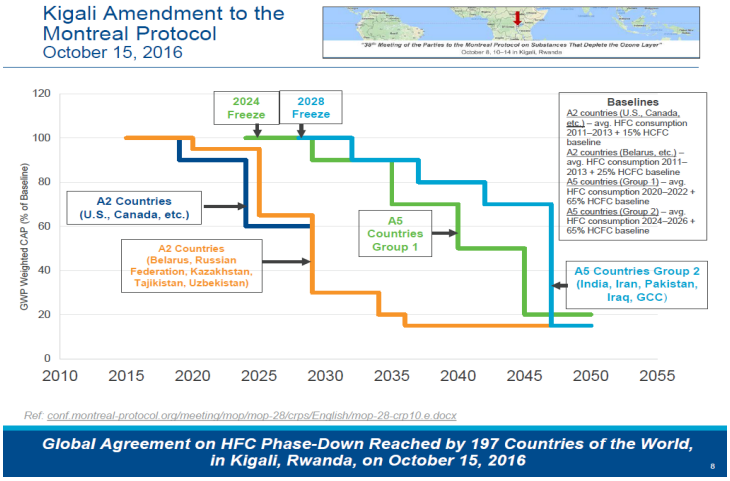
Source: Industry, Emkay Research

Exhibit 4: EBITDA per kg of HF consumed by Indian players



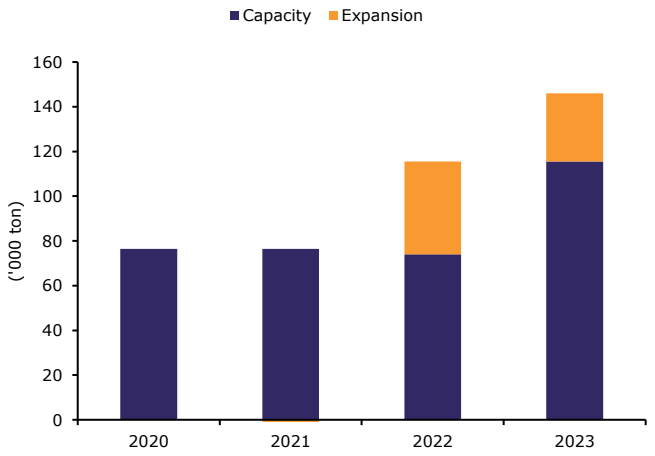
Source: Company, Emkay Research

Exhibit 5: HFC phase down, as per The Montreal Protocol



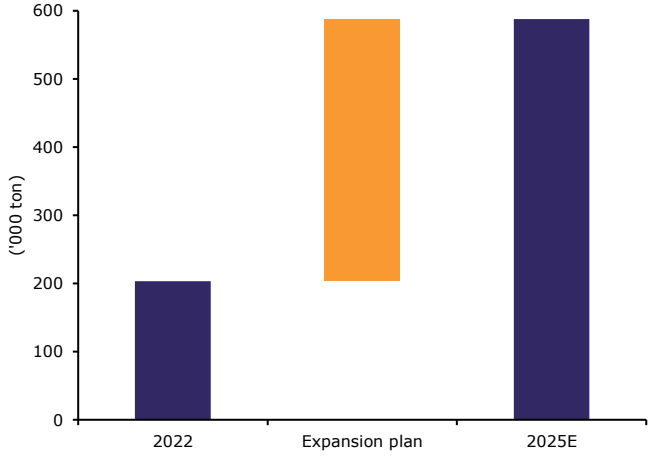
Source: Industry

Exhibit 6: Chinese PVDF capacity expansion on the rise



Source: Industry, Emkay Research

Exhibit 7: Global $LiPF_6$ capacity expansion on the rise



Source: Industry, Emkay Research

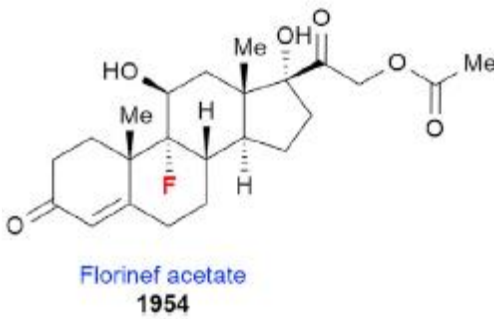
Why has fluorine chemistry gained traction in recent years

The introduction of fluorine uniquely affects the properties of organic molecules through strong polar interactions due to the atom's high electronegativity and small size. Fluorination of molecules often imparts desirable properties such as metabolic and thermal stability, increased bioavailability, and lipophilicity, and thus over the last few years, fluorinated molecules have gained particular interest in the fields of agrochemical, pharmaceutical, and performance chemicals. The introduction of fluorine molecules to agrochemicals and pharmaceuticals traces back to more than half a century; however, in recent years, fluorination chemistry has gained traction owing to progress in the synthetic methodology used to obtain organofluorine compounds and approval by regulatory authorities.

Exhibit 8: First fluoro-agrochemical

Source: Industry

Exhibit 9: First fluoro-pharmaceutical



Source: Industry

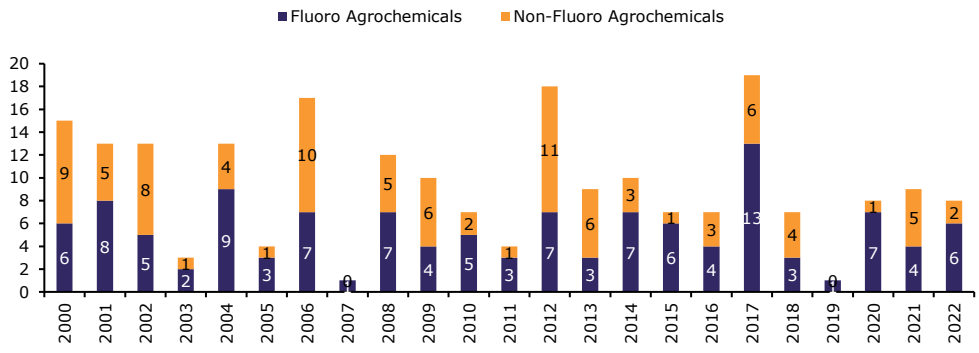
Snapshot of fluorinated molecules in the agrochemical industry

Fluorinated molecules have seen increased acceptance in the agrochemical industry

The first fluoro-agrochemical, Trifluralin (selective pre-emergence herbicide used for the control of annual grasses and certain broadleaf weeds), was brought into the market in 1963. However, it is only over the last two decades that fluoro-chemicals have been associated with significant advances in the agrochemical development process.

The rise in the number of organofluorine compounds in the agrochemical market is well supported by the significant progress that has been made in synthetic organofluorine chemistry. Presently, about 30% of the total commercial agrochemicals are fluoro-agrochemicals (~65% of the molecules registered in the last 5 years contain fluorine).

Exhibit 10: Number of fluoro agrochemicals assigned new common ISO names over last 20 years



Source: Industry, Emkay Research

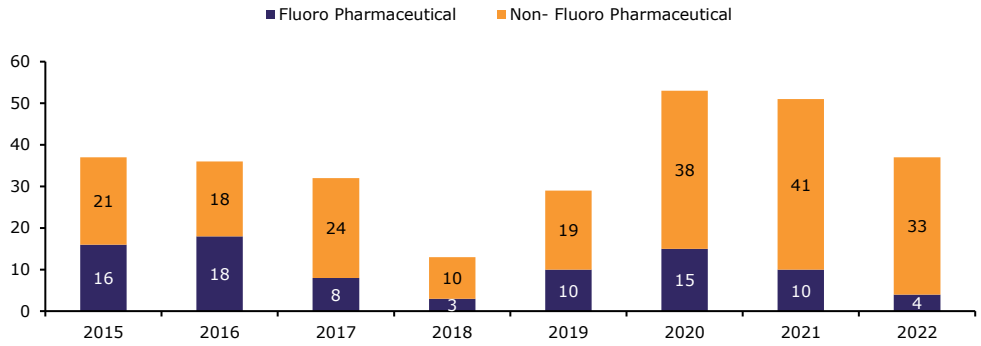
Snapshot of fluorinated molecules in the pharmaceutical industry

The first fluoro-pharmaceutical — Florinef acetate (synthetic corticosteroid) — was brought to the market in 1954. Inspired by the success of fluorinated corticosteroids in the 1950s and fluoroquinolones in the 1980s, fluoro-pharmaceuticals have been attracting attention for more than half a century. In recent years share of fluorine-containing molecules of the total fluoro-pharmaceuticals registered each year has significantly increased.

At present, ~20% of the commercial pharmaceuticals are fluoro-pharmaceuticals

The high prevalence of fluoro-organic compounds among pharmaceuticals can be explained by several factors. First, fluorine (F) is the second-smallest atom after hydrogen (H) in the periodic table; thus, the replacement of an H atom in a drug candidate with F does not drastically change the parent structure. Second, the C-F bond is the strongest bond that carbon can form, which often increases the metabolic stability of fluoro-pharmaceuticals. Third, as the most electronegative element, F induces bond polarization, which may alter the lipophilicity/hydrophilicity balance of a compound. Presently, about 20% of the commercial pharmaceuticals are fluoro-pharmaceuticals (~40% of the molecules registered in the last 8 years contain fluorine).

Exhibit 11: Number of fluoro pharmaceuticals approved over the last 8 years



Source: Industry, Emkay Research

Fluorochemicals industry

The fluorochemicals industry, currently estimated at USD27bn, is expected to clock a CAGR of ~6% over the next decade. Fluorochemicals have a wide range of applications, which have increased over time with more advanced research and development, newer end-use applications, and the development of synthetic techniques to incorporate fluorine. This market largely comprises fluorocarbons, fluoropolymers, organic and inorganic compounds.

Fluorination in the refrigerant industry (fluorocarbons):

Refrigerant gases are indispensable to air conditioning, refrigeration systems, and a variety of discrete synthetic chemicals, many of which contain fluorine in their chemical structure. The market for these gases has been growing, but the choice of one refrigerant over another has been driven majorly by regulatory pressures. However, refrigerant gases continue to enjoy a big opportunity in the global specialty chemicals business.

Fluorination in performance materials and advanced applications (fluoropolymers):

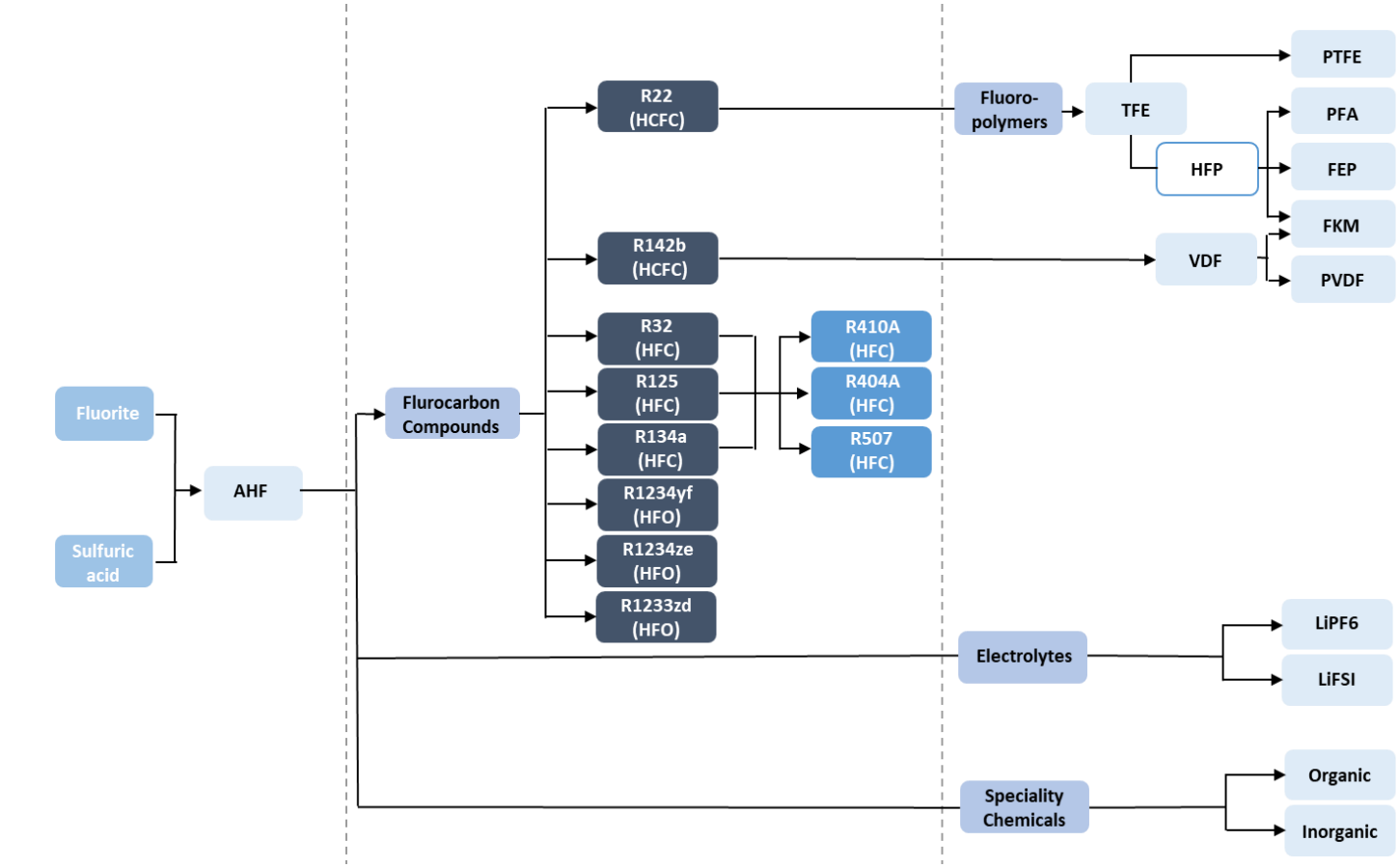
Fluoropolymers are a family of high-performance plastics characterized by their strong carbon-fluorine bonds. This unique atomic structure imparts a range of desirable properties, such as chemical resistance, thermal stability, and electrical insulation. They are used in a wide array of industries, including aerospace, automotive, electronics, and medical applications. The specific properties and processing techniques for each type of fluoropolymer can vary, based on the chemical composition and formulation. These processing techniques are critical to the performance of the material in the most difficult applications where heat, chemical exposure, or electrical values are important.

Fluorination in the agrochemical and pharmaceutical industry:

Traditionally, agrochemicals were derived from natural products and inorganic materials. The use of synthetic organic agrochemicals in crop protection increased over inorganic chemicals and natural products. Over time, organofluorine compounds have evolved as an attractive synthetic building block in the agrochemical industry owing to the sophisticated properties inculcated by these compounds. The increasing incorporation of fluorine into pharmaceutical bioactive molecules is attributable to the profound effects this substitution has on their activity and disposition. The growing share of fluorine in agrochemical and pharmaceutical fields has opened significant opportunities for players with fluorination capabilities.

Fluorine Chemicals — Value Chain

Exhibit 12: Fluorine Chemicals — Value Chain



Source: Emkay Research

The world's fluorspar reserves stand at ~260mn ton and annual production at ~8mn ton

What is the source of fluorine?

Fluorine is found mainly in a mineral called fluorspar, which is also sometimes known as fluorite. Fluorite is produced and consumed in two grades: metallurgical grade and acid grade. The most in demand is acid-grade fluorspar (which contains >97% CaF_2) which is used as raw material to produce hydrofluoric acid, the chemical precursor to most fluorinated products. The main deposits of fluorspar are to be found in Mexico, China, South Africa, Mongolia, and Spain — total world reserves are estimated at ~260mn tons.

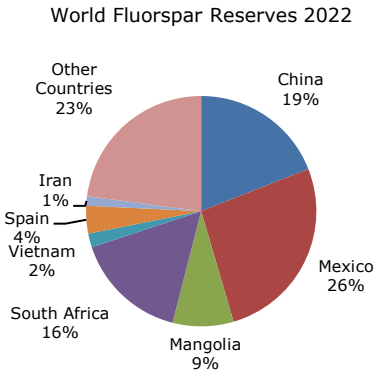
Total global fluorspar production is estimated to be ~8.3mn tons, as of 2022. At the current run rate of extraction, the world has fluorspar reserves for the next 30-35 years. The USA had fluorspar reserves in the late 1990s but is now largely dependent on imports. Thus, fluorspar has become a strategic mineral for many countries, and regulatory policies for safeguarding their reserves are being implemented by the government.

Exhibit 13: World Fluorspar Reserves & Production 2022

	Mine production ('000 ton)		
Country	**2021**	**2022**	**Reserves**
China	5,700	5,700	49,000
Mexico	1,000	970	68,000
Mangolia	650	350	22,000
South Africa	403	420	41,000
Vietnam	215	220	5,000
Spain	155	160	10,000
Iran	50	50	3,400
Other countries	93	98	59,000
	8,680	8,260	260,000

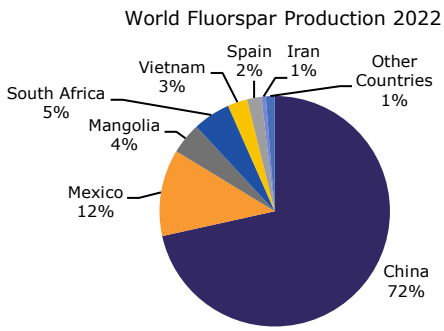
Source: Industry, Emkay Research

Exhibit 14: Mexico leads the world's reserves



Source: Industry, Emkay Research

Exhibit 15: China leads the world's production



Source: Industry, Emkay Research

Fluorspar dynamics

Orbia (formerly Mexichem), the world's largest producer of fluorspar, declared *force majeure* in March 2022 against some of its supply contracts, owing to safety concerns involving geological issues in a section of its Las Cuevas mine in Mexico. Samine in Morocco closed its fluorspar mine in December 2021, as it had seen declining output for some years. Canada Fluorspar Inc. (which has been ramping up production capacity since 2019) entered insolvency in February 2022, halted production, and has now been acquired by African Minerals Exploration and Development Funds (AMED Funds), a Luxembourg-based company (expecting to start production in November). Such developments have led to an uptick in fluorspar prices.

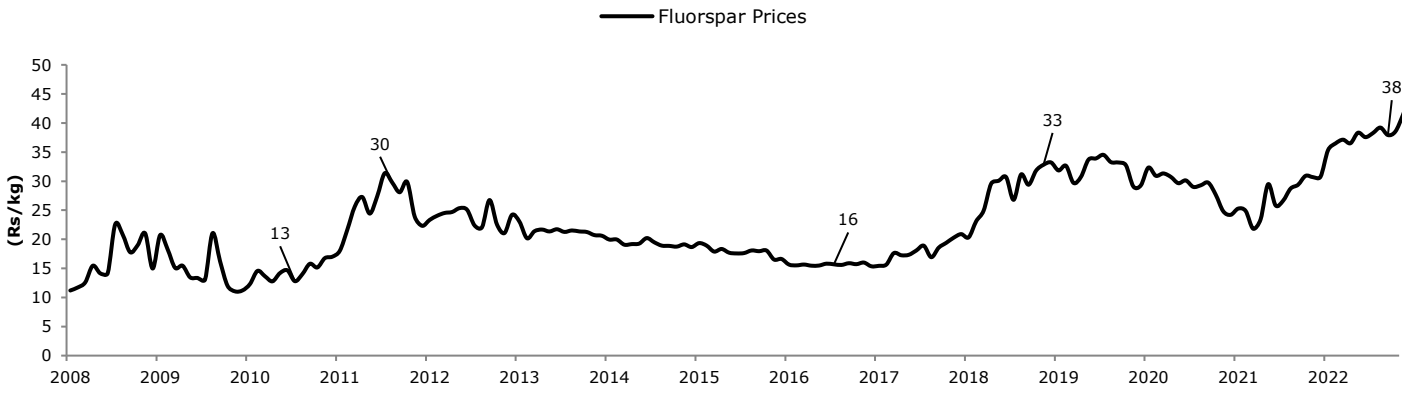
Fluorspar prices have been on a steady upswing, owing to issues with 2 large mines

Chinese supply, which once dominated the world's supply, remains in decline, while its domestic market demand continues to grow, and seeks external supply sources. China at the current run rate of extraction will run out of fluorspar reserves within the next 10 years, i.e. its reserve-to-production ratio of a single fluorspar mine is only about 10 years old (unless new reserves are identified). Mexico and South Africa will lead the world's reserves led by companies like Orbia and Sepfluor, which will have sustainable reserves over the next few decades. China will have to slow down its pace of extraction, or else it will become dependent on Mexico, Mongolia, and South Africa within the next 10 years. China has 'more poor ores and less rich ones', which means high-grade rich ores with a CaF_2 grade greater than 80% account for less than 10% of the total reserves.

Except for the Lost Sheep Mine in the USA, no new fluorspar mines are expected to start production by 2024, and it can take 8 years to fully develop a new fluorspar mining project. Moderate expansions have been planned for mines in Mongolia, Canada, and the UK. These dynamics will help sustain global fluorspar prices at elevated levels.

India does not have large sources of fluorspar, and there is only one mine located in the district Chandrapur of Maharashtra owned by the Maharashtra State Mining Corporation and having a capacity of ~100ktpa with the rate of extraction at 1–1.5ktpa. Indian companies largely import their total fluorspar requirements (~250ktpa) from South Africa, China, Thailand, and Morocco.

Exhibit 16: Fluorspar prices on a steady upswing



Source: Industry, Emkay Research

Exhibit 17: Policies related to fluorspar in China becoming stringent

Year	Regulation	Policy/Guidance
2003	-	Suspension of new fluorspar mining licenses
2006	Notice on Adjusting the Export Rebate Rate for Some Commodities and Adding the Catalog of Prohibited Products for Processing Trade (Finance and Taxation [2006] No. 139)	Cancel fluorite export tax rebate
2007	"Import and Export Tariffs of the People's Republic of China" 2007 Edition	Begins to impose 10% fluorspar export tariff
2008	"2008 Tariff Implementation Plan"	Increase fluorspar export tariff to 15%, and fluorspar mining is clearly listed as a prohibited foreign investment catalog
2009	Notice of the Customs Tariff Commission of the State Council on Adjusting Export Tariffs for Some Products	Adjust fluorite export tariffs
2010	"Notice of the General Office of the State Council on taking comprehensive measures to control the mining and production of refractory clay fluorspar"	In principle, the land and resources management department will no longer accept new exploration and mining registration applications for refractory clay (high clay minerals) and fluorspar. It is necessary to strengthen the management and rectification of the mining order of refractory clay (high clay minerals) and fluorite resources.
2010	"Fluorspar Industry Access Standards"	Strictly restrict the establishment of new mining mines in restricted mining areas specified by the state and local governments
2010	"Notice on the Total Quantity Control Indicators of High Clay Mineral Fluorite Ore Mining in 2010"	The total mining volume of fluorspar mines shall be controlled and managed; in principle, applications for exploration and mining registration of new fluorspar mines will no longer be accepted in the future.
2016	"National Mineral Resources Planning (2016-2020)"	Encourage the large-scale development, green development and integrated development of upstream and downstream industries such as fluorite, boron ore, kaolin, talc, barite, wollastonite and other minerals
2020	"Production Technical Specifications for the Fluorite Industry" (Draft for Comments)	The Ministry of Industry and Information Technology solicits opinions from the public on the mandatory national standard "Production Technical Specifications for the Fluorite Industry"
2022	"Guiding Opinions on Promoting High-quality Development of the Petrochemical and Chemical Industry during the "14th Five-Year Plan""	Protectively mine fluorite resources and encourage the development and utilization of associated fluorine resources

Source: Industry, Emkay Research

China's policies related to the protection of fluorspar resources are gradually tightening and supervision is increasing. Since 2003, China's fluorspar export preferential policies have been gradually tightened, from a 13% tax rebate to a 15% tariff. In 2008, fluorspar mining was listed as a prohibited foreign investment catalog. Subsequently, China began to restrict fluorspar production on the production front. The "Fluorspar Industry Access Standards" issued in 2010 strictly restricted the entry of new companies. To protect fluorspar resources in recent years, in March 2022, six departments including the Ministry of Industry and Information Technology jointly issued the "Guiding Opinions on Promoting High-Quality Development of the Petrochemical and Chemical Industry during the "14th Five-Year Plan", which emphasized the need for protective mining of fluorspar resources and encouraged developing and utilizing associated fluorine resources.

China's policies related to fluorspar are tightening and supervision is increasing

With the strengthening of supervision, China has gradually transformed from a net exporter of fluorspar to a net importer since 2018. China's fluorspar import volume in 2021 was 668ktpa, while its export volume was only 209ktpa. Since the second half of 2021, due to the shutdown of two major mines — in Mexico and Canada, as well as the global epidemic, China's fluorspar imports have decreased and domestic production has possibly increased.

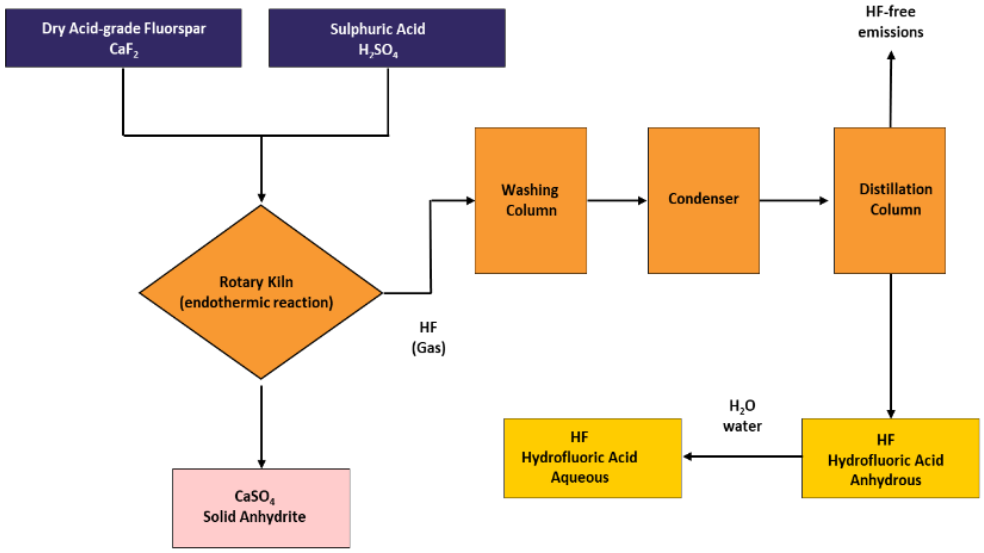
In the past six years, China's fluorspar market has experienced two rounds of sustained increases. The first round of surge was from Jan-17 to Dec-18 when fluorspar prices rose from ~1,500 Yuan/ton to ~3,600 Yuan/ton on account of environmental norms and the resultant decline in fluorspar plant operations. The second round of rising prices occurred from Mar-22 to Dec-2022, rising from ~2,540 Yuan/ton to ~3,260 Yuan/ton, and then falling back in early 2023. The second round was again impacted by the low utilization rate of domestic fluorspar plants, the closure of some global fluorspar plants, and rising downstream demand. Prices have again fallen in H1CY23, on account of weak HFC demand.

Hydrofluoric Acid from Fluorspar

Hydrofluoric acid is manufactured by heating acid-grade fluorspar (CaF_2) with liquid sulfuric acid, forming gaseous hydrogen fluoride (HF) and solid calcium sulfate as a by-product. The endothermic reaction usually takes place in a rotary tube furnace. HF provides the primary source of fluorine, which forms the basis of a vast range of industrial, pharmaceutical, polymer, electronics, petroleum, personal care, agrochemical, and fine chemical products.

Refrigerant gases, fluoropolymers, fluoro-elastomers, and aluminum trifluoride are some of the major applications where HF is directly used. The volume of HF consumed for materials used in lithium-ion batteries is significantly increasing, and it is expected to be a main growth driver for HF demand in coming years. HF is mainly produced in China, the USA, Europe, and Japan.

Exhibit 18: Process of HF production



Source: Industry, Emkay Research

Global HF capacity is ~3mn tons, of which China has a lion's ~65% share, followed by North America, Europe, and Japan. China largely consumes all of its HF production in-house. Do-Fluoride in China, the largest global producer of HF, has about 10% of the world's capacity. Excluding China, Orbia is the largest producer of HF in the world, followed by Honeywell, including its US and German plants.

China is the global leader in HF capacity; India has ~5% of global HF capacity

A large part of China's 2 million tons of HF capacity is mainly located in Zhejiang, Fujian, Jiangsu, Shandong, Jiangxi, and Inner Mongolia. HF facilities in Henan and Hunan are mainly for aluminum fluoride. Currently, 56% of Chinese HF is used to produce refrigerants, 24% is used to produce fluoropolymers, 8% is used to produce fluorine-containing fine chemicals, and 6% is used to produce inorganic fluorine products. China is a net exporter of HF, majorly exporting to Japan and South Korea (adjacent countries due to high transportation costs).

EBITDA per kg of HF consumed by Indian players

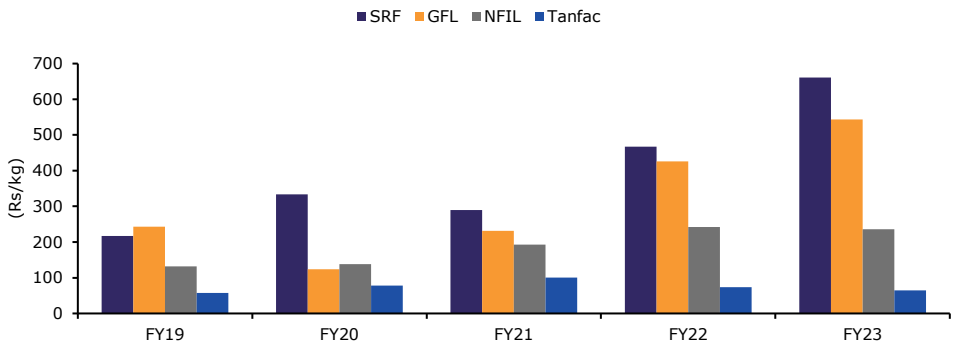
Indian capacity is currently only at ~5% (~150ktpa) of global capacity, largely held by 4 players: SRF, NFIL, GFL, and Tanfac. These companies are expanding their capacities and, post-expansion, India will have ~8% (~240ktpa) of global capacity. Most of this HF is consumed in-house by SRF, NFIL, and GFL, while Tanfac is the only player selling HF in the open market to other players. HF being a basic source of fluorine when controlled by 4 players, creates an implied barrier to entry for new entrants. A large part of this HF is consumed in refrigerants and fluoropolymers followed by fine chemicals.

Exhibit 19: Domestic HF capacity — 2023*

Company	Existing Capacity (MT)	Capacity post expansion (MT)	Commissioning
SRF	70,000-80,000	70,000-80,000	NA
NFIL	20,000	60,000	H1FY26
GFL	39,600	72,600	NA
Tanfac	14,850	27,900	H2FY25

*Source: Company, Emkay Research; Note: *approximate figures based on our calculations*

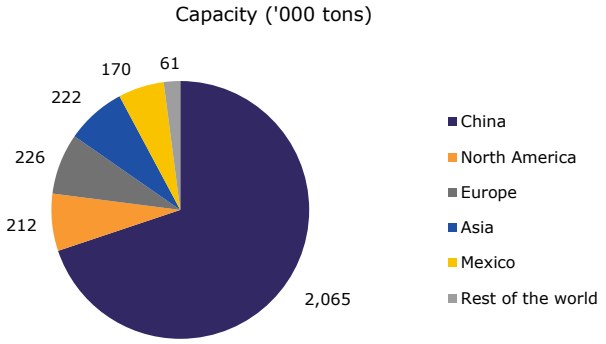
Exhibit 20: EBITDA per kg of HF consumed by Indian players*



*Source: Company, Emkay Research; Note: *approximate figures based on our calculations*

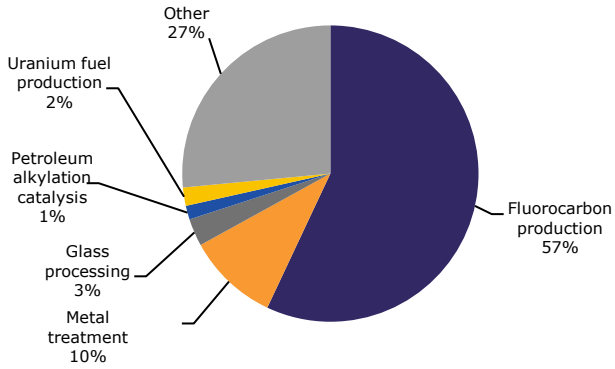
We have attempted to calculate the EBITDA/kg of HF consumed by Indian players. Based on our calculations, SRF has been leading all other companies, indicating a significant sophisticated specialty chemicals portfolio. GFL had lower per-kg EBITDA compared with NFIL till FY20; however, post FY21, on account of a significant increase in fluoropolymers volumes and pricing, its per-kg EBITDA has nearly doubled. NFIL's EBITDA/kg of HF consumed is more sustainable and seeing steady growth. Tanfac by nature is present in basic building blocks and thus contributes lower per-kg EBITDA. EBITDA per kg of HF consumed by Indian companies is far superior compared to their Chinese counterparts largely due to the backward integrated value chain. In China, very few companies are completely backward integrated.

Exhibit 21: Global HF capacity is ~3mn ton, as of 2022



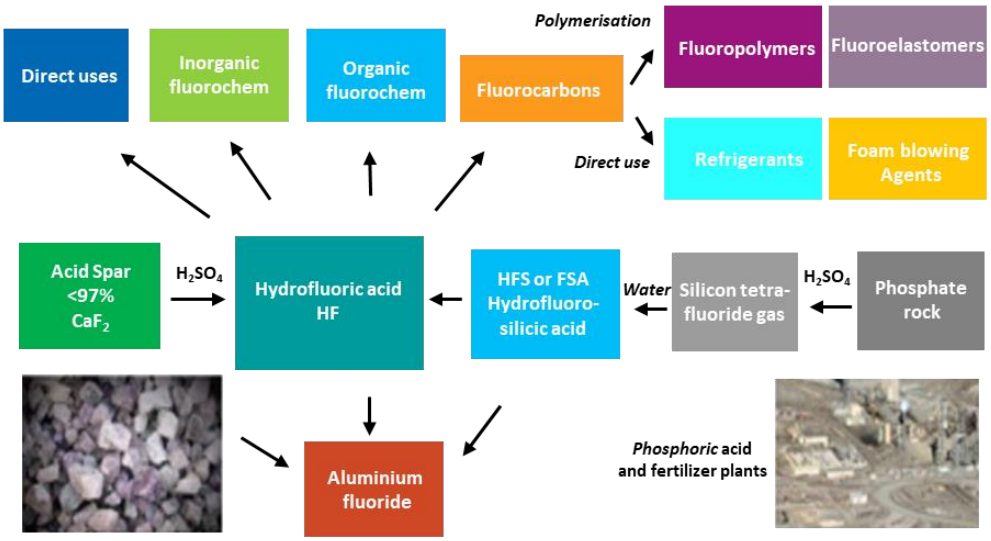
Source: Industry, Emkay Research

Exhibit 22: Global consumption of HF in 2022



Source: Industry, Emkay Research

Exhibit 23: The fluorspar, HF and derivatives supply chain



Source: Industry, Emkay Research

Fluorocarbons

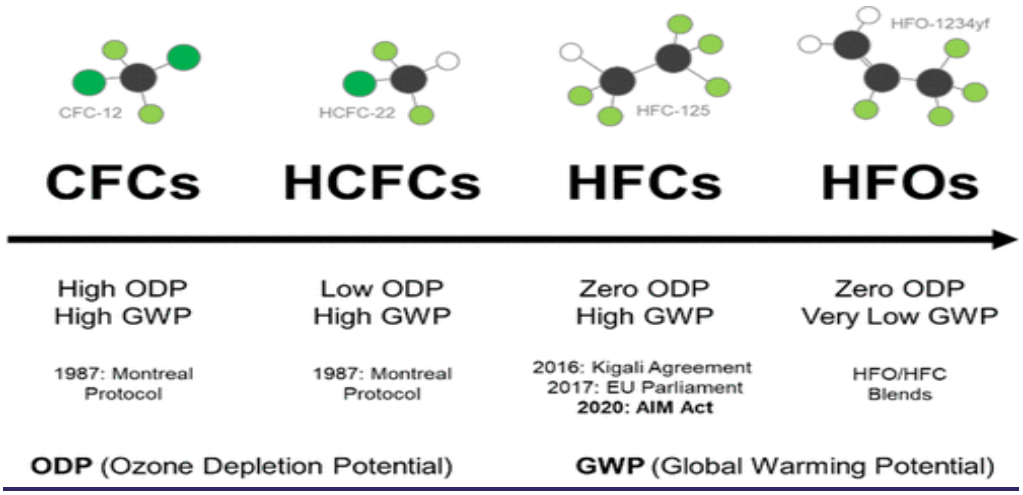
Fluorinated hydrocarbons or fluorocarbons are aliphatic compounds that have fluorine atoms or a combination of carbon and fluorine in their structure. Chlorofluorocarbons (CFCs) were originally developed in the 1930s and are widely used for refrigeration, air conditioning, aerosol sprays, foam blowing, fire protection, and solvents. Both, pure aqueous solutions and mixtures of fluorocarbons, are common in these applications.

It was later discovered that CFCs hurt the ozone layer due to their ability to break down ozone molecules. They have also been recognized as highly potent greenhouse gases. Because of such concerns, the use of CFCs was banned in many countries in the 1990s under the Montreal Convention, on substances that deplete the ozone layer.

HCFCs/HFCs are being replaced with HFOs

HCFCs (Hydrochlorofluorocarbons) were used to replace CFCs in air conditioning systems which are now further being replaced with HFCs (Hydrofluorocarbons). HCFCs/HFCs were considered more environmentally friendly than CFCs because they do not contribute to the degradation of the ozone layer. However, because of their high Global Warming Potential (GWP) HCFCs/HFCs are being phased out and the world is moving towards HFOs (Hydrofluoroolefins).

Exhibit 24: Transitions from CFCs to HFOs



Source: Industry

Hydrochlorofluorocarbons (HCFCs)

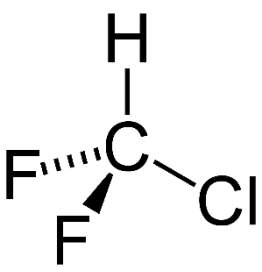
Chlorodifluoromethane (R22)

R22 is manufactured by reacting anhydrous hydrogen fluoride with chloroform. Despite being phased out in developed countries, it is one of the highest-produced refrigerants by volume, with ~800ktpa globally (including non-emissive use). About half of the total R22 production is being used for non-emissive use as a feedstock for PTFE. China, the USA, and Europe are major producers of R22. R22 is being used in central air conditioners, heat pumps, mini-splits, car AC systems, and other refrigeration equipment.

1-Chloro-1, 1-difluoroethane (R142b)

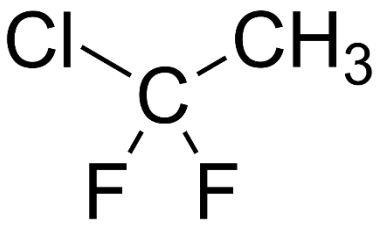
R142b is largely used as a foam-blowing agent and as a polymer precursor for manufacturing PVDF. Globally, production volumes are ~150ktpa, largely dominated by Chinese companies, and a large part of these volumes are being produced for non-emissive use.

Exhibit 25: R22 structure



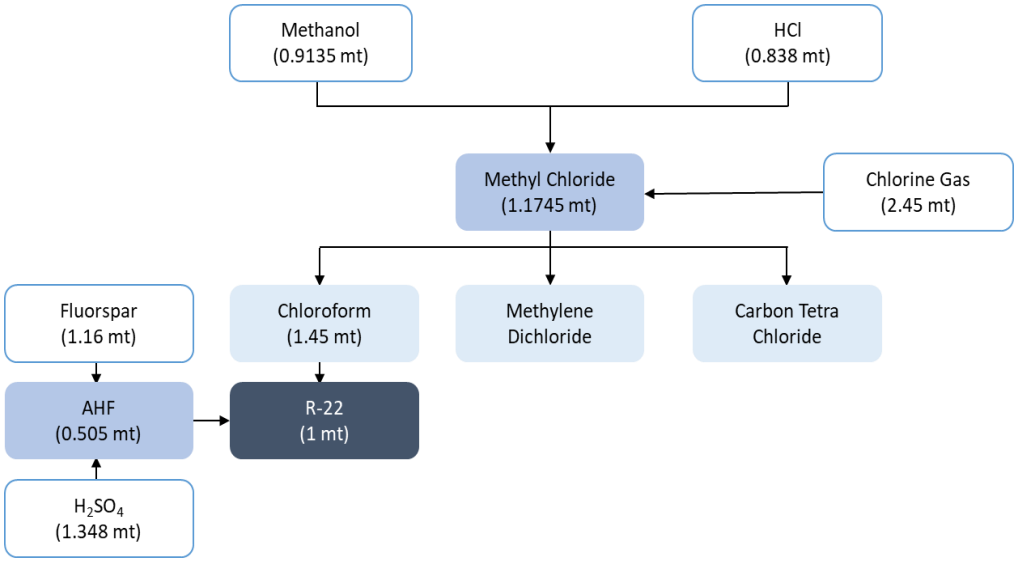
Source: Industry

Exhibit 26: R142b structure



Source: Industry

Exhibit 27: The R22 manufacturing process for a backward integrated facility



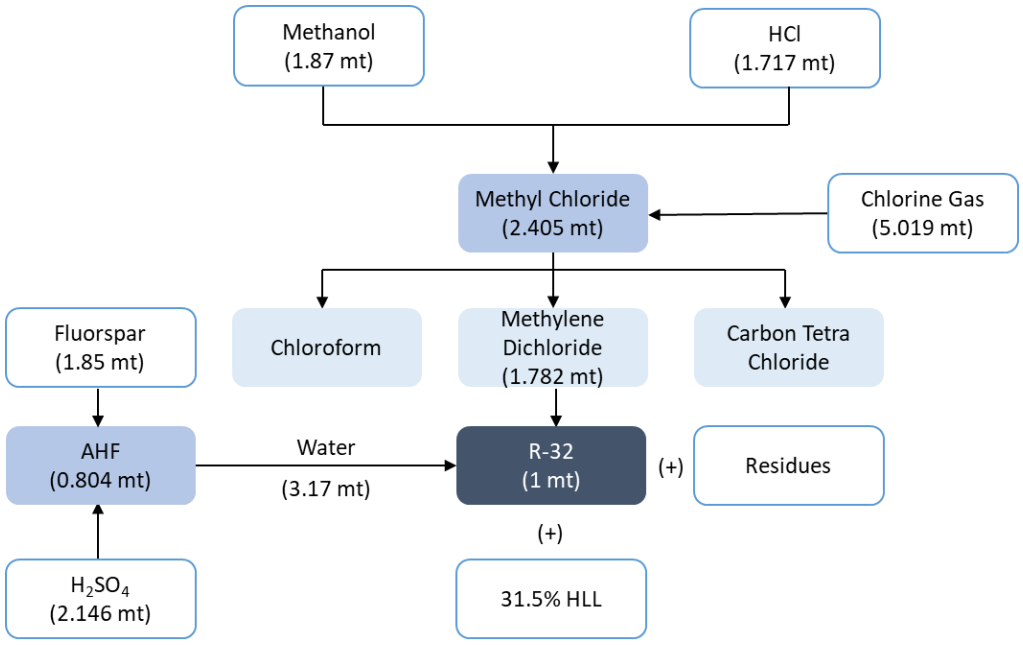
Source: Emkay Research

Hydrofluorocarbons (HFCs)

Difluoromethane (R32)

R32 is manufactured by reacting anhydrous hydrogen fluoride with methylene dichloride. It is the most balanced refrigerant in terms of environmental impact, energy efficiency, safety, and cost-effectiveness within HFCs. Currently, ~200ktpa of R32 is being manufactured globally and, owing to its low GWP, has been in focus for capacity expansion by most refrigerant manufacturers. R32 will also be used as blends with HFOs, to ensure gradual transition and cost-effectiveness. R32 is suitable for industrial refrigerant applications, air conditioning systems of residential buildings, and air source heat pumps.

Exhibit 28: The R32 manufacturing process for a backward integrated facility

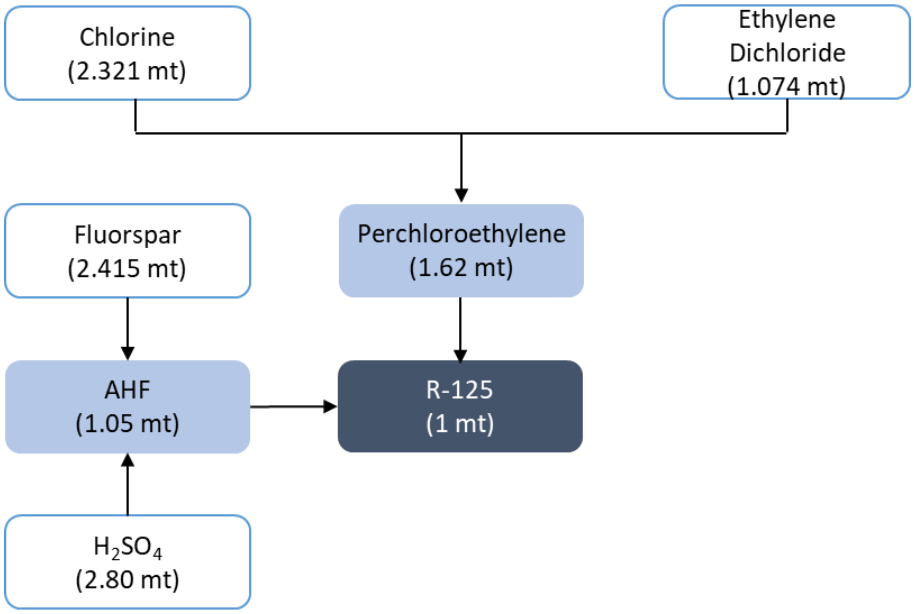


Source: Emkay Research

Pentafluoroethane (R125)

R125 is manufactured by reacting anhydrous hydrogen fluoride with perchloroethylene (it also has a tetrafluoroethylene route). Within HFCs, R125 has a substantially high GWP and is part of some of the most import blends like R404a, R407c, R410a, etc, which were replaced with HCFCs. Currently, ~175-180ktpa of R125 is being manufactured globally, largely dominated by China. R125 is being used as a refrigerant as well as a fire suppression agent in fire suppression systems. It suppresses fire by absorbing heat energy at its molecular level faster than heat can be generated, so the fire cannot sustain itself.

Exhibit 29: The R125 manufacturing process for a backward integrated facility

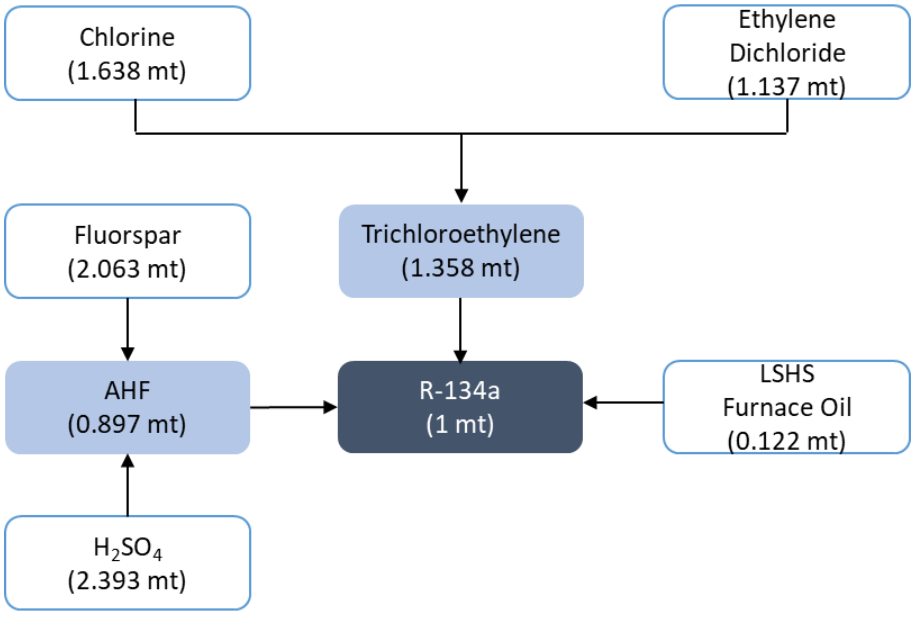


Source: Emkay Research

1,1,1,2-Tetrafluoroethane (R134a)

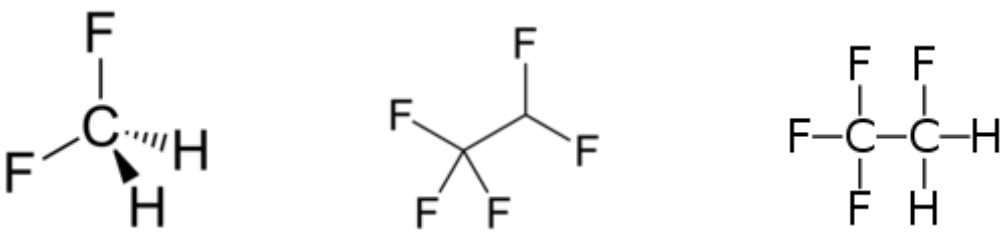
R134a is manufactured by reacting anhydrous hydrogen fluoride with trichloroethylene. It is largely a replacement to R12 a CFC and R22 a HCFC and currently, ~220ktpa of R134a is being manufactured globally. China and USA are the dominant producers of R134a. It is used in refrigeration and air-conditioning equipment, particularly in automotive vehicles.

Exhibit 30: The R134a manufacturing process for a backward integrated facility



Source: Emkay Research

Exhibit 31: R32, R125 and R134A



Source: Industry

Hydrofluoroolefins (HFOs)

2,3,3,3-Tetrafluoropropene (HFO-1234yf)

HFO-1234yf has largely been introduced as a replacement for R134a and is the highest-volume HFO refrigerant worldwide. Currently, 25-30ktpa of HFO-1234yf is being manufactured globally. The USA, China, and Japan are the leading producers of HFO-1234yf. Several patents have been filed by Honeywell, Arkema, DuPont, etc, and they will largely be going off-patent around CY2024-26. Transition to HFOs will take time, as they entail 2.5-3x the cost of HFCs.

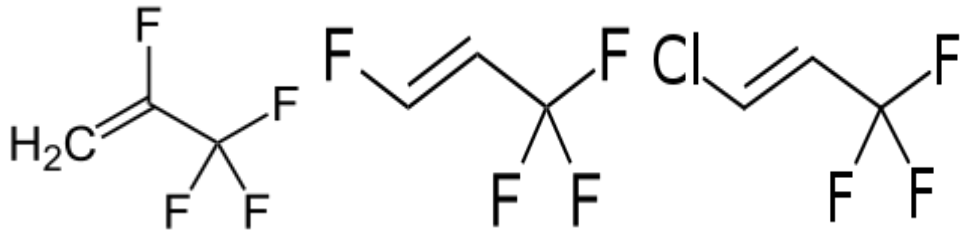
1,3,3,3-Tetrafluoropropene (HFO-1234ze)

HFO-1234ze is the second-most-developed HFO in terms of production capacity. It can be used as an aerosol propellant and is also marketed by Honeywell under the name Solstice — a gas-blowing agent. It is a component in many blends, such as HFO-444A, HFO-444B, HFO-445A, HFO-447A, and HFO-447B, and is suitable for use in low and medium-temperature refrigeration, stationary air-conditioning, and heat pump applications.

1-Chloro-3,3,3-trifluoropropene (HFO-1233zd)

HFO-1233zd is marketed by Honeywell as Solstice LBA liquid blowing agent. It is a substitute for HFC-245fa, with commercial applications in domestic appliances, and is also used as a replacement for R123 in centrifugal chillers. HFO-1233zd is nonflammable as well as non-toxic, which is a distinct advantage in terms of regulatory approval and consumer acceptance over many other HFOs.

Exhibit 32: HFO1234yf, HFO1234ze and HFO1233zd



Source: Industry

Exhibit 33: Annual end-uses of major refrigerant gases in North America, Europe, China, and Japan, including quantities used in blends (including hydrocarbons and non-emissive use)

Refrigerant gas (k ton)	Polymer Precursor	Refrigeration & A/C	Foam Blowing Agents	Aerosols	Solvents	Fire Suppression
HCFC-22	360	248–400	34	-	-	-
HCFC-141b	-	-	60	-	5	-
HCFC-142b	150	6	11	-	-	-
HFC-32	-	180-220	-	-	-	-
HFC-125	-	150-200	-	-	-	0.4
HFC-134a	-	190–240	70	-	-	-
HFC-152a	110	17	16	38	-	-
HFC-245fa	-	-	28–62	-	-	-
HFC-143a	-	71	-	-	-	-
HFC-365mfc	-	1	8	-	-	-
HFC-227ea	-	-	-	-	-	0.6
HFO-1234yf	-	15–30	-	-	-	-
HFO-1234ze	-	<1	1–4.5	Unknown	-	-
HFO-1233zd	-	<1	4	-	-	-
HFO-1336mzz	-	Neg	Neg	-	-	-
Pentane (R601c)*	-	-	355	-	-	-
CO2 (R744)*	-	70–80	15	52	-	-
Propane (R290)*	-	37–46	-	420	-	-
Ammonia (R717)*	-	9–26	-	-	-	-
Isobutane (R600a)*	-	6–11	-	420	-	-
n-butane (R600)*	-	-	-	420	-	-
Total	620	970–1,228	610–649	1,350	14	13

*Source: Industry, Emkay Research; Note: *hydrocarbons*

Geographical landscape

The total volume of fluorocarbon refrigerants (for emissive use) in 2022 was estimated to be ~1.2 million metric tons. China remains the largest producer (73%), followed by the USA (21%). At the time CFCs were phased out in the mid-1990s, refrigerant manufacturers were already beginning to produce commercial quantities of HFCs that would eventually replace HCFCs. DuPont, for example, already had 50ktpa of global R134a capacity by January 1993, with plants located in the United States and Japan. Refrigerant manufacturing during this period tended to be located in regions with major end-use markets for refrigerants (i.e. the USA, European Union, and Japan).

China is the largest manufacturer of refrigerant gases owing to inexpensive feedstocks

More recently, China has become a major refrigerant manufacturer and now accounts for the majority of the annual fluorocarbon production. Inexpensive feedstocks derived from China's extensive fluorspar mining operations, cheap labor, and power costs have led to this growth. This growth in bulk refrigerant manufacturing is also in sync with the significant increase in Chinese refrigeration and air-conditioning equipment production. Partnerships between major Western chemical companies and Chinese producers are now common in the refrigerant industry and have continued with the transition to HFO production.

USA too remains a major producer of HFCs and, now, even HFOs. In 1949, Arkema constructed an HF plant in Calvert City, Kentucky, utilizing the fluorspar from nearby mines as feedstock. Although fluorspar has not been mined in Kentucky since 1992 due to lower import prices, the Calvert City plant still remains and has undergone several expansions—it now produces R134a and R32. Honeywell too remains a very large player in refrigerant gas manufacturing (including its non-US plants)

Exhibit 34: Global HCFC capacities — Birds-eye view

Source: Industry

Exhibit 35: Global HFC capacities — Birds-eye view

Source: Industry

Exhibit 36: Global HFO capacities — Birds-eye view

Source: Industry

India has surplus capacity in refrigerant gases, largely exporting to the USA

India is self-sufficient and largely exports its refrigerant gas production

India produces HCFCs, HFCs as well as HFOs; however, the capacities are fairly small compared with those of Chinese companies. Indian companies are largely announcing expansions in low GWP gases like R32 and working on developing technologies/routes for manufacturing HFOs as well as optimizing the production cost for the already-developed route to become competitive globally. Indian capacity for HCFCs is ~130ktpa (R22 – 100ktpa, including non-emissive use; R142b – 30ktpa for non-emissive use) and HFCs is ~60ktpa (R32 – ~30ktpa after SRF expansion of 15ktpa; R125 – 15ktpa; R134A – 15ktpa), which is roughly 5% of global capacities.

Exhibit 37: Indian refrigerant gas demand-supply

Ref Gas (ton)	Indian Capacity	Indian Production*	Indian Exports	Indian Imports	Indian Demand
R22	100,000	28,000-30,000	13,000	-	~15,000
R32	31,500#	10,000-11,000	3,000	3,000	~10,000
R125	15,000	13,000	13,000	-	-
R134a	15,000	12,000	7,000	10,000	~15,000
R142b	30,000	-	-	-	-
Total	192,500	63,000-66,000	36,000	13,000	~40,000

*Source: Company, Emkay Research; Note: *emissive use; # after planned expansion by SRF (15,000ton) and by NFIL (4,000ton); approximate figures based on our calculations*

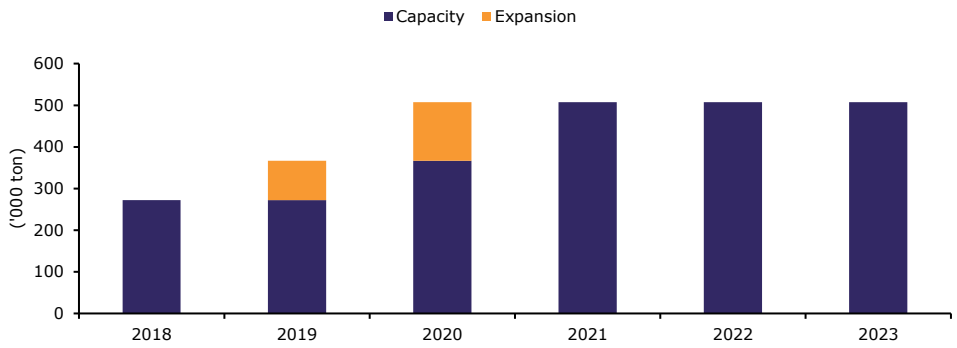
India has a total refrigerant gas capacity of ~190ktpa (including R22 and R142b for emissive as well as non-emissive use). Production for emissive use is 63-66ktpa and India exports ~60% of refrigerant gas manufactured. Of the total exports, ~80% is to the USA and the balance ~20% is sold to the Middle East. Indian demand for refrigerant gas is ~40ktpa and, despite being self-sufficient, India imports ~13ktpa. The USA markets offer better pricing for Indian refrigerant gas players, leading to large exports. India today does not have a demand for HFOs.

China has expanded capacities at a much rapid pace during 2020-22, to seize quotas

China has expanded capacities during 2020-22, to seize quotas

The baseline years for the reduction of HFC quotas in China were 2020-2022. During this period, the production capacity of HFCs of various manufacturers rapidly expanded, striving to seize the quota before the production capacity was frozen. Accordingly, Chinese R32 production capacity increased from 272ktpa in 2018 to 507ktpa in 2022, R125 production capacity increased from 228ktpa in 2018 to 300ktpa in 2022, and R134a production capacity increased from 320ktpa in 2018 to 335ktpa in 2022. At the same time, to seize more quotas, companies used price war strategies to increase sales, resulting in low domestic prices.

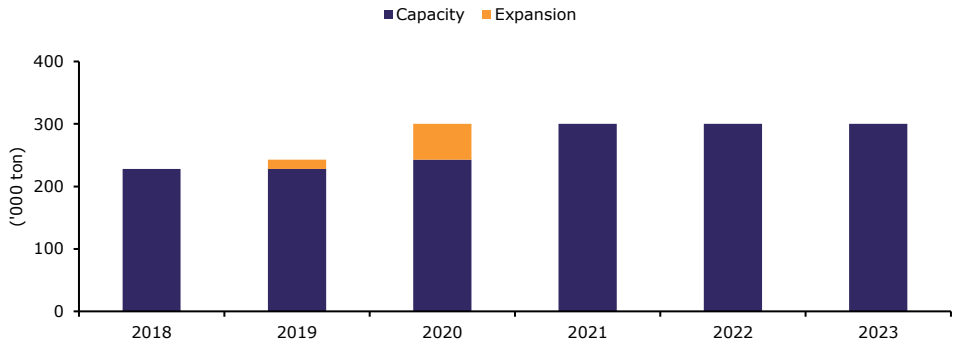
Exhibit 38: Chinese R32 capacities



Source: Industry, Emkay Research

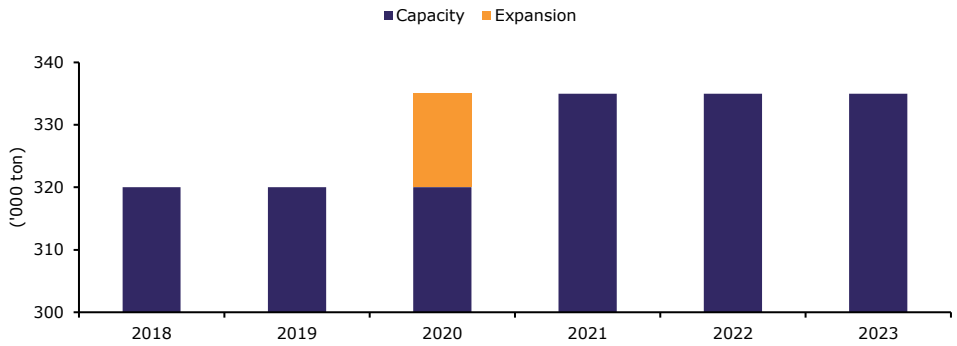
Chinese refrigerant gas capacity of HFCs has frozen from FY20

Exhibit 39: Chinese R125 capacities



Source: Industry, Emkay Research

Exhibit 40: Chinese R134a capacities



Source: Industry, Emkay Research

Pricing in China has seen two major upcycles

On the price front, R32, R125, and R134a are currently all at relatively low levels compared with the past six years. The price of mainstream HFCs has experienced two rising cycles in the past six years. The first round was from Feb-17 to May-17, when the average price of R32/125/134a sharply rose, from 14,857 Yuan/ton, 25,119 Yuan/ton, and 24,421 Yuan/ton, respectively, to 29,775 Yuan/ton, 62,075 Yuan/ton, and 30,825 Yuan/ton between this period. The main reason is the increase in the price of raw material fluorspar, the strengthening of environmental protection supervision, which leads to the increase in refrigerant production and transportation costs, and other factors.

The second round of a rising cycle was from Jul-21 to Oct-21, when the average price of R32/ R125/R134a saw a sharp rise, from 11,941 Yuan/ton, 26,973 Yuan/ton, and 19,807 Yuan/ton, respectively, to 17,244 Yuan/ton, 51,013 Yuan/ton, and 37,385 Yuan/ton, with increases of 44.%, 89%, and 88%, respectively during this period.

Phase-out plan, as per The Montreal Protocol

Background

The Montreal Protocol on Substances that Deplete the Ozone Layer is the landmark multilateral environmental agreement that regulates the production and consumption of nearly 100 man-made chemicals referred to as ozone-depleting substances (ODS). When released into the atmosphere, such chemicals damage the stratospheric ozone layer, which is the Earth's shield that protects humans and the environment from harmful levels of ultraviolet radiation from the sun. Adopted on 16-Sep-1987, the Protocol is to date one of the rare treaties to have achieved universal ratification.

HFCs are anthropogenic fluorinated chemicals that have no known natural source. HFCs are used in the same applications in which ODS have historically been used, such as refrigeration and air conditioning, foam-blowing agents, solvents, aerosols, and fire suppression. HFCs are potent GHGs with 100-year GWPs (a measure of the relative climatic impact of a GHG) that can be hundreds to thousands of times more potent than carbon dioxide (CO_2).

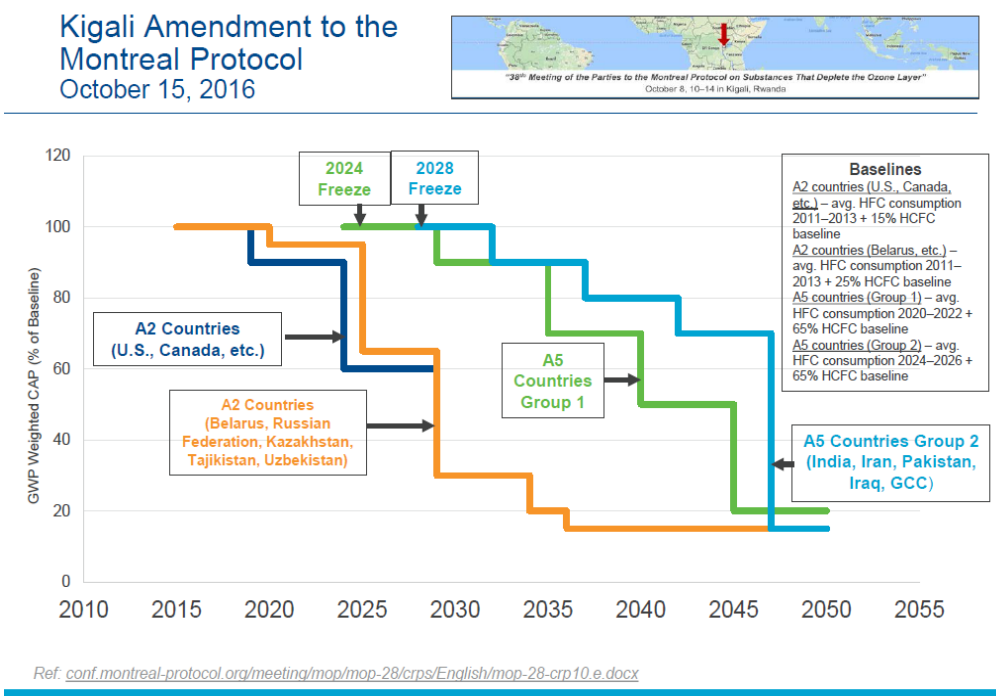
The Protocol

Based on the Kigali amendment, phase-dwon in developed countries will start from 2019 and for developing countries from 2024

The international phase-down for production and consumption of HFCs was accelerated by the Kigali amendment to the Montreal Protocol in Oct-16. All countries have committed to legally binding targets, which mandate gradual reductions in HFC consumption and production, starting from 2019 for developed countries and from 2024 for developing countries. The HFC reductions are measured based on overall CO_2 emissions/impact, as HFCs have widely differing GWPs. As per the amendment:

- Developed countries will begin phasing down from CY19 (consumption has already frozen from CY15), completing the reduction by CY36 (85% from baseline).
- Developing countries (Article A5 group 1) will begin and end the phase-down later, allowing more time for alternative technology to mature in their markets. Most of these countries, including China, will freeze the level of HFC consumption in CY24, begin phasing down in CY29, and complete the process by CY45 (80% from baseline).
- Other countries (Article A5 group 2), including India and the Middle East, will freeze consumption from CY28, begin reducing from CY32, and complete the phase-down by CY47 (80% from baseline).

Exhibit 41: Phase down, as per the Kigali Amendment to The Montreal Protocol



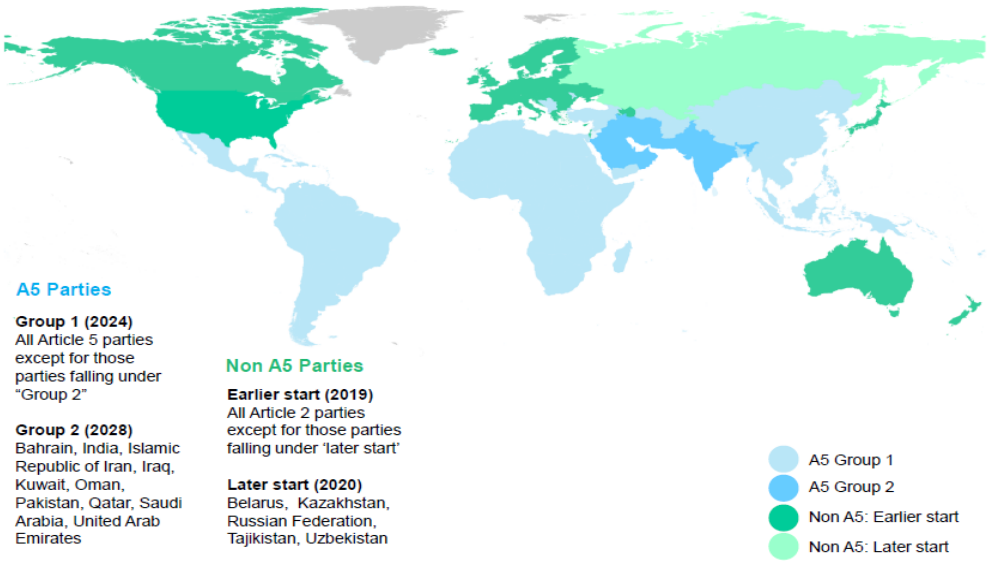
Source: Industry

Exhibit 42: HFC phase-down schedule under the Kigali Amendment

	Non-A5 (developed countries)	A5 (developing countries) Group 1	A5 (developing countries) Group 2
Baseline HFC component	2011-2013 (average consumption)	2020-2022 (average consumption)	2024-2026 (average consumption)
Baseline HCFC component	15% of baseline	65% of baseline	65% of baseline
Freeze	-	2024	2028
1st step	2019 - 10%	2029 - 10%	2032 - 10%
2nd step	2024 - 40%	2035 - 30%	2037 - 20%
3rd step	2029 - 70%	2040 - 50%	2042 - 30%
4th step	2034 - 80%	-	-
Plateau	2036 - 85%	2045 - 80%	2047 - 85%
Notes	Belarus, Russian Federation, Kazakhstan, Tajikistan, Uzbekistan, 25% HCFC component and 1st two steps are later: 5% in 2020, 35% in 2025	Article 5 countries not part of Group 2	GCC (Saudi Arabia, Kuwait, United Arab Emirates, Qatar, Bahrain, Oman), India, Iran, Iraq, Pakistan

Source: Industry

Exhibit 43: Countries phasing out ref gas — Birds-eye view



Source: Industry

F-Gas regulations have phased down HFCs, ahead of the Kigali amendment

The Act in Europe

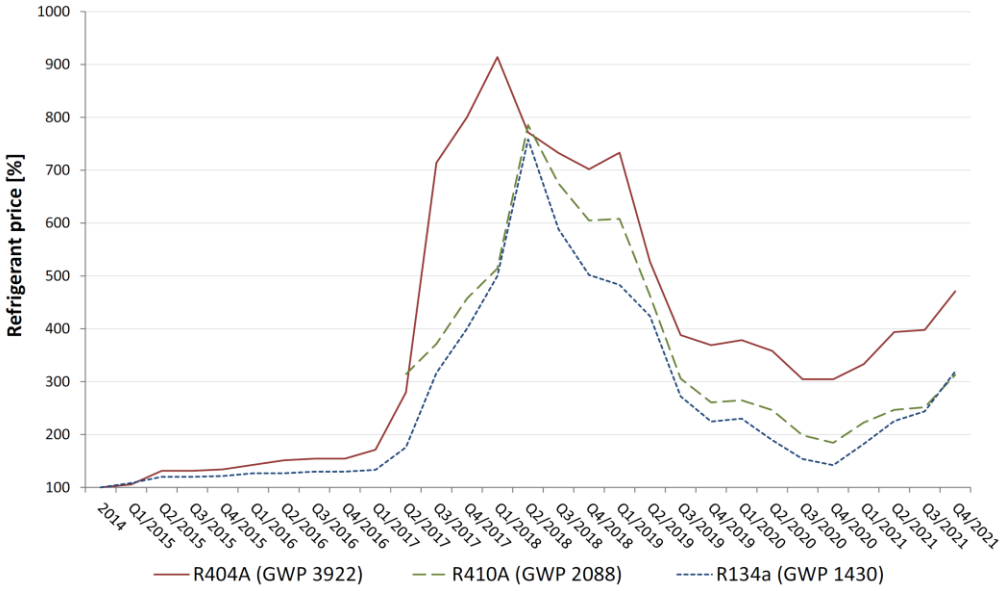
F-Gas regulation in the EU has put in place the HFC phase-down schedule, from 2015 to 2030, by means of a quota system and sectorial bans on high GWP refrigerants. F-Gas regulation was the first to phase down HFCs in line with the Montreal Protocol. The regulation made its targets of CO_2 emissions and phase-down much aggressive after the Kigali amendment.

Exhibit 44: F-Gas regulations for the HFC phase down schedule

Year	HFC Phase-Down Schedule*
2015	100%
2016-17	93%
2018-20	63%
2021-23	45%
2024-26	31%
2027-29	24%
2030	21%

*Source: Industry, Emkay Research; Note: *% of baseline, which is the average of 2009-12*

Exhibit 45: Price impact in Europe, pre and post the 2018 phase down in HFCs



Source: Industry, Emkay Research

Pricing impact in the EU:

Ref gas pricing to be cyclic, based on phase down schedules

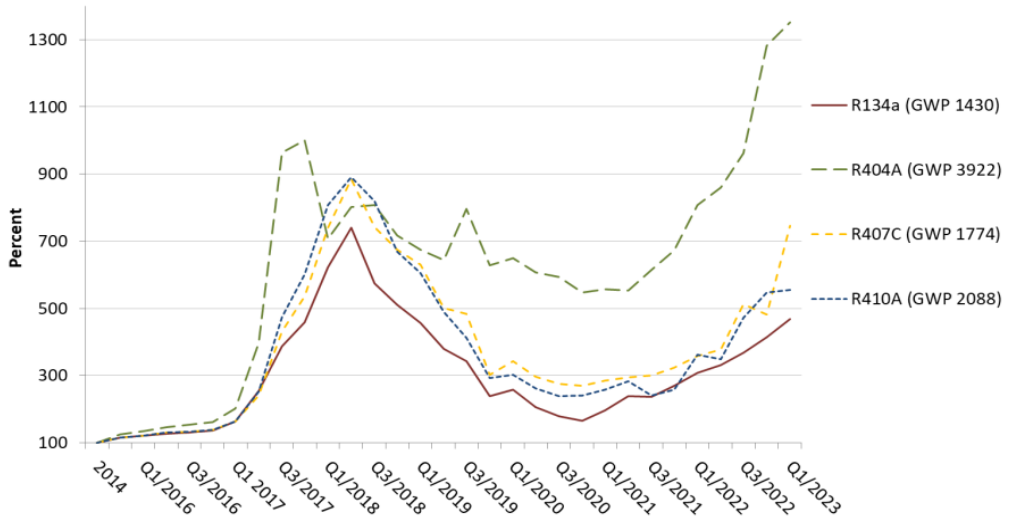
- European Commission's report in 2020 confirms the strict factual connection between measures targeting refrigerant gases and their prices. Following the economic law of demand and supply, the higher ambition in the EU phase-down scheme of HFCs would automatically trigger higher prices of these substances.
- Prices of High GWP HFCs spiked in 2017, reaching peaks of 6 to 13 times higher than their 2014 baseline price, as reported by EU-based companies. This can be connected to the steep reduction that was introduced during the period, i.e. a reduction of 30 percentage points, from 93% to 63%, of the allowed quotas in the EU market.
- Following this trend, the additional reduction from 63% to 45% in 2021 also exerted upward pressure on HFC prices. As the reduction of allowable quantities comes into force in terms of CO_2e, HFCs with a higher GWP will find it harder to access the market.
- Moreover, quotas will need to be used to purchase a reduced bucket of available substances, and the higher the GWP of a substance, the higher the cost.
- In Apr-22, the European Commission presented the revision of the original F-Gas legislation, to fine-tune it to the ambitious climate goals enshrined in the EU's body of legislation with the EU Climate Law, where a more stringent phase-down schedule was proposed.
- Post this, compared with the baseline in 2014, R134a and R410A prices are now 2-5 times higher, and R404A prices are 3-13 times higher, depending on the supply-chain level. Compared with Chinese producer prices, the selling prices of European producers are almost 4 times higher for R134a.

Volume impact in EU:

Europe largely imports Chinese refrigerant gases

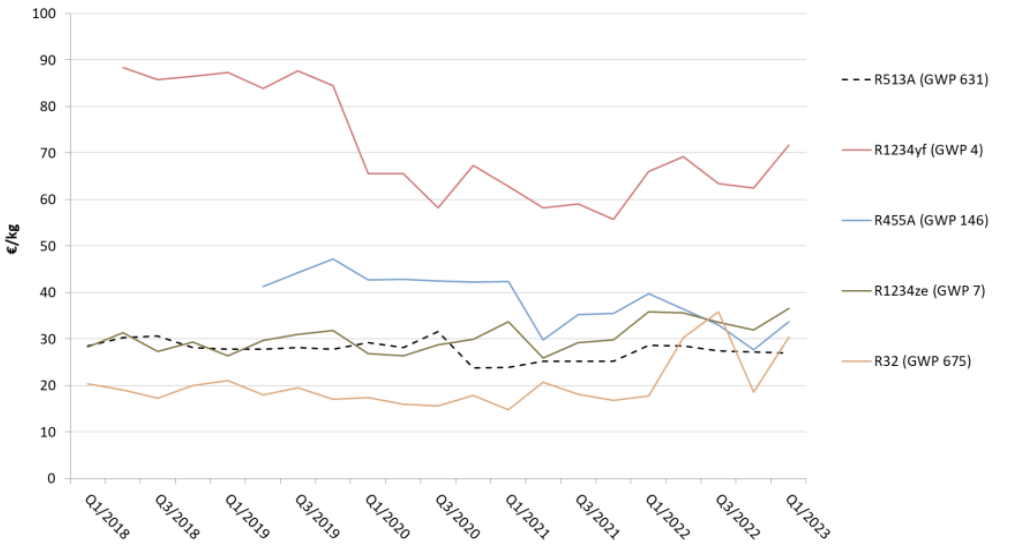
- The EEA's 2021 report on fluorinated substances underlines that EU production of fluorinated substances, HFCs included, has constantly decreased since 2007 – a likely effect of the bloc's regulation on these substances. From almost 60,000 tons produced in 2007, European producers manufactured less than 20,000 tons in 2020, equaling roughly 40mn tons CO_2e.
- This number can be compared with the number of fluorinated substances imported into the European Union: around 80,000 tons of f-gases, including more than 60,000 tons of HFCs, were imported in 2020, with China being the first exporter, injecting almost 40,000 tons of HFCs into the EU market.
- China, therefore, supplied around 66% of the HFCs imported into the European market, with the USA—the second largest supplier, accounting for only ~10,000 tons. These data, in comparison with the decrease in European production, show that Chinese suppliers already provide the majority of HFCs to the European Union.

Exhibit 46: Price impact on HFCs in Europe post the accelerated phase-down proposed in 2022



Source: Industry

Exhibit 47: Price impact on HFOs/low GWP HFCs in Europe post the accelerated phase-down proposed in 2022



Source: Industry

The Act in USA

USA to see its first major phase-down in CY24

The American Innovation and Manufacturing (AIM) Act

- Consistent with the Kigali Amendment to the Montreal Protocol, the US AIM Act has authorized the Environmental Protection Agency (EPA) to phase down production and consumption of HFCs in the USA, by 85% of the baseline, by CY36.
- This phase-down will be done in stages, and CY24 will see first major cut – from 90% to 60% of baseline in consumption and production, followed by a second major cut down to 30% of the baseline in CY29 and finally to 15% of the baseline by CY36.
- Currently, the consumption allowance is ~270MMTEVe (Million Metric Tons of Exchange Value equivalent) which is 90% of the baseline and will get cut to ~180MMTEVe in CY24 (60% of the baseline).
- Companies that use HFCs in one of following five applications listed in the AIM Act will receive application-specific allowances: 1) A propellant in metered dose inhalers, 2) Defense sprays, 3) Structural composite preformed polyurethane foam for marine use and trailer use, 4) The etching of semiconductor material or wafers and the cleaning of chemical vapor deposition chambers within the semiconductor manufacturing sector, and 5) Onboard aerospace fire suppression.

Exhibit 48: The HFC phasedown schedule, as per the AIM Act in USA

Year	Share of consumption and production from baseline	Est. consumption and production cap (MMTEVe*)
Proposed Baseline		Consumption: 299 Production: 375
2022-23	90%	Consumption: 269.1 Production: 337.5
2024-28	60%	Consumption: 179.4 Production: 225
2029-33	30%	Consumption: 89.7 Production: 112.5
2034-35	20%	Consumption: 59.8 Production: 75
2036 & after	15%	Consumption: 44.9 Production: 56.3

*Source: Industry, Emkay Research, Note: * baselines are expressed in million metric tons of exchange value equivalent (MMTEVe) and calculated as the average of 2011-2019*

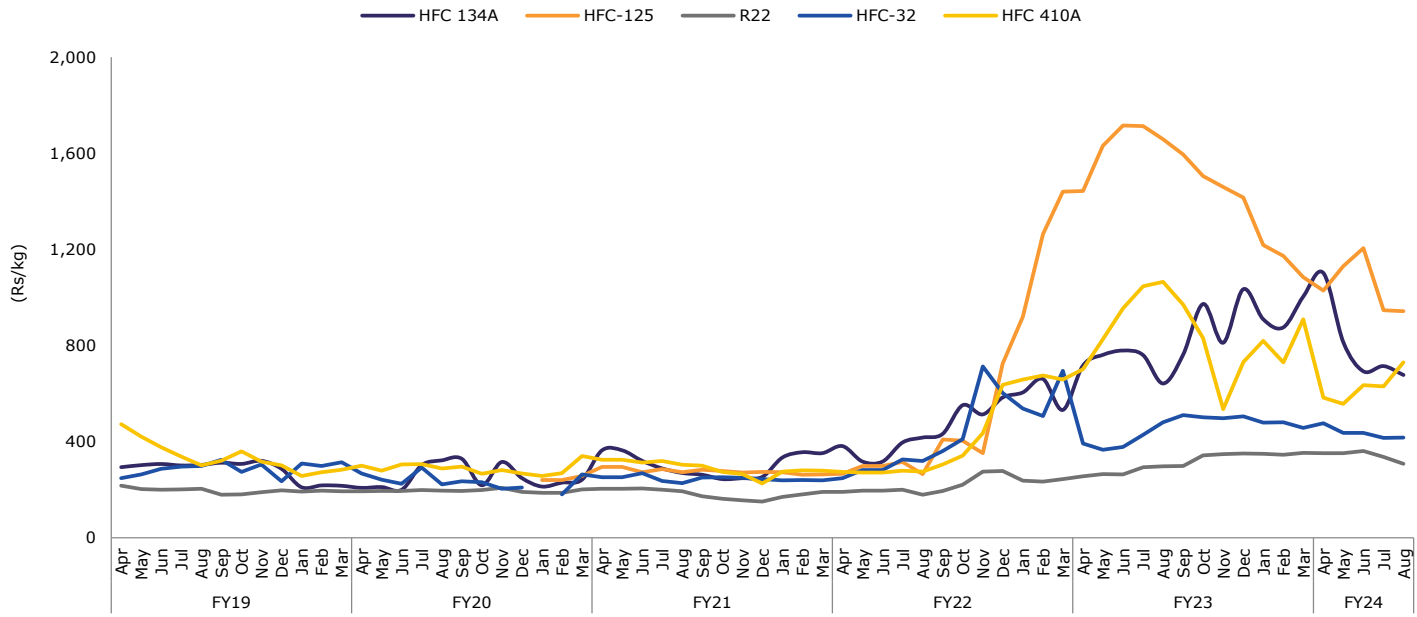
Pricing impact in USA:

- We have observed a similar uptrend in pricing (2-6x) in the USA in 2022-23, as observed in Europe in 2016-17 before the first major cut-down. However, these prices were further aggravated by the cyclical uptick in raw material costs in 2022-23, when prices of chloromethanes were up 2-3x and prices of HF were up 3-4x on increase in fluorspar & sulfuric acid prices.
- This holds true when quotas need to be used to purchase a reduced bucket of available substances, and the higher the GWP of a substance, the higher the cost. Companies in the USA might aspire to stock their HFC requirements just before the first major cut-down, which has lifted the demand and put upward pressure on prices.
- Prices have started normalizing now, with higher GWP gases seeing a higher decline in prices; this is again in sync with the decline in raw material costs and the possible reduction in demand for HFCs, as most of the companies might have stocked their requirements.
- We believe similar pricing trends will be observed in other geographies as well, primarily impacted by the phase-down schedule, domestic inventory, and GWP of the gas.

Refrigerant	GWP
R22	1,810
R32	675
R125	2,800
R134A	1,430
R410A	2,088
HFO1234yf	4
HFO1234ze	6

Source: Industry, Emkay Research

Exhibit 49: Price impact on HCFCs/HFCs in USA before the 2024 phase-out



Source: Industry, Emkay Research

US anti-dumping duty (ADD) on Chinese refrigerant imports

Chinese ADD to keep prices elevated in USA

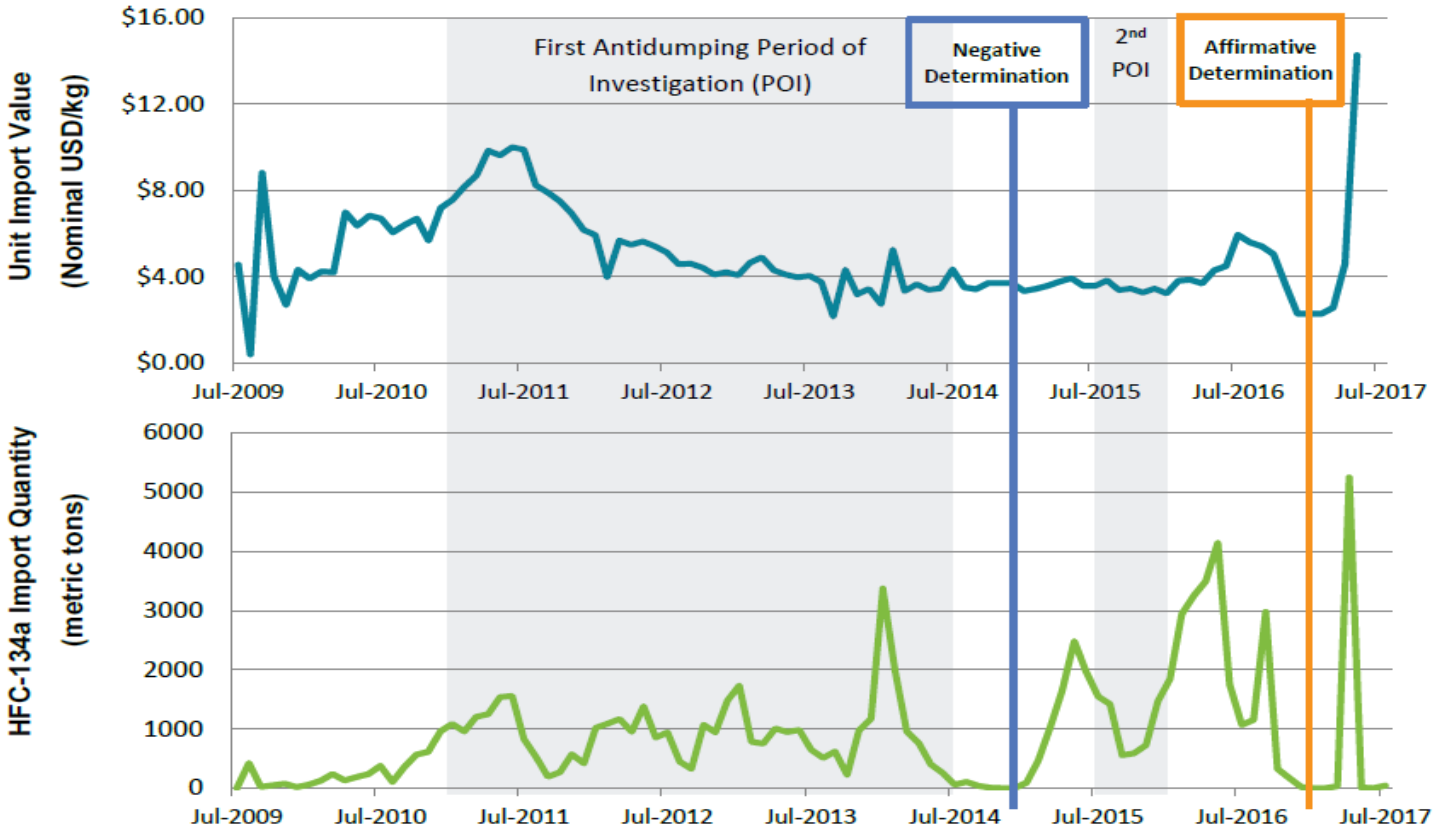
In 2016, an antidumping lawsuit was brought by US refrigerant manufacturers against importers of Chinese HFC blends and blend components. The US International Trade Commission (US ITC) found that the US refrigerant industry was materially injured by Chinese imports of HFC blends and ruled out an ADD of 216% on blends imported from China (now under review).

Following this judgement, the USA has imposed ADD on HFC imports from China a number of times:

- In Apr-17, ADD of 167% was imposed on R134a imported from China (now under review).
- In Jan-21, ADD of 221% was imposed on Chinese R32 (will be applied for the next 5 years).
- In Mar-22, ADD of 278% was imposed on Chinese R125 (will be applied for the next 5 years).

The USA has also taken severe measures to stop the circumvention of ADD on HFCs. In Jun-19, it affirmatively determined the circumvention of ADD on HFC blends via unfinished R32/R125 blend, which has led to independent ADD on both products. However, Chinese companies started selling unfinished blends like R410b, which is a 45:55 blend of R32:R125.

Exhibit 50: Unit values and quantities for US imports of HFC-134a from China, from July '09 to July '17



Source: Industry; Note: The vertical lines represent the dates of final decisions issued by the US International Trade Commission in the two antidumping lawsuits concerning HFC-134a imports from China

Chinese circumvention for anti-dumping duty

China's circumvention of unfinished blends under review

In Jul-23, The US Department of Commerce initiated anti-circumvention inquiries to determine whether imports of Chinese HFCs are circumventing the 2016 antidumping duty (ADD) order on HFC blends. Importers have, more recently, begun importing blends, such as R410B and various 'custom' blends that do not have any commercially approved use. After importation, these unapproved HFC refrigerant blends are simply re-blended into one of the products covered by the ADD order.

These requests were triggered by the staggering 340% increase in the volume of R410B imports originating in China or blended in Turkey from Chinese components. In fact, imports of R410B in 2022 exceeded US imports of all other HFC blends. Such imports can be re-blended at a fraction of the cost of manufacturing HFCs. For example, R410B is easily re-blended into R410A, which can then be sold in the US market.

India has also imposed ADD on HFC imports from China

- In Jul-16, India imposed ADD of USD1.22/kg on R134a imported from China; however, on expiry of the five-year ADD term, government decided to revoke the ADD on R134a in a notice issued on Jan-22.
- In Sep-21, India implemented ADD of USD1.55-2.25/kg on Chinese HFC blends.
- In Dec-21, India imposed ADD of USD1.17 to Rs1.52/kg on R32.

Exhibit 51: HFOs to be replaced with HFCs

HFO Products	Blend of	Replacement of	Uses
R1234yf	NA	R134a	Automobile ACs
R1234ze	NA	R134a	Chillers; Commercial AC
R1233zd	NA	R123	Low pressure centrifugal chillers, foam blowing agent
R450A	R134a (+) R1234ze	R134a	Heat pumps, air-cooled and water-cooled chillers, district heating and cooling, vending machines and beverage dispensers
R448A	R32 (+) R125 (+) R134a (+) R1234ze (+) R1234yf	R22 & R404a	Commercial Refrigeration
R454B	R32 (+) R1234yf	R410a	Reversible chillers and heat pump applications
R515B	R1234ze (+) R227ea	R134a / R227ea / R124	Chillers, heat pumps and high-ambient AC systems
R513A	R134a (+) R1234yf	R134a	Commercial and Industrial Chillers, flooded and/or centrifugal chillers
R452B	R32 (+) R125 (+) R1234yf	R410a	Direct expansion chillers, High pressure heat pumps, Split AC units, Commercial Packaged Systems
R452A	R32 (+) R125 (+) R1234yf	R404a & R507	Commercial & industrial refrigerators, condensing units, plug-ins and transport refrigeration
R455A	R32 (+) R744 (+) R1234yf	R404a / R290 / R22 / R407c	Plug-ins, condensing units, foodservice, waterloop

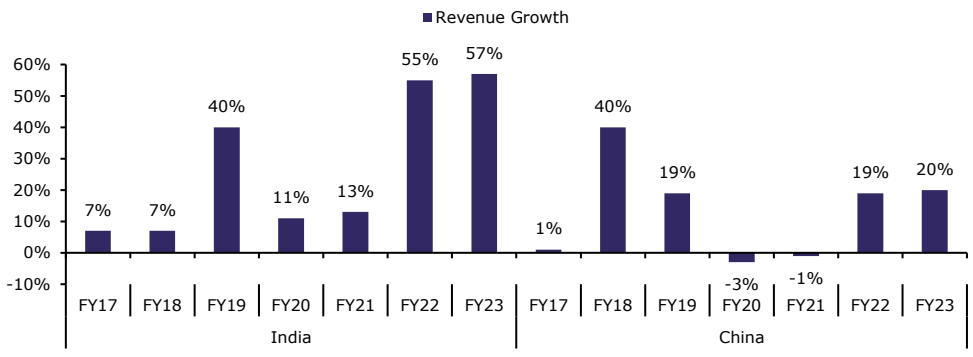
Source: Industry, Emkay Research

Chinese companies have seen some headwinds on environmental policies

Chinese companies have faced headwinds on environmental policies

Chinese fluorochemical companies have been facing challenges such as declining revenues. These challenges are attributed to several factors, including a significant emphasis on environmental sustainability, which has led to the closure of factories. Consequently, Chinese firms have exhibited comparatively lower growth rates or have not performed as well as their Indian counterparts. Chinese fluorochemical firms experienced a growth decline in FY20 and FY21, thereafter seeing a recovery in FY22. FY23 saw a modest growth rate of only 20%.

Exhibit 52: Revenue growth of Indian vs. Chinese Fluorochemical companies



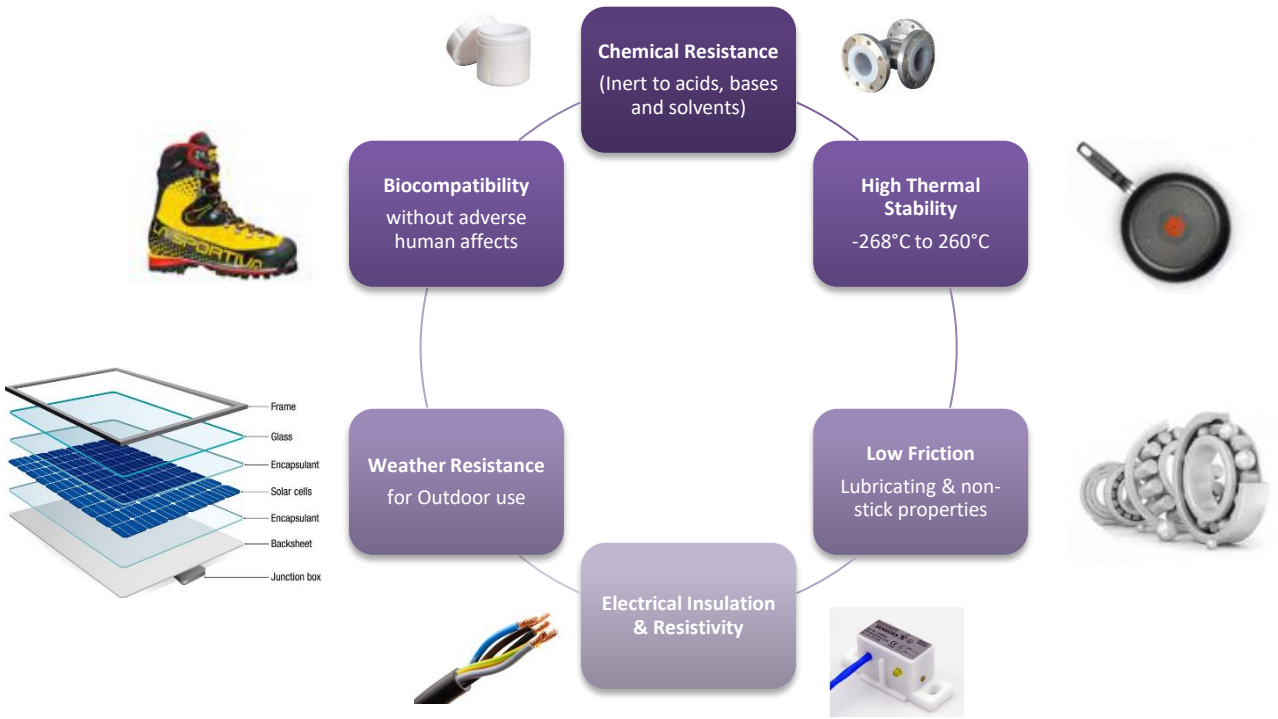
Source: Company, Emkay Research

Fluoropolymers

What are fluoropolymers?

Fluoropolymers are fluorocarbon-based polymers with multiple carbon–fluorine (C-F) bonds and fluorine atoms directly attached to their carbon-only backbone. They are high-performance plastics with core-specific applications, wherein normal plastics or other metals cannot perform due to the presence of solvents, chemicals, heat, and electrical conductivity. The first fluoropolymer—polytetrafluoroethylene (PTFE)—was discovered by mere chance, by a scientist at DuPont (Now Chemours) in 1938. Subsequently, there emerged a range of chemical derivatives using the carbon-fluorine molecular arrangement; these derivatives have shown bonds better than those of hydrogen or carbon.

Exhibit 53: Unique properties of Fluoropolymers



Source: Industry, Emkay Research

Fluoropolymers can be found in various forms: **1) Solid Granules/Pellets,** which are processed with extrusion or compression molding. **2) Melt-Processable** fluoropolymers—can be processed with techniques such as extrusion, injection, and blow molding. **3) Films,** suitable for insulation/sealing using casting, extrusion, or skiving techniques. **4) Paste** form, used in films, industrial tubing, seal tapes, and membranes. **5) Dispersions** form (Solvent or Aqueous Medium), used in coatings. These different forms of fluoropolymers can withstand heat, water, and salt, making them suitable for use in harsh environments.

Fluoropolymers have a strong, visible demand from new-age industries

The fluoropolymer industry will experience a high growth trajectory, driven by increasing demand from various end-user industries such as auto, medical, general architecture, chemical, aviation, and electrical wiring. In addition, the growing potential for use in sunrise industries like electric vehicles (EVs), EV battery, solar cell manufacturing, semiconductors, aerospace & defence, and Telecom is propelling fluoropolymer capacities at a rapid pace across China, India, and the USA.

The fluoropolymers market is expected to clock a CAGR of 6%, from USD8.2bn in 2022 to USD13bn by the end of 2030. Global fluoropolymer capacity stands at 450-500ktpa as of FY23. China enjoys >50% market share in the production of fluoropolymers which is growing rapidly. In Europe, Germany contributes to nearly 25% of the fluoropolymer market, primarily feeding the automotive segment. Major players operating in the fluoropolymers market are Chemours (DuPont), Honeywell, Solvay, Halopolymer, Daikin, Asahi Glass Company (AGC), 3M, Arkema, Gujarat Fluorochemicals (GFL), Dongyue, Juhua and HaoHua.

India holds nearly 8% (~30ktpa) of global fluoropolymers capacity, dominated by only one player—GFL. Further, SRF is in the process of setting up a PTFE capacity by FY24 and gradually commencing production of other fluoropolymers. Indian demand is ~12-15ktpa (~60% is PTFE and 40% is other fluoropolymers), which makes it a net exporter of fluoropolymers.

Exhibit 54: Indian fluoropolymer demand-supply*

(ton)	Indian Capacity	Indian Production	Indian Exports	Indian Imports	Indian Demand
PTFE	18,000	16,200	13,000	4,000	~7,200
Other Fluoropolymers	13,200	6,600	4,000	3,000	~5,600
Total	31,200	22,800	17,000	7,000	~12,800

*Source: Company, Emkay Research; Note: *approximate figures based on our calculations*

Exhibit 55: Major industrial applications of fluoropolymers and their properties

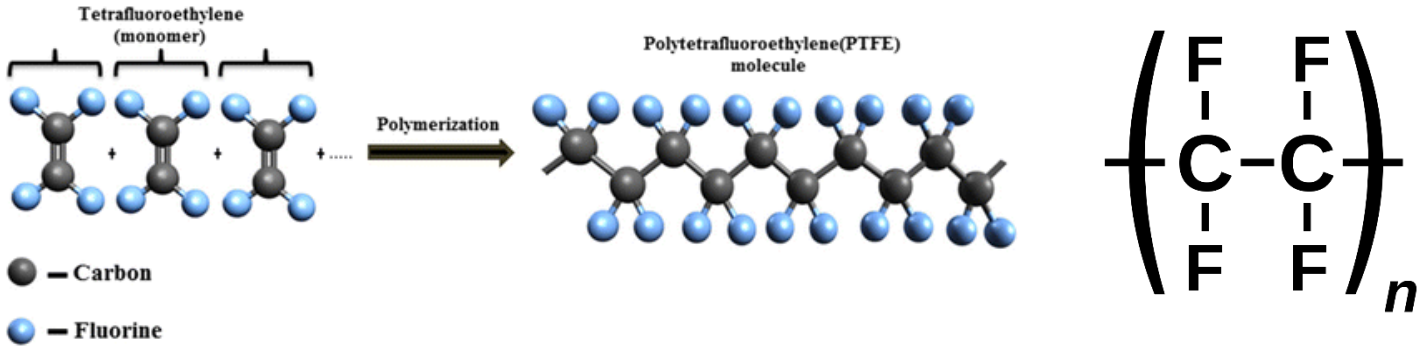
Industry	Properties	Applications	PTFE	PFA	FEP	ETFE	PVDF	FKM
Chemical/Petrochemical	• Chemical Resistance • Good Mechanical Properties • Thermal Stability • Cryogenic Properties	Gaskets, vessel liners, pumps, valve and pipe liners, tubings, coatings, expansion joints/bellows, heat exchangers	✓	✓	✓	✓	✓	✓
Electrical/Electronic	• Low Dielectric Constant • High Volume/Surface Resistivity • High Dielectric Breakdown • Voltage Flame Resistance • Thermal stability • Low refractive indices	Wire and cable Insulation, connectors, optical fibers, printed circuit boards	✓	✓	✓	✓	✓	
Automotive/Aircraft	• Low Coefficient of Friction • Good Mechanical Properties • Cryogenic Properties • Chemical Resistance • Low permeation properties	Seals, O-Rings, hoses in automotive power steering, transmissions, and air conditioning, bearings, sensors fuel management systems.	✓	✓				✓
Coatings	• Thermal/Weather Stability • Low Surface Energy • Chemical Resistance	Cookware coatings, coatings of metal surfaces, powder coatings	✓	✓		✓	✓	
Medical/Pharma/CPI	• Low Surface Energy • Stability, Purity • Good Mechanical Properties • Chemical Resistance	Cardiovascular grafts, heart patches, ligament replacement packaging films for medical products	✓				✓	
General Architectural/Fabric/**Film applications**	• Excellent Weatherability • Flame Resistance • Transparency • Low Surface • Energy Barrier properties	Coated fabrics and films for buildings/roofs, **front/backside films for solar applications**	✓			✓	✓	
Polymer additives	• Low coefficient of Friction • Flame Resistance • Abrasion resistance • Anti-stick properties	Polyolefin processing to avoid surface defects and for faster processing. Additives for inks, coatings, lubricants, anti-dripping agents.	✓				✓	✓
Semiconductor	• Chemical Resistance • High Purity • Anti-adhesion • Insulation • Barrier properties • Thermal Stability	Process surfaces, **wafer carriers**, tubing, valves, pumps and fittings, storage tanks	✓	✓				✓
Energy conversion/storage **Renewable Energies**	• Chemical/thermal resistance • Ion-transportation • High weatherability • High transparency • Corrosion resistance	**Binder for electrodes, separators, ion-selective membranes**, gaskets, membrane-reinforcements, films for photovoltaics coatings for wind mill blades	✓		✓	✓	✓	

Source: Industry, Emkay Research

Polytetrafluoroethylene (PTFE)

PTFE is a thermoplastic polymer which is a white opaque solid at room temperature made by polymerization of tetrafluoroethylene (TFE). PTFE is hydrophobic and frictionless, thus commonly used in the petrochemical, machinery, electronic, and electrical fields. PTFE production capacity in developed countries has been reworked for high-end specialization and the commodity-like PTFE has been primarily manufactured in China. The PTFE market is expected to register a steady CAGR of 4.2%, from USD3bn in CY20 to USD4.5bn in CY30 (slower than the overall fluoropolymers market growth).

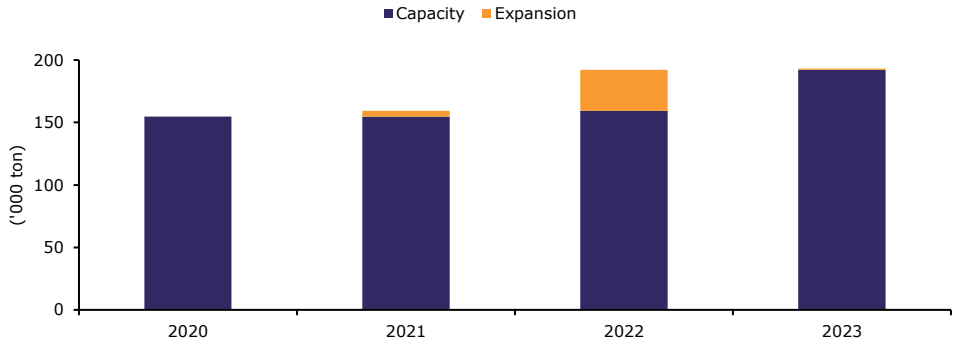
Exhibit 56: PTFE — Molecular Structure



Source: Industry

Global PTFE capacity in FY22 stood at ~280ktpa, which at ~70% average utilization levels resulted in consumption of ~200ktpa. Chinese companies have a total capacity of ~200ktpa. Currently, the world has a surplus capacity of PTFE—largely dominated by China (a large part of the capacity expansions have been done in FY22); however, we believe that Chinese capacities will be tilted more towards commodity-grade PTFE.

Exhibit 57: PTFE — Capacity addition by Chinese companies



Source: Industry, Emkay Research

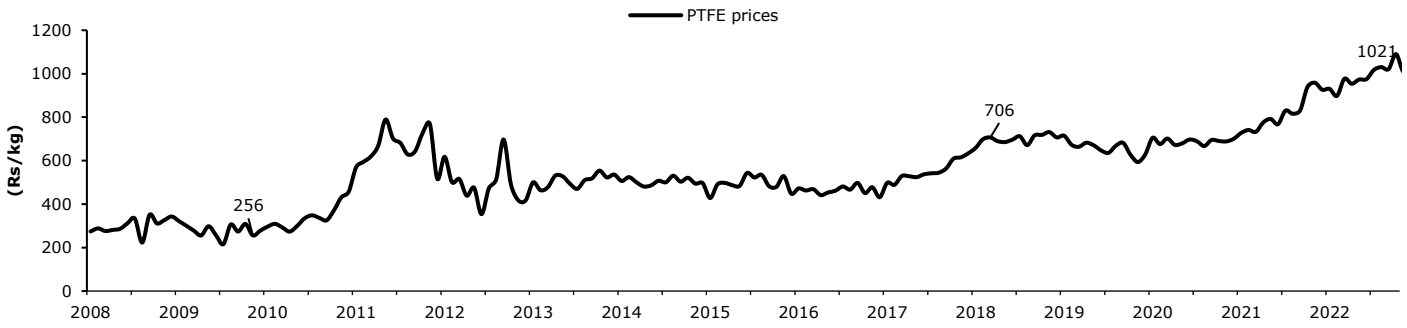
China still has an 18ktpa PTFE suspension resin project under construction production which is expected to commence in Dec'24. Further, 50ktpa expansions were announced by Chinese players in FY23 which would take global PTFE production capacity to ~350ktpa by FY25.

The PTFE market has matured and is seeing capacity additions

These aggressive capacity expansions by Chinese players would most likely put pricing pressure on commodity-grade PTFE over the next few years, whereas demand would grow only ~4%. The current demand-supply gap will take at least 5-7 years to bridge. For a long time, the Chinese domestic self-sufficiency rate of high-end PTFE products has been insufficient, and the country has mainly relied on imports. Chinese companies have now started working on value-added PTFE grades to reduce their import dependency.

Indian demand for PTFE is ~7-8kpta, with GFL catering to ~50% of this demand, with the rest being imported (mainly from China). Indian demand is expected to grow 10-12% faster than overall globally, with increasing demand from the automotive industry and other new-age applications. Key domestic customers using PTFE are Hindustan Polymers, Karnataka Polymers, Vescoat India, Vipro Tools, Edlon, and Praxair surface, while domestic offices of global companies like 3M, Arkema, Hubei, Solvay, etc. also sell their fluoropolymers in the Indian market. Indian companies like GFL claim to have entered the value-added grades of PTFE, where their average realizations have increased over the last few years. SRF entering this space may put some pressure on domestic pricing.

Exhibit 58: PTFE — Price trend for Indian companies with value addition

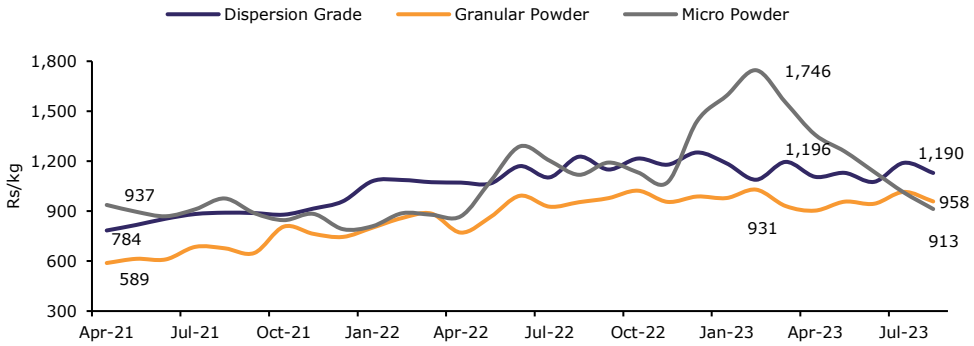


Source: Industry, Emkay Research

Developing the right grade is vital

PTFE is manufactured in more than 250 grades by different companies for multiple industries and client requirements. It is important to select the appropriate PTFE grade based on the specific requirements of the application, as choosing the wrong grade can significantly impact performance and reliability. The prices for different grades differ according to the technical details of each. For example, dispersion grade PTFE earns a premium of 15-25% over normal PTFE, in granular PTFE there is a discount of 5-10%, while PTFE Tapes sell for USD 5-7/kg.

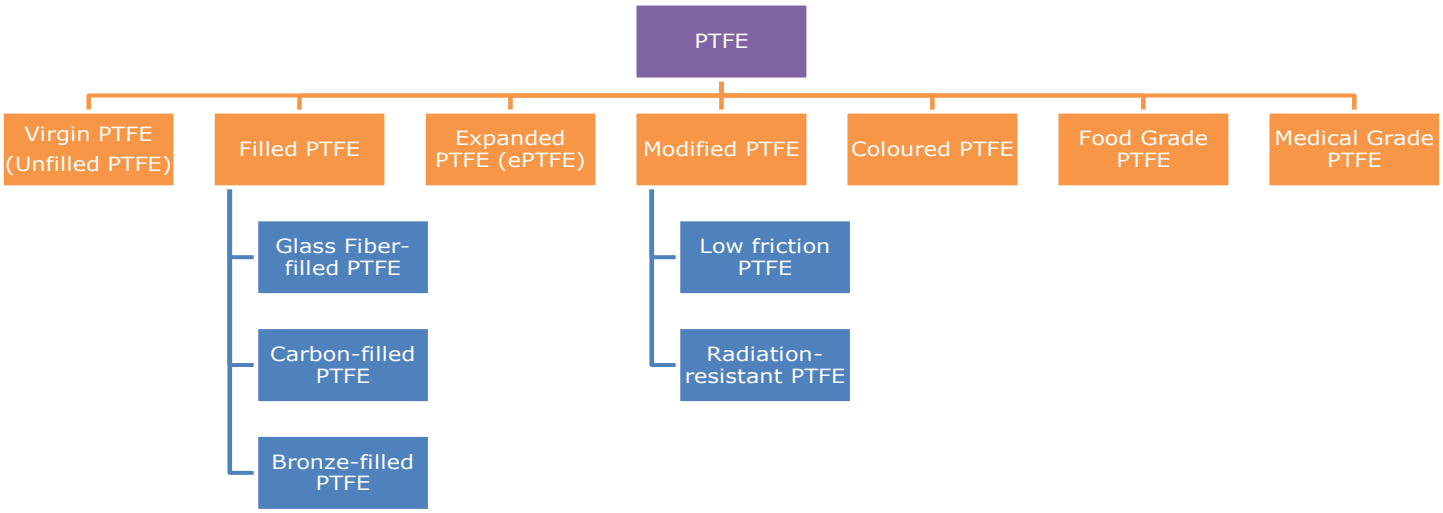
Exhibit 59: PTFE — Price trend for different grades over the last two years



Source: Industry, Emkay Research

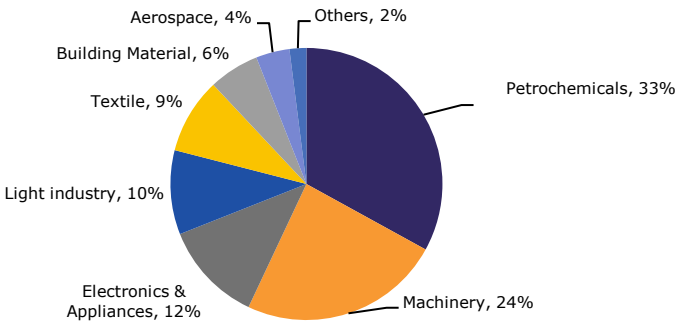
Virgin PTFE is the purest form of PTFE which is used to manufacture laboratory equipment, gaskets, and seals. Glass-filled PTFE improves mechanical strength and dimensional stability in piston rings, bearings, and mechanical seals. Carbon-filled PTFE enhances the electrical conductivity and resistance to wear & tear. Bronze-filled PTFE offers improved thermal conductivity and higher mechanical strength compared with Virgin PTFE. There are various other filled PTFE grades—aluminum-oxide filled, calcium fluoride filled, stainless steel filled, Mica filled, boron filled, etc—which have their specific properties and downstream demand.

Exhibit 60: Different grades of PTFE



Source: Emkay Research

Exhibit 61: PTFE — Downstream demand



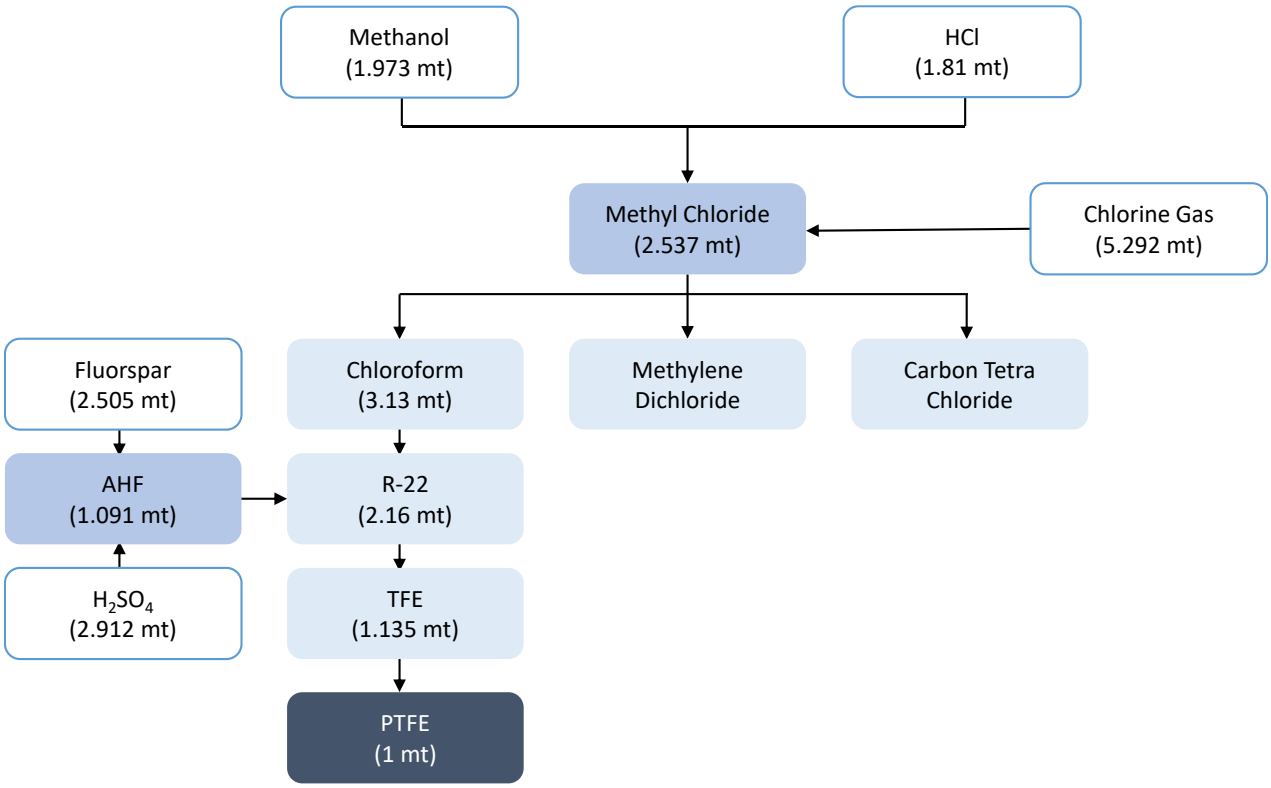
Source: Industry, Emkay Research

PTFE Manufacturing Process

The raw material for manufacturing PTFE is tetrafluoroethylene (TFE), which is a monomer. PTFE is formed by free radical polymerization of TFE. Its polymerization methods include bulk polymerization, solution polymerization, suspension polymerization, and emulsion polymerization (dispersion polymerization). Suspension polymerization and dispersion polymerization are mainly used in the industry. TFE is an organic compound and is produced in a cracking furnace at high temperatures by adding R22.

Polymerization is a considerably power-intensive process and companies with a captive power plant will be better placed for reducing energy costs. With different grades and types of PTFE, further chemical reactions and processing are required to change its form, from virgin PTFE to others, depending on customizations required.

Exhibit 62: PTFE — Unit economics



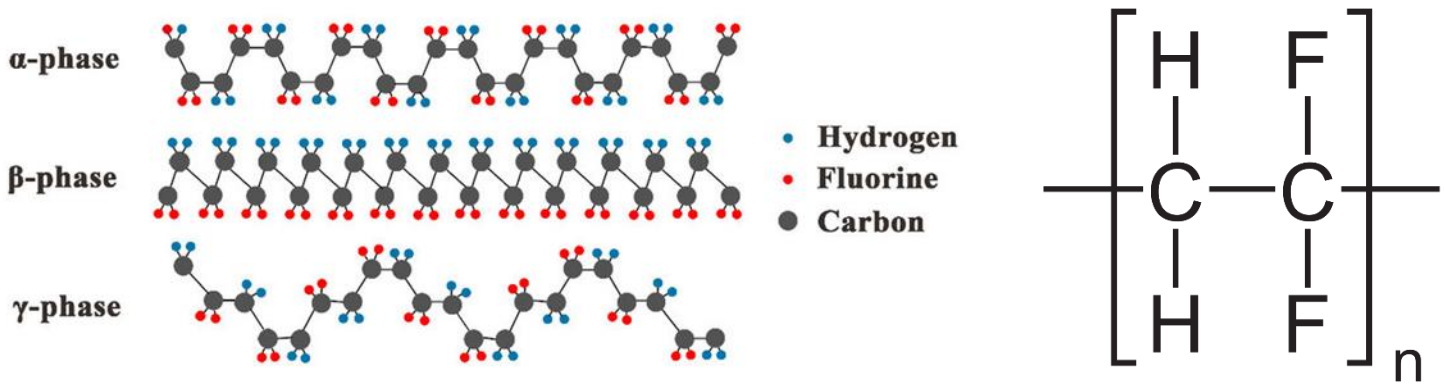
Source: Emkay Research

Polyvinylidene Fluoride (PVDF)

Polyvinylidene Fluoride (PVDF) is a highly non-reactive thermoplastic fluoropolymer produced by the polymerization of vinylidene difluoride (VDF) and has a fluorine content of ~60%. It has a lower density than other fluoropolymers like PTFE. It is resistant to almost all types of aliphatic and aromatic hydrocarbons, mineral and organic acids, halogenated solvents, oxidizing environments, and alcohols. Thus, it is a new-age solution for solar panel backsheets. It has outstanding aging resistance, with its properties remaining intact over years.

PVDF is FDA-compliant, absolutely non-toxic, and can be used in repeated contact with food products. Its surface, like glass, is unfavorable for the proliferation of microorganisms. PVDF has good mechanical properties in tension as well as in deflection, torsion, and compression compared with other fluorinated polymers, and will not swell or alter in a wet environment. PVDF forms are named alpha, beta, and gamma, depending on their piezoelectrical capacity.

Exhibit 63: PVDF — Molecular structure

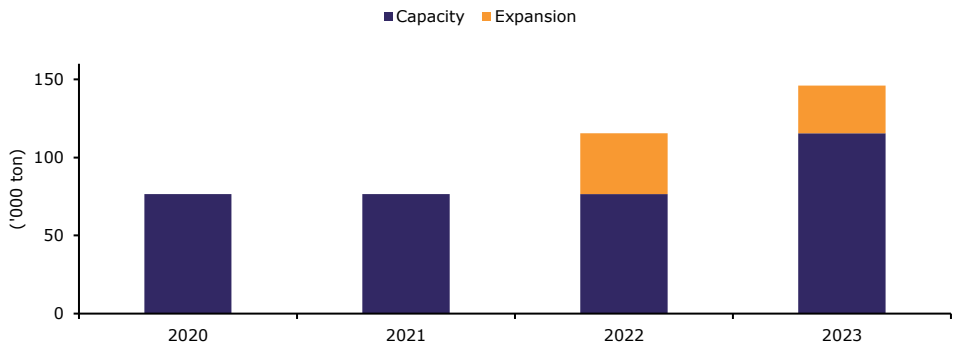


Source: Industry

PVDF will see high growth, but is also witnessing commensurate capacity additions

The PVDF market is expected to log a CAGR of 12%, from USD2.2bn in CY22 to USD5bn in CY30. Current global PVDF capacity is ~180ktpa (~70% in China) and demand is ~75ktpa, leading to average utilization levels of ~40%. In FY21, China had a capacity of 74ktpa, which nearly doubled to 146ktpa in FY23. Chinese companies have, cumulatively, announced a capex plan for setting up a new PVDF capacity of ~120kpta by FY25, to fulfill the growing demand in Li-ion batteries and solar panel back sheets, and thus take the total global capacity to 330-350ktpa. These capacities are being created in anticipation of significant demand growth, but the demand may take more time to catch up with supply.

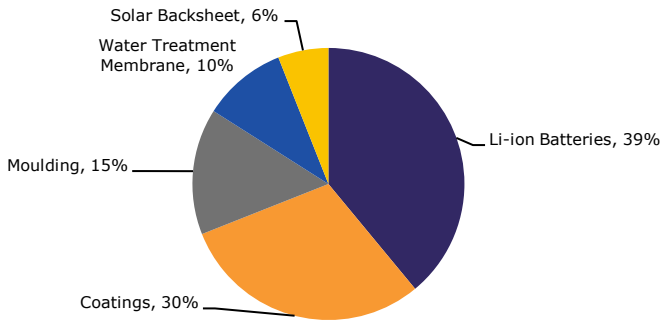
Exhibit 64: PVDF — Capacity addition by Chinese companies



Source: Industry, Emkay Research

These aggressive expansions will again create significant surplus capacities and put pressure on pricing. PVDF prices in China have come down by 50% in H1FY24. Prices of PVDF skyrocketed from USD12/kg in April 2021 to the peak of USD38-40/kg, and are now hovering at USD22-25/kg. It seems the downtrend will continue till the end of the year due to stagnating demand in the near term and increasing plant capacities day by day, though, the overall demand outlook for PVDF is maintaining a high growth rate.

Exhibit 65: PVDF — Downstream demand

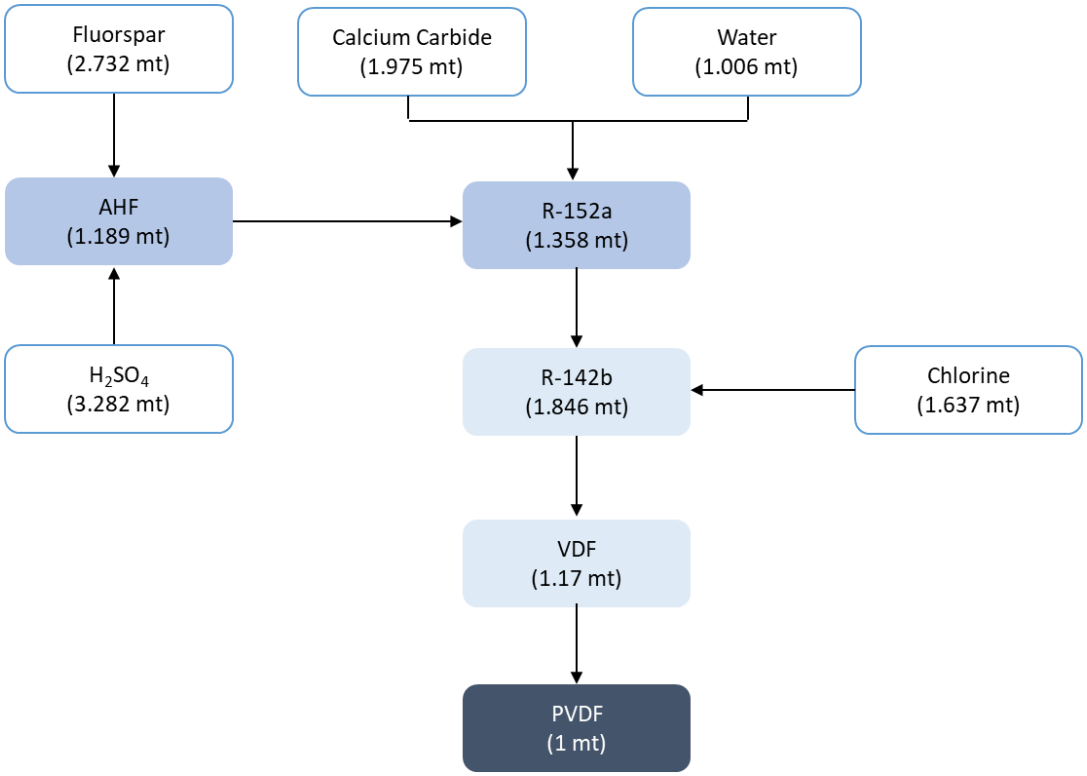


Source: Industry, Emkay Research

PVDF Manufacturing Process

PVDF is synthesized from R142b by removing hydrogen chloride to synthesize the VDF monomer, which is then polymerized. There are two methods of producing R142b, which is the raw material for VDF. The first method entails reacting VDC with HF to generate R141b and again reacting it with HF to generate R142b. The second method calls for reacting HF with Acytelene (Calcium Carbide) to generate R152a and then R142b. GFL has planned for backward integration of PVDF through the VDC route due to commercial viability.

Exhibit 66: PVDF — Unit economics



Source: Emkay Research

Fluorine Kautschuk Material (FKM)

Kautschuk refers to rubber or latex. Here, Fluorine Kautschuk Material (FKM) represents Fluorine rubber or Fluoro-rubber. FKM is a family of Fluoro-elastomer materials which contains vinylidene fluorine (VDF) as a monomer. It was originally developed by Chemours (erstwhile DuPont) in 1957, to meet demands of the aerospace industry that required high-performing sealing applications and is now being manufactured by all major players across the globe.

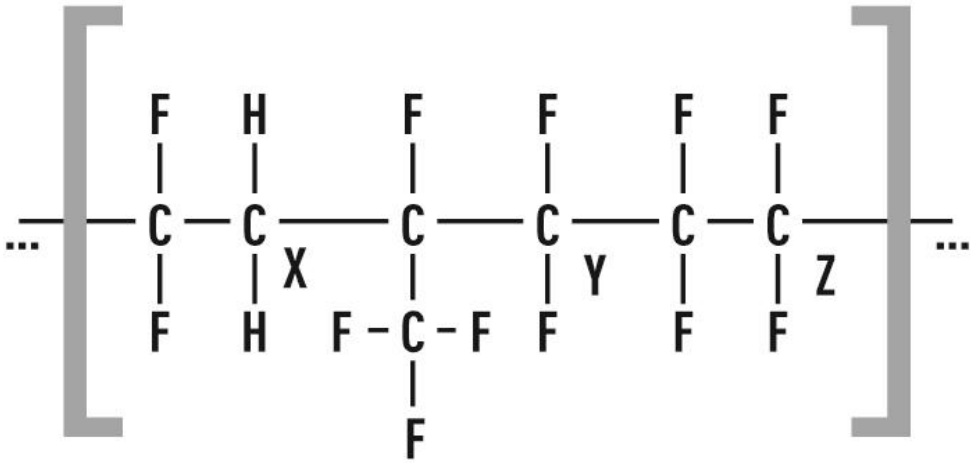
The remarkable resistance of FKM to various industrial chemicals stems from its high fluorine-to-hydrogen content ratio. This characteristic provides it with robust protection against a broad spectrum of corrosive substances, such as acids, steam, methanol, petroleum-based and silicone oils, diesel fuels, and other highly polar fluids.

FKM's strength lies in the stability of the carbon-fluorine bonds within the material. These bonds remain strong even when exposed to high-temperature conditions, which helps to prevent chemical degradation or saturation.

FKM has varied end-uses but is largely skewed towards the global auto demand

In essence, the higher the carbon-fluorine content in an FKM product, the more resistant it is to corrosive agents. Additionally, lower viscosity FKM polymers find application in extrusion processes or are used to enhance mold flow, especially for complex part configurations. In summary, FKM elastomers are prized for their exceptional resistance to harsh chemical environments and extreme temperatures, making them indispensable in industries that demand reliability and durability in challenging conditions.

Exhibit 67: FKM — Molecular Structure



Source: Industry

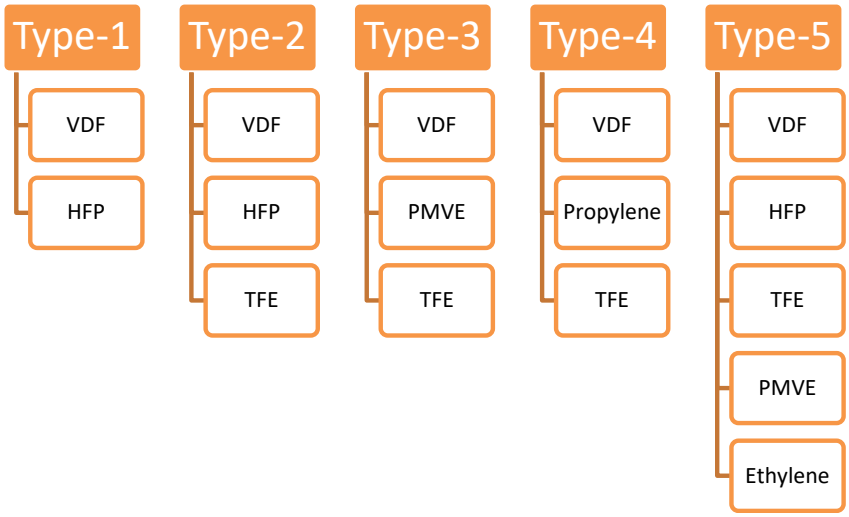
Advancements in gas turbine engines challenge fluoro-elastomers, to test their thermal limits. As vehicles, aircraft and ships become more powerful and energy-efficient, they will require components that are more reliable, operate safely and last longer.

Typical uses of FKM in the aeronautical industry include O-rings, gaskets, shafts, fuel hoses, joints, and other electrical connector components that are subjected to intense temperatures and pressure changes during flights. In the automotive industry, FKM helps to power high-performance engines that combine oil and chemicals with high temperatures.

Types of FKM by Chemical Composition

- Type 1 – Fluorine content (66%); overall good performance.
- Type 2 – Fluorine content (68-69%); better chemical and heat resistance.
- Type 3 – Fluorine content (62-68%); better low temperature flexibility.
- Type 4 – Fluorine content (67%); base resistance is increased, swelling properties in hydrocarbons are worsened.
- Type 5 – Fluorine content (65%); base resistance and high temperature resistance to hydrogen sulfide.

Exhibit 68: Types of FKM, by chemical composition



Source: Industry, Emkay Research

More complex grades are developed by western players

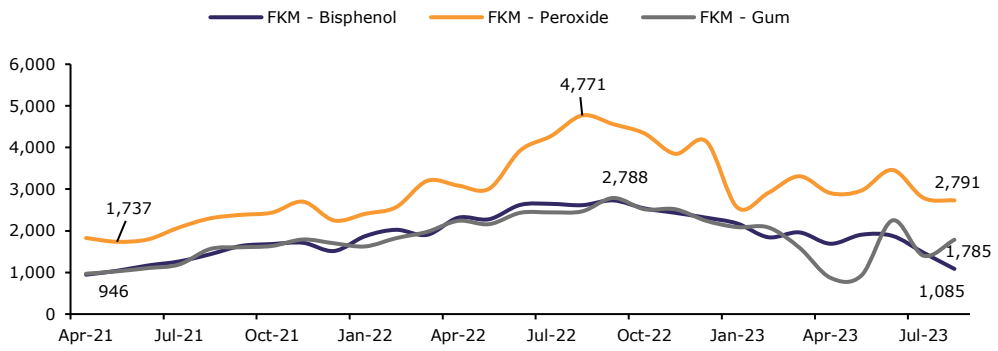
GFL mainly deals in Type-1 and Type-2 grades of FKM. Solvay is the only company selling all types of FKM grades, while DuPont, 3M and Daikin are manufacturing Type 1 to Type 4 grades.

The general performance of any rubber compound will be dictated by the polymer. An elastomer fails at its application either through its polymer backbone, the cure-site (co-agent) or both. There are three cure systems through which chemical linkage is achieved. Each type of cure has its strengths and weaknesses.

- **Diamine Cure:** Introduced in the 1950s and based on an organic species containing two amine groups. Its excellent ability to enhance FKM bonding to metal and imparting high hot tensile strength is the best.
- **Bisphenol Cure:** Introduced by Chemours (erstwhile DuPont) in the 1970s. It has two bonds per molecule, i.e. it is difunctional in structure. It has extreme thermal stability in mineral oil.
- **Peroxide Cure:** The bond is covalent in nature and has three bonds per molecule in structure. It offers excellent resistance to water, steam, and acids.

In the market, peroxide-based FKM is sold at a premium of nearly 0.8-1.0x of bisphenol cured FKM. This is because of its higher applicability and goes through more refining to add an additional atom to the carbon molecule.

Exhibit 69: FKM — Price trend



Source: Industry, Emkay Research

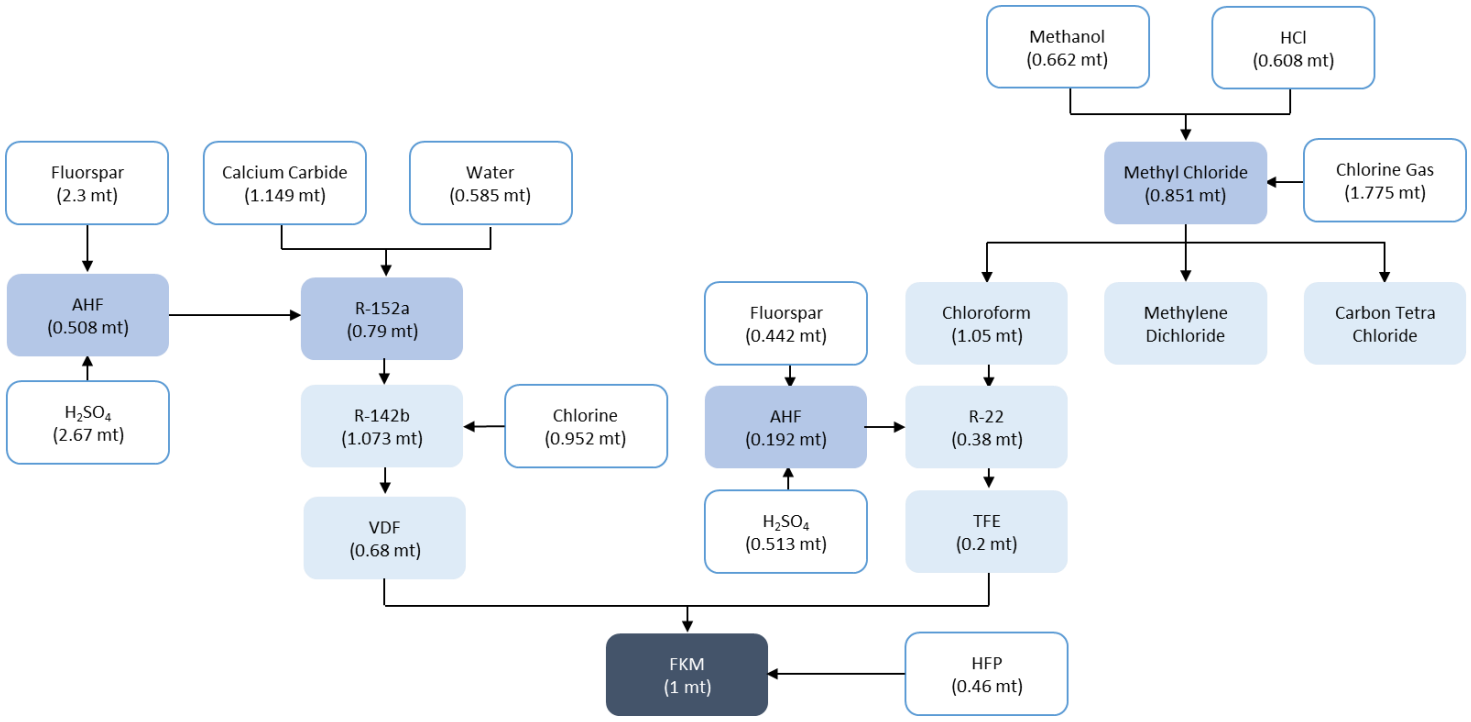
In general, manufacturing of fluoropolymers is a complex process with a considerably long period for setup and a high approval period from customers before revenue starts to flow. Manufacturing of FKM is a complex process (Exhibit 70), especially for a new entrant. Thus, there are limited suppliers of FKM across the globe. The complexity increases with each type of FKM grade. For a vertically-integrated facility, it must have minimum VDF capacity, as it is costlier to procure, while HFP is available through the year without any disruption.

FKM has become largely commoditized now and is seeing low focus compared to PVDF

In CY22, the FKM global consumption demand was at USD1.5bn and it is expected to post a normalized CAGR of 3% over CY22-30. FKM demand is linked more to the automotive industry, which is the major demand driver. The shift towards EV alternatives will reduce the demand for O-Rings and gaskets; however, aerospace and the oil & gas industry will continue driving demand. The FKM market has become quite commoditized now and grades are easily replicable, making it a low-focus area compared to PVDF.

Manufacturing 1ton of Type-2 FKM requires 0.68ton of VDF, 0.2ton of TFE and 0.46ton of HFP. All these materials are mixed and compressed, along with de-ionized water, for polymerization. Then, this latex is coagulated by adding the coagulant. Thereafter, the latex is transferred to trays for cooling and packing.

Exhibit 70: FKM — Type-2 Unit economics



Source: Emkay Research

FFKM is a **per-fluoro-elastomer**, which contains higher content of fluorine compared with FKM and thus entails higher temperature ratings. The first FFKM seal was introduced in the 1960s. However, it did not scale up due to patent restrictions.

FFKMs have a carbon-to-carbon polymer backbone, surrounded by relatively large fluorine atoms, creating a shielding effect against virtually all types of chemical attack. Also evident is the high bond dissociation energy C-F bond in the FFKM, in comparison to the weaker C-H bonds found in the FKM material. This more robust chemical makeup gives FFKM materials their high-temperature sealing capability and significant chemical-resistance performance. This is especially important for consumer health to ensure an end-product free of contamination.

FFKM materials have quite a few, low molecular weight species added during the compounding step of material production; this level of purity results in a much lower outgassing rate.

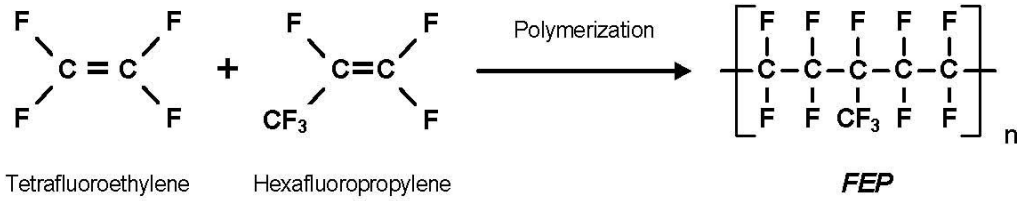
While FFKM materials are initially more expensive than FKM materials; this expense is largely offset by medium-to-long term cost savings, including relative reliability and longevity, less frequent maintenance, shorter repair and overhaul windows and, most notably, the potential to rationalize onto a single material grade across all applications.

Fluorinated ethylene propylene

Fluorinated ethylene propylene (FEP) is a copolymer of hexafluoropropylene (HFP) and tetrafluoroethylene (TFE). Its properties are similar to PTFE. It differs from the PTFE resins, in that it is melt-processable using conventional injection molding and screw extrusion techniques due to lower viscosity. In addition, FEP is highly transparent as well as resistant to sunlight. It is suitable in almost all fields of fluoropolymers and can replace PTFE in some industries. FEP was invented by DuPont in the 1950s.

TFE and HFP are added to the mixing tank according to the proportion, and then pressed into the polymerization kettle. At the same time, deionized water and initiators, emulsifiers and other additives are added to the polymerization kettle to polymerize under a certain temperature and pressure. The upstream raw material TFE is gaseous at room temperature and is toxic, thus making transportation substantially difficult. Most relevant domestic production companies need to start with the refrigerant HCFC-22 to produce TFE, then further produce HFP, and finally polymerize to produce fluorine-containing polymer materials, which requires a long production process.

Exhibit 71: FEP — Molecular structure

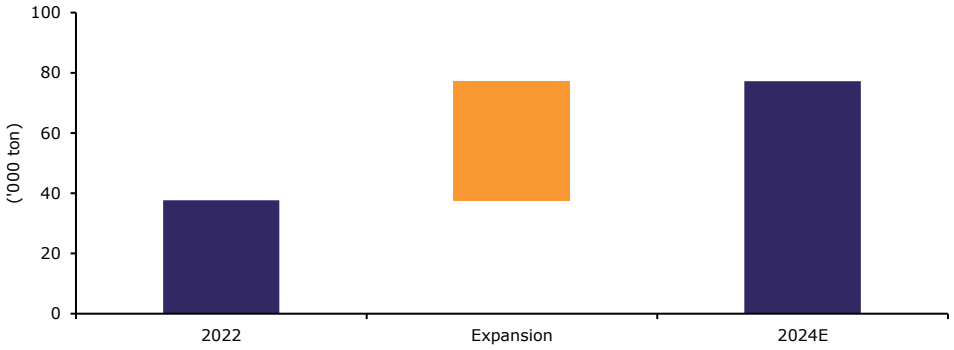


Source: Industry

FEP can replace PTFE to a certain extent and is thus seeing capacity additions

The FEP market is estimated at ~USD1bn as of CY22, expected to grow at 5% over CY22-30, on demand from chained to growth in demand for fiber cables and photo voltaic cell lamination. Global FEP capacities stand at ~60kpta as of CY22 and demand is ~40ktpa; China has manufacturing capacity of ~38kpta which is 65% of the global capacity. Chinese players plan to double their existing capacity to ~77ktpa by CY24.

Exhibit 72: FEP capacity addition by Chinese players



Source: Industry, Emkay Research

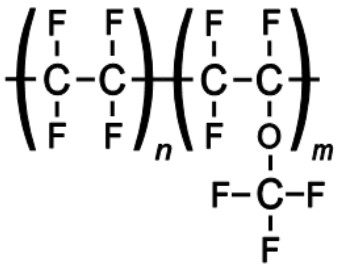
Owing to its resistance to sunlight, fluorinated ethylene propylene (FEP) is used as an insulation material for outdoor electrical wires, as well as jacketing material for optical fiber cables. Additionally, FEP is an excellent semiconductor for manufacturing electrical fittings and appliances. Also, studies have shown it to be a cost-effective alternative to PTFE in non-stick applications of the cookware industry. FEP is widely used in power cables, aerospace, energy, non-ferrous metal smelting, oil mining, motors, etc.

Perfluoroalkoxy alkane

Perfluoroalkoxy Alkanes (PFA) are copolymers of tetrafluoroethylene (TFE) — which is manufactured from R22 — and perfluoroethers (PFE). Properties of PFA are more or less similar to that of PTFE. PFA is excellent at preventing things from sticking to it and can withstand exposure to many harsh chemicals, though it is more susceptible to scratches and physical abrasions compared with some other materials.

The alkoxy ingredients allow PFA to be melt-processed. On a molecular level, PFA polymers have a smaller chain length and higher chain entanglement than other fluoropolymers. They also contain an oxygen atom at the branches. This results in materials that are more translucent and have improved flow and creep resistance, with thermal stability close to or exceeding PTFE. Thus, PFA is preferred when extended service is required in hostile environments involving chemical, thermal, and mechanical stress. Even FEP is ten times less capable of withstanding repeated bending without fracture than PFA.

Exhibit 73: PFA — Molecular structure

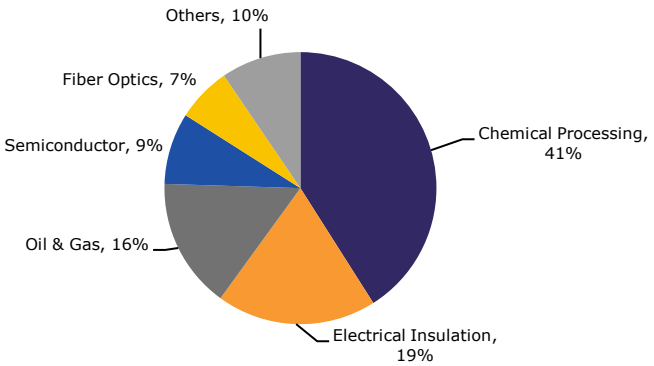


Source: Industry

PFA will see strong demand from semi-conductor applications and be the second fastest growing fluoropolymer after PVDF

PFA is commonly used in piping and as a fitting for active chemicals, as well as for the corrosion-resistant lining of containers in the chemical manufacturing industry. PFA is also used to make sampling equipment in analytical chemistry and in the field of geochemical or environmental studies. The PFA market is expected to have grown to USD0.4bn in CY22 which translates into global demand of ~6-7kpta. At present, there is an increase in the demand for high-purity PFA in critical fluid transport tubing applications.

Exhibit 74: PFA — Downstream demand



Source: Industry, Emkay Research

PFA has found applications in the semiconductor industry, which is one of the early adopters of fluoropolymers. Fluoropolymers help to achieve the purity required in the production of microchips. According to World Semiconductor Trade Statistics, the global semiconductor market is estimated at USD580bn as of CY22.The demand for electronics products in the Asia-Pacific region is largely from China, India, and Japan. The Government of India (GoI) has also announced an outlay of USD10bn.

PFA is cleaner and resulting containers have lower traces of the metal. Application of PFA products in the semiconductor industry is in wet etching and cleaning (PFA material cassette, acid tank, beaker, etc); Chemical mechanical polishing (CMP; volumetric flask, measuring cylinder, beaker, etc.); Sample introduction system (ICP-MS instruments for measuring low percentage-point level trace metals); Transport high-purity acid (10ppt grade).

Fluorinated compounds

Fluorinated compounds are aliphatic, aromatic and hetrocyclic molecules in which at least one fluorine atom has been introduced using any of the routes. These molecules may either be intermediate to agrochemical technicals, pharma active ingredients or other performance materials. China has the largest presence in commoditized compounds. Based on our interactions with global fluorination experts, sophisticated molecules which are more hetrocyclic in nature will be absolute winners.

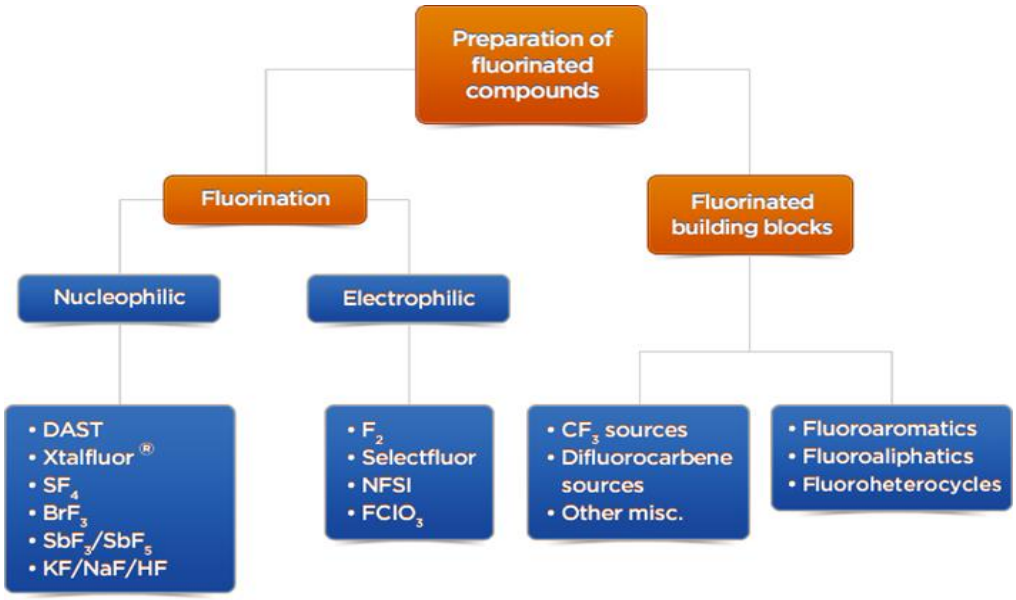
The right way of fluorinating compounds:

- **Developing the right method of fluorination –** The simplest way to introduce fluorine is either through the HF or the KF routes. Reaction under HF is rigorous and fast (exothermic), whereas reactions under the KF route are milder and easy to handle, and generally done through halogen exchange. The electrophilic way (by using F_2, Selectfluor, etc.) may be expensive and difficult to handle, but more yield efficient. There should be constant efforts towards cost optimization and yield efficiency in the existing processes, for developing the best route to manufacture a compound.
- **Developing the right building block is key –** Companies that specifically focus on developing key building blocks will have significant opportunities to scale the derivatives in coming years. Though building blocks may become commoditized over time, the supply chain risk is largely mitigated with a backward integrated building block in place. The key building blocks today are Fluorobenzene, TFE (Tetrafluoroethylene), TFA (Trifluoroacetic acid), HFA (Hexafluoroacetone), BTF (Benzotrifluoride), etc. which are currently being imported to a large extent in India.
- **Capability need to be built for handling higher volumes –** Once the molecule is developed with lab & pilot scale, companies generally follow the process of mapping the molecule to a multi-purpose plant, unless the customer asks for a dedicated plant. These molecules will then be manufactured, depending on the customer's volume requirements; however, the challenge lies in scaling up the molecule with a dedicated plant. Customers are generally ready to fund the capex of a dedicated plant for companies that have the capability to scale the molecule in a dedicated plant.
- **Catalogue products will face competition –** Catalogue products will face competition from Chinese players, but Chinese companies are focused more on scaling volumes for catalogue rather than on building more derivatives or high-end specialty products. China's forte is in inorganic fluorochemicals, while the organic market is fragmented. In China, there is not a single large player in the organic fluorospecialty space. Ex-China, the organic market is a consolidation of large players with strategic access to raw materials.
- **The more sophisticated and hetrocyclic molecules will have higher margin –** Sophisticated molecules with high-end pharma and agrochemical applications and no alternatives will get the bigger portion of the opportunity pie. Hetrocyclic molecules, which contain a pyridine & pyrazole ring with larger use in patented molecules, will have volume as well as margin advantage. Companies that are focused more on these kinds of molecules in their R&D will most likely grow and largely remain immune to long cyclical downturns.
- **Each molecule will have its own lifecycle –** Each molecule used in either a patented or a non-patented end-product will have its own lifecycle. The molecule will start scaling up in volume at a standard price during the period of the patent for the end-product. Once the end-product nears its getting off-patented, multiple players enter the market and start making it more competitive, thereby putting pressure on price; however, volumes may grow. The molecule will also have its own lifecycle, depending on an application or a process patent and its expiry.
- **De-risking the end-use portfolio –** Fluorinated compounds have uses in agrochemicals, pharma and performance materials. Companies should have a balanced mix of all these sectors in their portfolio, to enjoy the benefits of natural hedge in case of cyclicality in any particular vertical. Over the last few years, several Indian companies have been de-risking their portfolio, away from agrochemicals towards pharma and performance materials.

How is fluorination conducted?

Fluorination reactions are employed to introduce fluorine into substrate molecules, and various reagents are available for this purpose. One common fluorinating reagent is hydrofluoric acid, although it also requires cautious handling due to its corrosive and reactive nature. Further, using elemental fluorine or HF poses challenges in terms of specificity, as these tend to react vigorously with organics, making it challenging to control the precise position of fluorine atom insertion in a substrate molecule. Consequently, researchers have developed alternative reagents that offer improved control over fluorination reactions.

Exhibit 75: Preparation of fluorinated compounds



Source: Industry

Nucleophilic Fluorination:

Nucleophilic fluorination is the most common method

In nucleophilic fluorination reactions, a nucleophilic fluorine source, such as alkali metal fluoride or silver fluoride, is used to substitute other functional groups in organic compounds with fluorine. Nucleophilic fluorination is known for its region-selectivity and ability to introduce fluorine selectively at specific positions in a molecule.

KF/NaF/AgF, NH4F, SF4, Tetra-n-butylammonium fluoride (TBAF), Selectfluor® (for selective fluorination), NFSI, Deoxo-Fluor or DAST (to replace hydroxyl groups (-OH) with fluorine atoms) etc—all these reagents are used in nuleophilic fluorination.

Electrophilic Fluorination:

This method involves the introduction of fluorine atoms or fluorine-containing groups into organic molecules using electrophilic fluorinating reagents, such as hydrogen fluoride (HF) or elemental fluorine (F_2). Historically, fluorine gas served as the primary electrophilic fluorine source, but it is both—highly toxic and possesses potent oxidizing properties. So these reactions often require careful handling due to the highly reactive nature of fluorine.

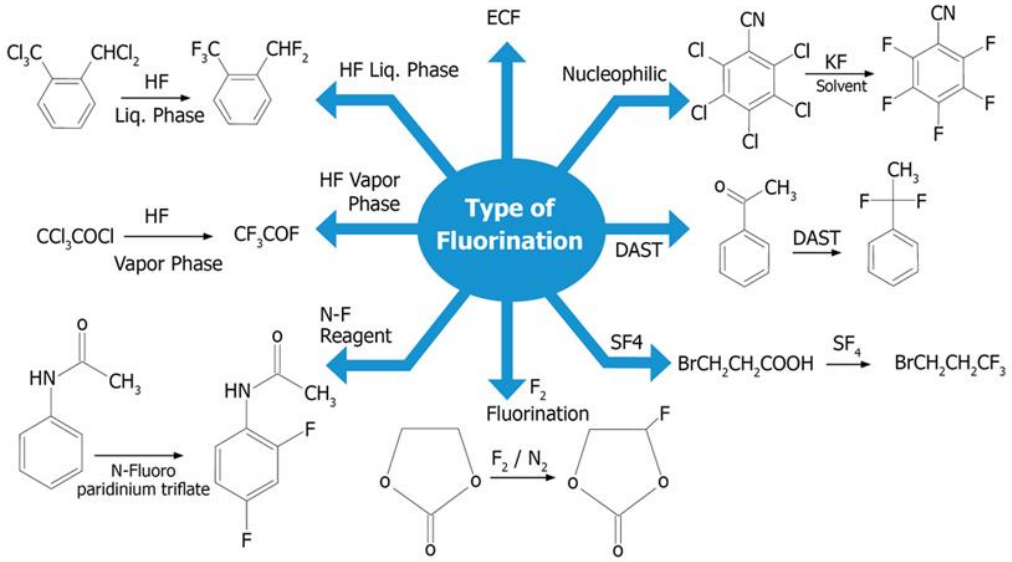
Fluorine gas (F_2), Hydrogen fluoride (HF), Fluoroxysulfates, ClO_3F, XeF_2, etc are commonly used in electrophilic fluorination reactions.

Fluorinated Synthons:

Fluorinated synthons are specific building blocks or intermediates that contain fluorine atoms or functional groups. These synthons can be incorporated into various organic syntheses to introduce fluorine-containing moieties into target molecules. They serve as versatile tools for the synthesis of fluorinated compounds.

Some examples of fluorinated building blocks are Fluoroacetic acid, Fluoromethyl ketone (CF_3COCH_3), Difluorocarbene (CF_2), Fluorinated alkyl halides, and Fluorinated aromatic compounds, etc.

Exhibit 76: The Fluorination process



Source: Industry

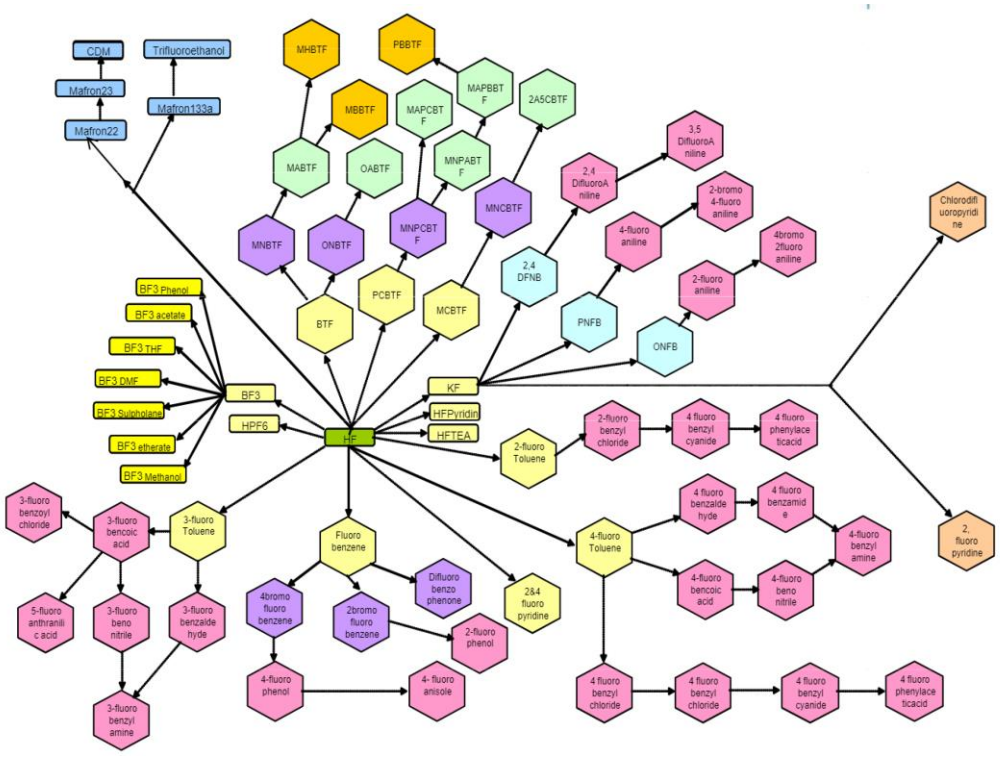
ECF is largely used for selectivity

Electrochemical Fluorination:

Electrochemical fluorination (ECF) processes utilize an electrochemical cell to introduce fluorine into organic compounds. Electrolysis of appropriate starting materials in the presence of a fluorine source can lead to the formation of fluorinated compounds. This method offers control over reaction conditions and selectivity.

Commercially, electrochemical fluorination is employed to manufacture perfluorinated compounds. This process involves electrolyzing solutions of organic compounds, primarily carboxylic acids, sulfonic acids, and tertiary amines, within anhydrous hydrogen fluoride. Notably, this occurs in a single cell without the intermediate generation of free fluorine. The fluorination process transpires at a nickel anode via a free-radical mechanism, typically operating at current densities ranging at 10-20 mA/cm².

Exhibit 77: Fluorinated compounds formed using HF and KF



Source: Industry

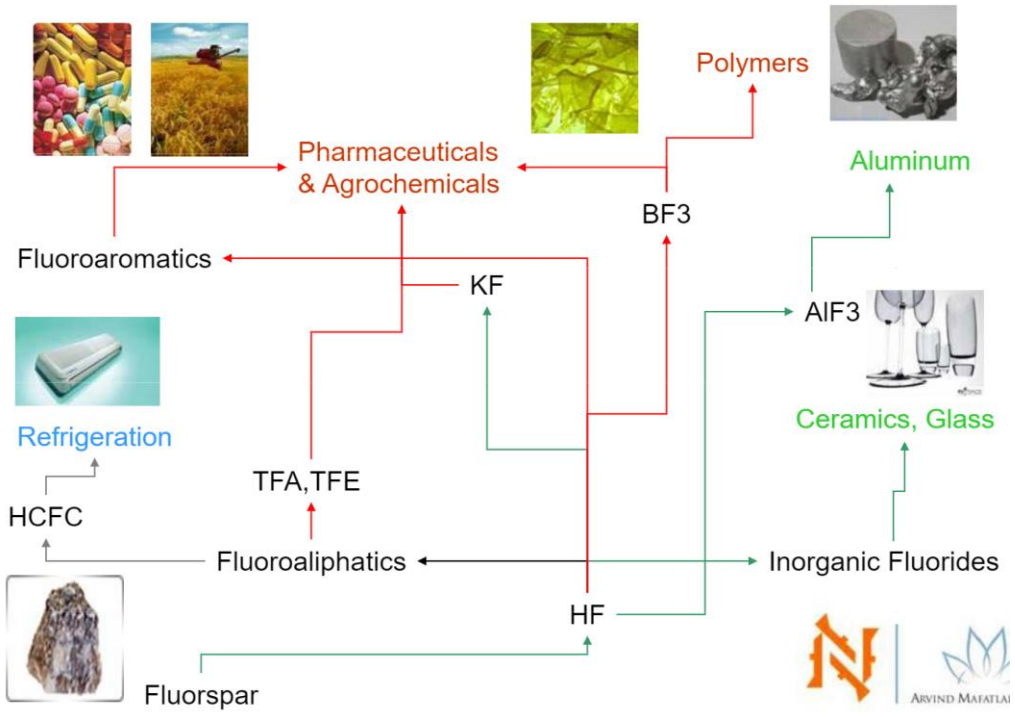
Some other important routes to carry out fluorination:

- **Vapor Phase Fluorination via Transition Metal Catalysis:** In a gaseous phase, a halocarbon containing three or fewer carbon atoms and at least one halogen (excluding fluorine) undergoes a reaction with anhydrous hydrogen fluoride (HF). This reaction occurs in the presence of a catalyst that includes a chromium compound and at least one transition metal compound chosen from nickel (Ni), palladium (Pd), and platinum (Pt). The process takes place at temperatures exceeding 200°C, resulting in the replacement of at least one of the non-fluorine halogen atoms with fluorine.

DAST is more convenient to handle

- **By DAST:** Due to its convenient handling and versatile properties, Diethylaminosulfur Trifluoride (DAST) has gained widespread popularity as a reagent for nucleophilic fluorination. It has found regular use in selectively introducing fluorine into various compounds, including alcohols, alkenols, carbohydrates, ketones, sulfides, epoxides, thioethers, and cyanohydrins. Moreover, DAST opens up the potential for novel organic cyclization reactions when employed as a reagent.
- **Fluorination via Fluorine Gas Flow:** In some industrial processes, fluorinated compounds are synthesized by flowing fluorine gas through a reactor containing the substrate molecules. This method is used in production of certain fluorinated polymers and specialty chemicals.

Exhibit 78: The organic and inorganic value chain



Source: Industry

New Age Applications — Energy Material

Lithium-ion Battery

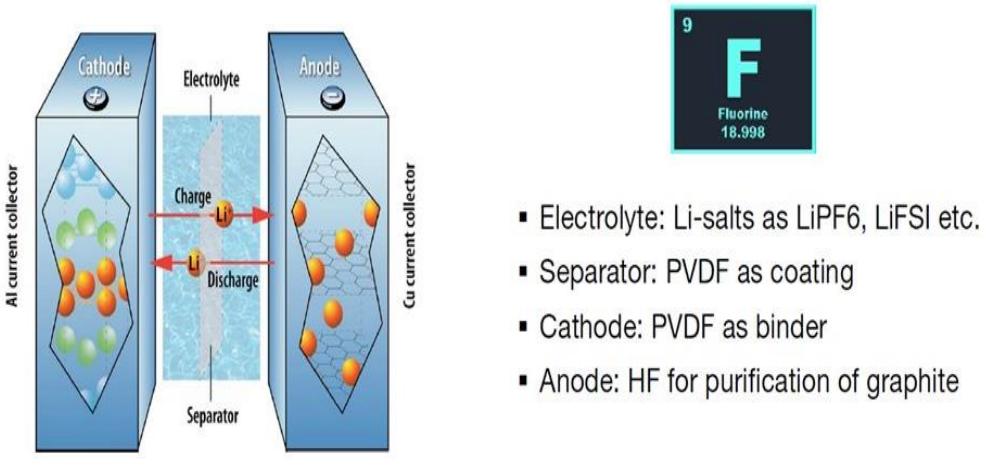
A battery has five major components – Cathode, Anode, Current Collectors, Separator and Electrolyte – that separate two terminals. The electrolyte allows an electrical charge to pass between the two terminals. It facilitates materials required for the reaction to come in contact with cathode and anode, therefore converting stored energy into usable electrical energy.

Different kinds of batteries work with different chemical reactions and different electrolytes. For example, a lead acid battery uses sulfuric acid for reactions; zinc-air battery does oxidation with zinc; alkaline batteries use potassium hydroxide and Li-ion batteries use $LiPF_6$.

PVDF will see significantly high use in battery cathode and separator

The Li-ion battery consumption demand for passenger EVs is estimated at 225GWh in CY23, while overall demand is expected to cross 400GWh. The US government forecasts the consumption demand to grow to 2,000GWh by CY30. Assuming battery cost at USD100/kWh for EV batteries, their expected market size will be at USD50bn by the end of CY25. On these assumptions, the Electrolyte market size will reach USD3bn and the Separator market size will reach USD3.5bn by CY25, driving huge demand for $LiPF_6$ and PVDF.

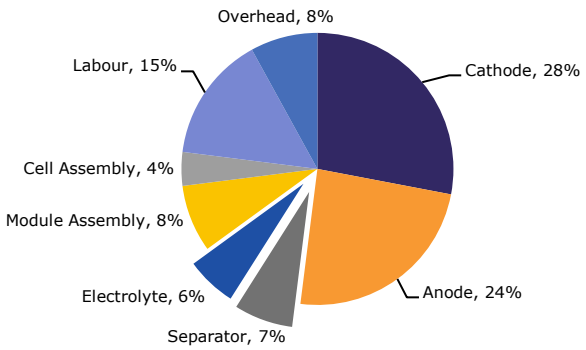
Exhibit 79: Li-ion Battery and application of fluorine



Source: Industry

Cathode (PVDF is used as a binder) and Anode (HF is used for purification of graphite) account for half of the battery manufacturing cost, while Electrolyte ($LiPF_6$ is used as salt) and Separator (PVDF is used as coating) together account for ~13-15% of the overall battery cost.

Exhibit 80: Cost breakup of Battery

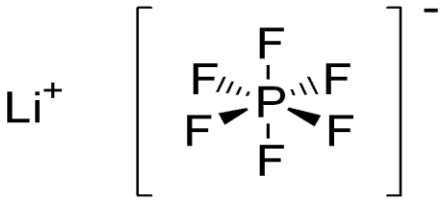


Source: Industry, Emkay Research

Lithium Hexafluorophosphate ($LiPF_6$)

$LiPF_6$ is made using lithium carbonate, phosphorus pentachloride, AHF and acetonitrile. The mixture in its appropriate proportion (Exhibit 82) is made to react in the reactor with a scrubbing solution, and then dried and filtered to get $LiPF_6$. $LiPF_6$ is typically dissolved in a solvent, such as ethylene carbonate/diethyl carbonate, to create electrolyte solution. Higher ionic conductivity increases the battery's performance and efficiency. It is sensitive to moisture and can release AHF when exposed to water. Thus, precautions should be taken while manufacturing it; $LiPF_6$ enables reversible movement of lithium ions.

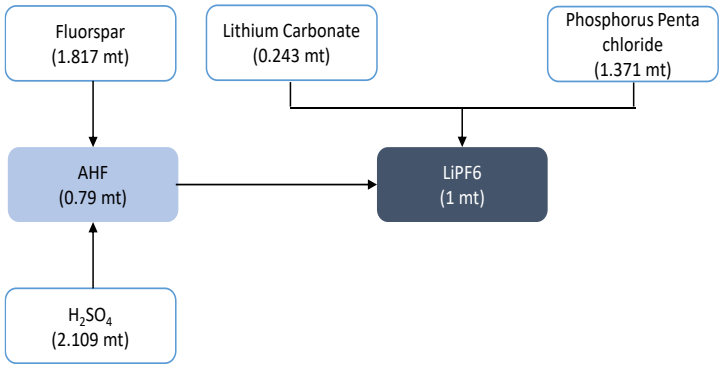
Exhibit 81: $LiPF_6$ — Molecular structure



Source: Industry

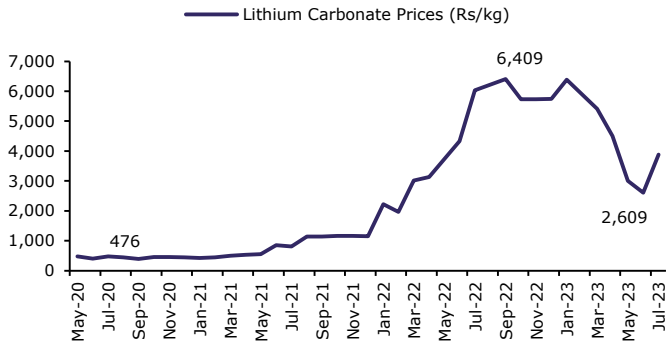
Post Covid-19, there has been a surge in EV demand driving up prices of EV battery chemicals. The prices of basic raw material for $LiPF_6$, an electronic-grade lithium carbonate (~50% of $LiPF_6$ cost), have skyrocketed, from Rs600-700/kg in FY21 to Rs6,400/kg in Sep-22 due to increasing demand. These prices have now normalized to Rs3,000-4,000/kg in H1FY24. Mainstream fluorination companies are not backward integrated to procure lithium carbonate, and source it from Lithium-producing countries like Argentina, Chile, etc.

Exhibit 82: $LiPF_6$ —Unit economics



Source: Emkay Research

Exhibit 83: Lithium Carbonate prices

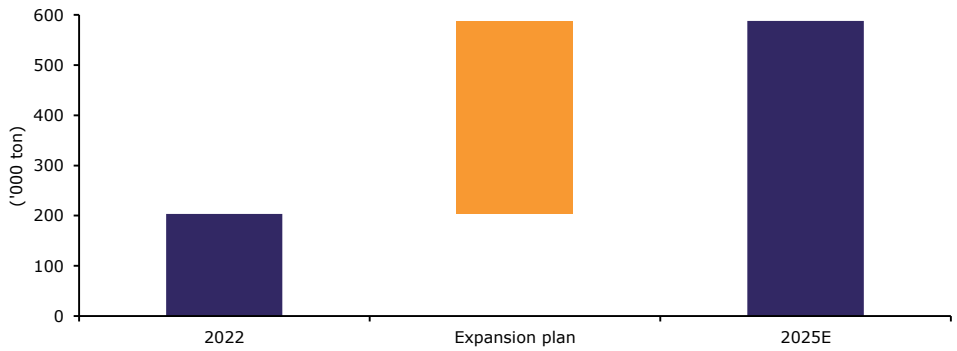


Source: Industry, Emkay Research

$LiPF_6$ is seeing massive capacity additions globally, largely led by Chinese players

With the rising spot prices and profitability of $LiPF_6$, new capacities are being added at a massive scale. The construction period has shortened to 12 months. Global capacities for $LiPF_6$ have reached ~200kpta as of CY22, with average utilization of 60%. Chinese companies have collectively committed to add ~350ktpa of capacity, and global capacity is expected to cross ~600ktpa by CY25. With this increase in capacities, there will be demand-supply mismatch, which may reduce utilization to less than 50% of capacities. Two Chinese companies—Tinci Materials and Do-Fluoride—will have estimated capacity of 245ktpa and 155ktpa, respectively, by CY25 which itself will be sufficient to cater to the entire global consumption demand. In India, only GFL is setting up $LiPF_6$ capacity of 3ktpa by FY24 and will expand further, based on the progressive demand.

Exhibit 84: Global $LiPF_6$ —Capacity expansions



Source: Industry, Emkay Research

Exhibit 85: Comparison of three Li-ion battery solution types

Features	$LiPF_6$	LiFSI	LiTFSI
Conductivity			
Safety			
Lifecycle			
Cost Competitiveness			

Source: Emkay Research

LiFSI is considered more promising compared with $LiPF_6$, but is more expensive

Although $LiPF_6$ entails low cost, its chemical properties are not stable. LiFSI has excellent properties like high ionic conductivity, high electrochemical stability, and thermal stability, it has not been widely used due to its low yield and high price. Currently, LiFSI is commonly used as an additive to electrolytes and can be mixed with $LiPF_6$ or used alone as an electrolyte. Its electrolyte performance is excellent and can significantly improve the electrolyte's conductivity, high and low temperature performance, etc., while also suppressing the generation of gas. Therefore, LiFSI is considered the most promising lithium salt to replace $LiPF_6$.

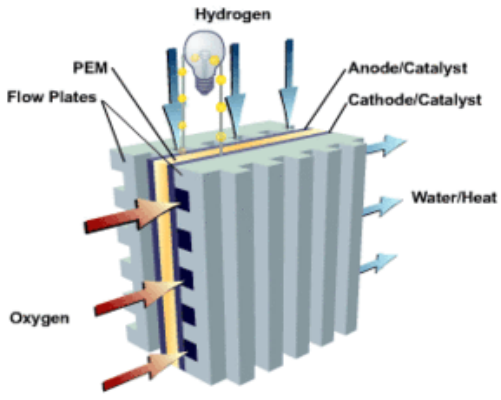
Within the fluorine chemistry, PVDF has most promising opportunities in the battery chemicals space as a binder in cathode and coating in a separator, with no known alternatives at this stage. $LiPF_6$ due to its known disadvantages will be open to alternatives (like LiFSI) within Li-ion batteries as well as open to threat from other types of renewable batteries. Too much capacity addition in China by FY25 also makes it a relative unattractive space to enter at this stage which will become commoditized eventually, till demand catches up with supply.

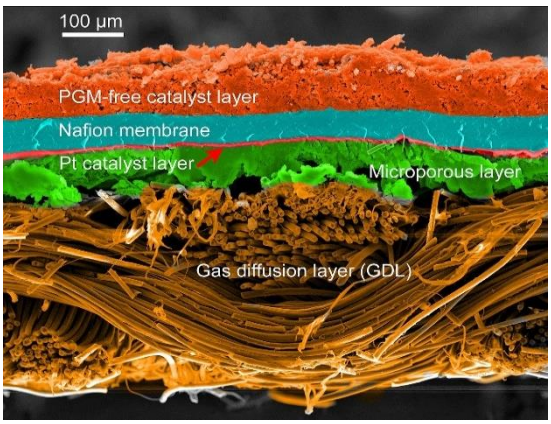
Proton-exchange Electrolyte Membrane Fuel Cell

The use of this ion-exchange membrane as an electrolyte was first suggested by Grubb in 1957 and the first such fuel cell system was based on a sulfonated polystyrene electrolyte developed by General Electric for NASA, for onboarding a power source in their Gemini Space Program.

Fuel cell converts H_2 and O_2 electrochemically into electrical power, water and heat. Proton-exchange Electrolyte Membrane (PEM) made up of PVDF is sandwiched between an anode and a cathode, each containing a porous diffusing layer and an active catalyst layer. H_2 is split into protons and electrons at the anode (negative electrode) and the sulfonated PVDF (PEM) placed in the center allows protons to pass from the anode to the cathode (positive electrode), while electrons induce a current via an external circuit to the cathode. At the cathode, the electrons recombine with the protons that have crossed the membrane and with oxygen from the air.

Exhibit 86: PEM — Fuel Cell





Source: Industry

Fuel Cell will require an oxidant or air to produce electrical energy and heat. The only by-product when fueled with hydrogen is water. A single PEM fuel cell generates a voltage lower than 1V, thus it should be stacked in a series, depending on the energy requirement. The role of an electrolyte is to provide ionic conductivity, to prevent the flow of electrons, to act as a barrier to the reactants, and to maintain chemical and mechanical stabilities.

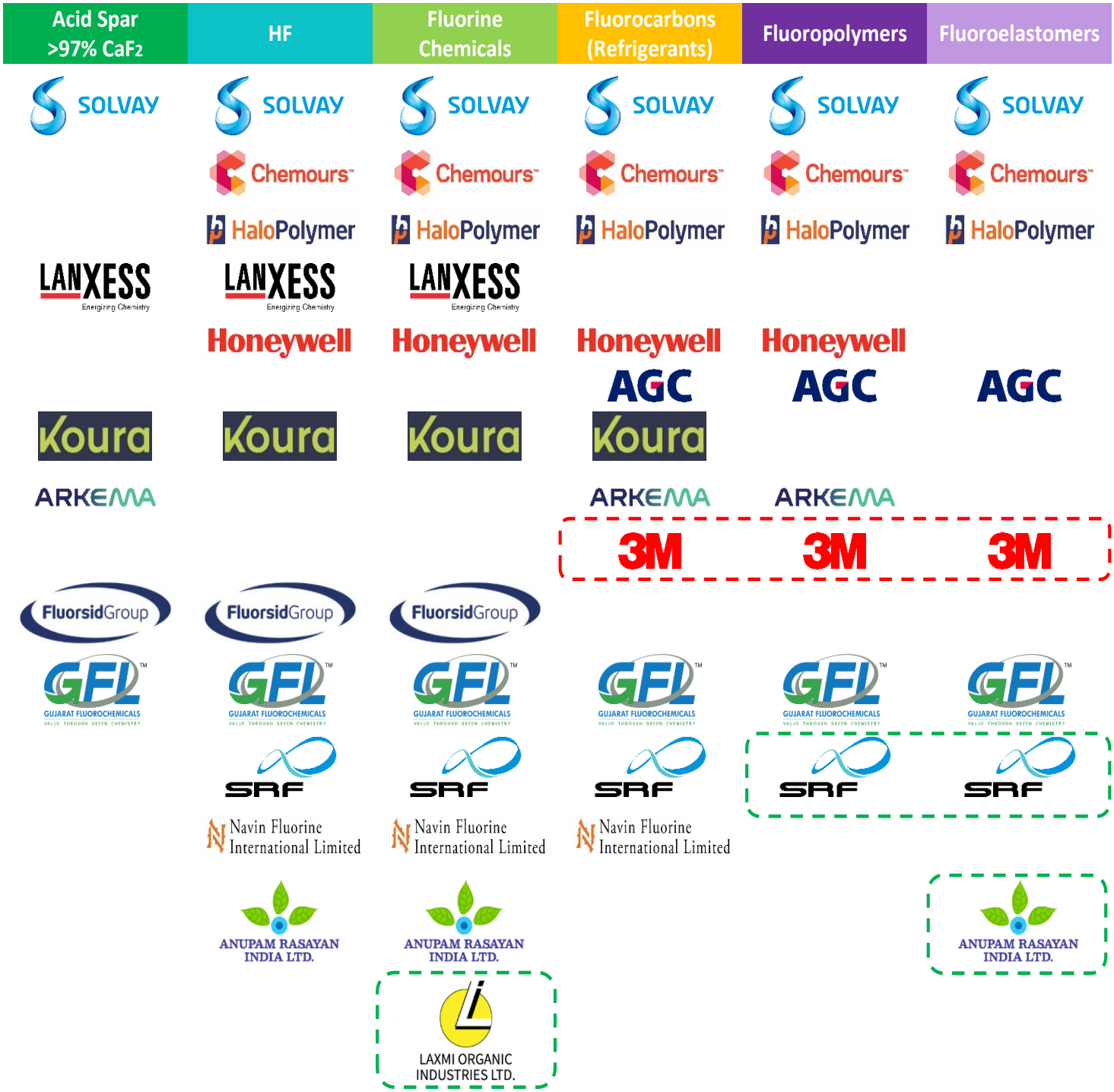
Government of India has approved the National Green Hydrogen Mission in FY22 to make India a leading producer and supplier of green hydrogen. It will take at least half a decade to take off, and scaling up this technology considering the infrastructural developments at the mobility-end and consumption end.

Fluorine supply-chain integration outside China

Globally, Solvay is the only player that is completely backward integrated and present across the fluorine value chain. Chemours and Halo Polymer do not have a fluorspar mine; however, starting from HF, they are present across the fluorine value chain. Orbia operates captive mines and is present up to manufacturing of fluorocarbons.

SRF, starting from HF, is now entering the fluoropolymers & fluoroelastomers space. NFIL, starting from HF, is present up to the fluorocarbons chain. GFL, starting from fluorspar is, present in the entire value chain. Anupam, after acquiring Tanfac, has access to HF and is planning to enter fluoroelastomers, flurorelectrolytes and other polymers. Laxmi Organics too has entered the fluorine chemicals space by acquiring Miteni's plant from Italy.

Exhibit 87: Fluorine supply chain integration outside China



Source: Emkay Research

Barriers to entry in fluorine chemistry

Fluorine chemistry has remained concentrated in limited hands when we speak of Indian fluorine markets. There are various factors that come into play, as to why there are countable companies in this space.

- **High Capex Intensity** – To enter the fluorination space one needs to create a capacity for the basic building block, which is HF. For a new HF plant, capacity of at least 15,000ton needs to be created for the economics of the plant to suit the capex. If such capacity is created, the manufacturers will have to create a parallel refrigerant gas/fluoropolymers capacity, as a large portion of HF gets consumed in these verticals. However, both refrigerant gas and fluoropolymers are long gestation businesses and existing players have already established their markets. Thus, a non-refrigerant/fluoropolymer player in fluorine will have to either source HF from Tanfac or import it from China, South Africa, etc (not being imported currently). A new entrant will have to initially operate with significantly lower asset turns, based on our workings that make it a significant barrier to entry.
- **Long gestation business** – A new molecule to develop from the ideation stage to the commercialization scale takes at least 5 years. If someone has to set up a completely backward integrated facility for refrigerants/fluoropolymers, it will take at least 5 years to commercialize and a best-case payback period of 10 years. Such a high gestation period and stringent product approvals make is difficult for any new entrant to scale up.
- **Restricted access to technology** – A very well-known expert in Flourination chemistry mentioned during the company's meeting with him that Chemistry is more of engineering and less about reactions. Chemical plants in China are being operated by AI which monitor the efficiency of a plant, analyses yields, solve downtimes, etc. For any new entrant, it would require to join hands with an existing fluorine chemistry player for technological transfer or do an inorganic acquisition.
- **Cost competitiveness** – Majorly, all Fluorochemical players are backward integrated, thus helping them to capture margins across the value chain and become cost competitive. This also makes companies less susceptible to the volatility of the commodity cycle. A non-backward integrated player will be affected by volatility in pricing/availability of raw materials and will become less competitive.
- **Stringent product development** – Higher R&D spend in the beginning will burn the cash flow and not offer any result. Once the R&D is done, it will require a minimal plant setup to pilot the new product, post which a dedicated plant is setup; however, the product generally faces consistency issues and takes time for stabilization. In CRAMS business, customers often choose vendors with a demonstrated history in product development. A new entrant may miss out on the criteria due to complex heterogeneous product development.
- **Operating Leverage** – Existing players enjoy higher operating leverage, as the business can be scaled with only minimal incremental investments. Higher utilization of capacity leads to higher operating leverage, better return ratios and improved operating margins. Incremental demand can be met in a cost-effective manner. Major fluorination players across the globe are vertically integrated, making it difficult to burn cash and set up a backward integrated facility and then market their products. Basis our IRR calculation, a new person competing with a backward integrated facility will lose 5-8% incremental IRR, depending on the products manufactured.
- **Customer approval cycle and stickiness** – It is important to develop grades and qualities of a product to suit the customer's requirements. Further, strong focus on service, continual technical support and quality consistency results in high customer retention. Also, warehousing in the customer's region and periodic fulfilment play an important role in managing client relationships.

Why is this business not attracting new competition?

R32 project of 15ktpa

The key assumptions considered are:

1. Market price of products
   - R32 : INR300/kg
   - AHF : INR150/kg
   - MDC : INR40/kg
   - Fluorspar : INR30/kg
   - H_2SO_4 : INR5/ltr
   - Methanol : INR25/ltr
2. Capex and Capacity assumptions
   - R32 : 15ktpa : INR4bn
   - AHF : 12.3ktpa : INR1bn
   - Chloromethane: 25.5ktpa : INR1bn
3. Effective capacity utilization : ~90%
4. Commercialization timeline for operating only the R32 plant (non-backward integrated) is 12-18 months; for the backward-integrated facility, it is 24-30 months (12 months for chloromethanes and an AHF plant, and another 12-18 months for an R32 plant).
5. Tax rate: 25%
6. Prices assumed to be steady over a period of 20 years. Inflation not considered.

Exhibit 88: The R32 project — IRR and margins

R32 project	Greenfield		Brownfield
	Non Backward Integrated	Backward Integrated	Forward Integration
Pre-tax IRR	8%	13%	22%
Post-tax IRR	4%	9%	16%
Pay Back Period (Pre-Tax)	10.5 Years	8 Years	5 Years
Gross Margin	36%	46%	
EBITDA (%)	11%	26%	
EBIT (%)	5%	20%	

Source: Emkay Research

Key Observations

- Forward integration is a leap, with existing capacities of feedstock.
- Longer pay-back period in the ref-gas industry.
- Regulatory risk for setting up new capacity for new entrant.
- Lower margins for non-integrated player.
- Higher gestation period and price volatility due to Chinese competition.

PTFE project of 5ktpa

The key assumptions considered are:

1. Market price of products
   - PTFE : INR800/kg
   - R22 : INR230/kg
   - AHF : INR150/kg
   - MDC : INR40/kg
   - Fluorspar : INR30/kg
   - H2SO4 : INR5/ltr
   - Methanol : INR25/ltr
2. Capex and Capacity assumptions
   - PTFE : 5ktpa : INR4.25bn
   - R22 : 10.8ktpa : INR2.5bn
   - AHF : 5.4ktpa : INR0.5bn
   - Chloromethane: 30ktpa : INR1bn
3. Effective capacity utilization : ~90%
4. Commercialization Timeline for only a PTFE plant is 24-30 months; for a backward-integrated facility, it is 36-48 months (12-18 months for chloromethanes and an AHF plant, 12 months for an R22 plant and another 12-18 months for a PTFE plant).
5. Tax rate: 25%
6. Prices assumed to be steady over a period of 20 years. Inflation not considered.

Exhibit 89: PTFE project — IRR and margins

PTFE project	Greenfield		Brownfield
	Non Backward Integrated	Backward Integrated	Forward Integration
Pre-tax IRR	11%	14%	24%
Post-tax IRR	7%	10%	19%
Pay Back Period (Pre-Tax)	9 Years	7.5 Years	5.5 Years
Gross Margin	38%	61%	
EBITDA (%)	18%	41%	
EBIT (%)	12%	35%	

Source: Emkay Research

Key Observations

- Forward Integration is a leap with existing capacities of feedstock.
- Longer Pay-back period in the Fluoropolymer industry.
- Regulatory Risk for setting up new capacity for new entrant.
- Customer acceptance risk for different grades.
- Higher gestation period and price volatility due to Chinese competition.

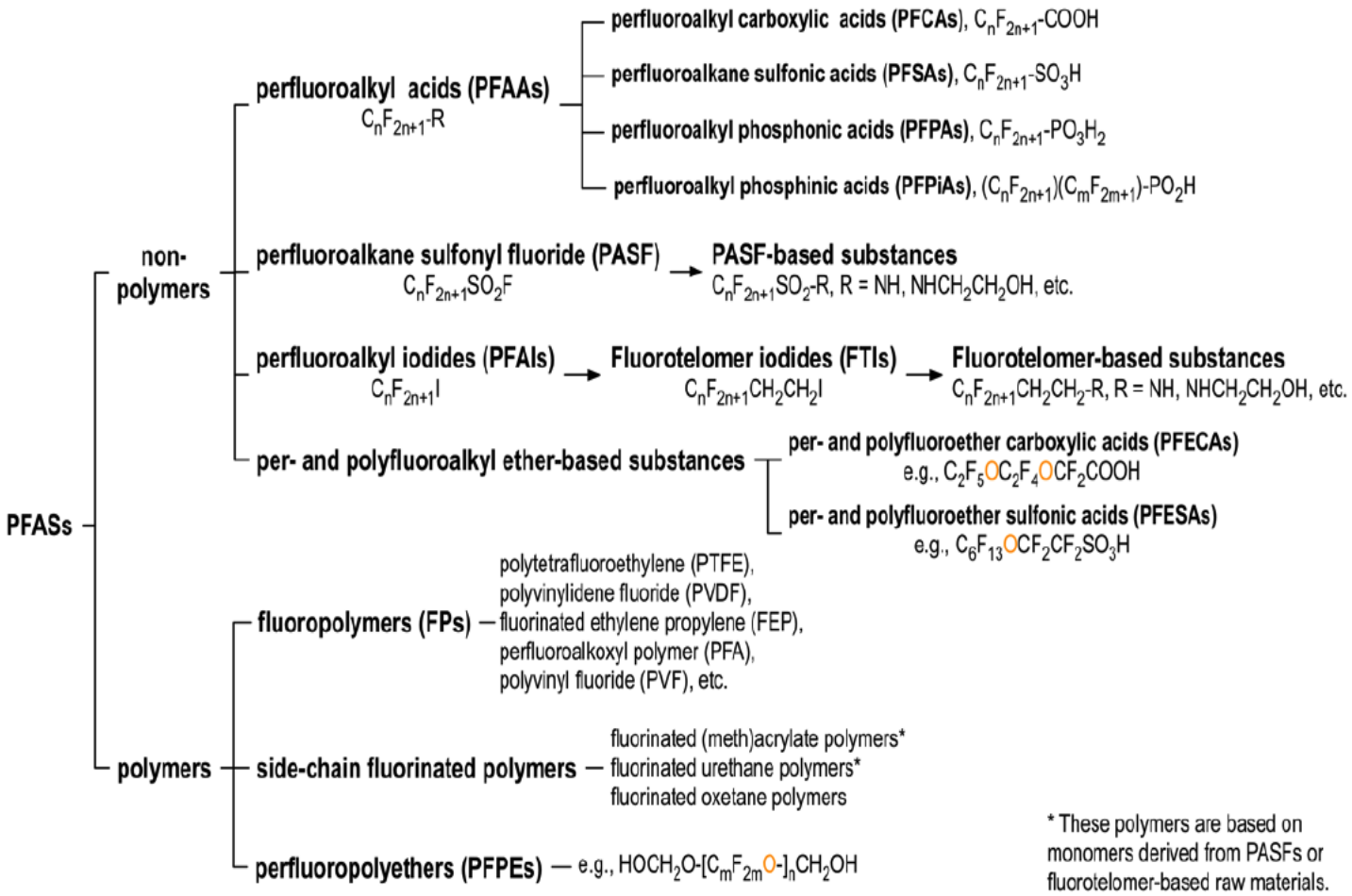
Environmental risk of fluorochemicals

Ban on Perfluoroalkyl Substances

The European Chemicals Agency (ECHA) has proposed a ban on the production, use, sale and import of ~10,000PFAS (the purpose of the ban is to keep PFAS out of the environment). Perfluoroalkyl Substances (PFAS) are used in tens of thousands of products, including mobile phones, wind turbines, cosmetics, solar panels, medical devices and raincoats. The proposed ban has been drafted by 5 countries in the European Union—the Netherlands, Germany, Denmark, Norway and Sweden. The European Commission is slated to formally present the proposal to the Member States in 2025. If passed, it would constitute one of the largest chemical substance bans ever in Europe.

The very strong bond between carbon and fluorine that gives PFAS their properties is mainly responsible for the concern: such chemicals are persistent and termed as 'forever chemicals'. While some of the more complex molecules can partially degrade, these will ultimately form a PFAS that is persistent in the environment. The PFAS group also includes polymers: e.g. fluoropolymers, perfluoropolyethers and side-chain fluorinated polymers.

Exhibit 90: Perfluoroalkyl (PFAS) substances



Source: Industry

Proposal

A ban on PFAS would reduce quantities of PFAS in the environment over the long term. It would also make products and processes safer for humans. If the European Commission adopts the proposal, companies will be forced to find alternatives for approximately 10,000PFAS in applications, where these substances are used. In many cases, no such alternatives exist at present and in some, they will possibly never exist. The proposal's formal submission in itself sends a clear signal that companies need to seek alternatives for PFAS.

Transition period

PFAS ban will be decided in FY25 and remains an overhang till then

Under the restriction proposal, companies will have about a year & a half to a maximum of 12years to introduce alternatives, depending on the application. Such deadlines also depend on the availability and applicability of PFAS alternatives. The proposal was drafted on the basis of the EU REACH Regulation on chemical substances. The rules governing active substances in plant protection products, biocides and medicines for both, humans and animals, will need to be evaluated further, for determining the extent to which PFAS can be banned for those specific applications.

Impact

Companies will either have to find an alternative or shut down production for all enlisted substances. The ban should ideally be on PFAS, which are finally being directly disposed in the environment, and not for long-chain compounds; however, the adoption of the regulation will have to be watched closely for its final impact. We believe that for applications where there are no alternatives, companies will ideally find non-fluorinated routes to manufacture these products or shut down their capacities eventually, where no alternatives are found. GFL has found the non-fluorinated surfactants route to manufacture fluoropolymers, while 3M will discontinue manufacturing all fluoropolymers, fluorinated fluids, and PFAS-based additive products by the end of 2025.

Exhibit 91: Global PFAS manufacturers

PFASs manufacturers	Country	Production capacity (ton)	Global market share (%)
AGC	Japan/United States	18,720	4
Arkema	France/China/United States	32,760	7
Chemours	United States/Sweden/China	56,160	12
Daikin	Japan/USA/China	51,480	11
3M Dyneon	United States/Japan	23,400	5
Solvay	Belgium/China/USA	37,440	8
Shandong Dongyue	China	60,840	13
Others	Worldwide	187,200	40
Total	**Worldwide**	**468,000**	**100**

Source: Industry, Emkay Research

Environmental risk of fluoro-agrochemicals

Organofluorine compounds are generally more stable than their organochlorine derivatives owing to the exceptional strength of the C-F bond, which leads to an extraordinary robustness of fluoro-agrochemicals, reflected in their resistance against enzymatic, chemical, and environmental degradation. This robustness is, on one hand, advantageous for the intended purpose. On the other, the exceptional environmental stability of fluoro-agrochemicals means that they can be expected to pollute the soil, the atmosphere, and water, ultimately leading to bio-accumulation in diverse organisms via the food cycle. Such undesired, long-term environmental effects of agrochemicals are difficult to predict and thus remain a major concern for prolonged periods after their commercial launch.

Being environmentally cautious is the most important factor when engaged in the business of fluoro-agrochemicals

A recent representative example of such a case is trifluralin, the first agrochemical launched in 1963, which was detected in the Arctic environment owing to sufficiently high quantities that are globally used and the most likely occurring long-range atmospheric transport. Trifluralin, which remained a highly prominent drug for half a century, was eventually banned in the European Union in 2008, owing to its toxicity to aquatic and human life.

Companies engaged in fluorination business should take utmost care

In this backdrop, companies that are engaged in the business of fluorinated substances should be cognizant of the fact that fluorine substrates found in the environment at the end of their useful life have been classified harmful in many ways, as they accumulate in water bodies, drinking water, plants and air. They are also considered bio accumulative in humans, animals and plants and, among the few that are well studied, most PFAS are considered to be toxic. Companies who adapt good environmental practices and align their business strategically to the regulatory framework will largely be winners in this business.

BUY SRF

Master of all trades

Specialty Chemicals ▸ Initiating Coverage ▸ **October 15, 2023**

TARGET PRICE (Rs) : 2,700

SRF has proven itself as a 'master of all' trades. Buoyed by its R&D capabilities and diversified business avenues, it has evolved into a trusted partner of choice for global innovators. With its safe handling of fluorine, along with steady capex in the last decade, SRF has showcased its strong credentials. Its superior capital allocation towards specialty chemicals—including investments in PTFE, other fluoropolymers and aluminium foil—is likely to drive growth in the coming decade. SRF's Rs150bn investments lined up over FY24-28 provide strong growth visibility and cement its leadership position. While FY24 may see some headwinds, FY24-26E revenue/EBITDA/PAT CAGR stands at 14%/21%/25%, with strong OCF and RoCE. We initiate coverage on SRF with a BUY recommendation and SoTP-based target price of Rs2,700/share.

SRF: Financial Snapshot (Consolidated)

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Revenue	1,24,337	1,48,703	1,49,116	1,69,843	1,93,572
EBITDA	31,759	35,292	33,004	40,135	48,136
Adj. PAT	18,889	21,623	17,797	21,833	27,839
Adj. EPS (Rs)	63.5	72.7	59.8	73.4	93.6
EBITDA margin (%)	25.5	23.7	22.1	23.6	24.9
EBITDA growth (%)	48.9	11.1	(6.5)	21.6	19.9
Adj. EPS growth (%)	(68.0)	14.5	(17.7)	22.7	27.5
RoE (%)	24.5	22.9	16.0	17.0	18.4
RoIC (%)	20.0	20.3	14.4	14.7	15.9
P/E (x)	35.5	31.0	37.7	30.7	24.1
EV/EBITDA (x)	22.0	19.9	21.4	17.7	14.7
P/B (x)	7.8	6.5	5.7	4.9	4.1
FCFF yield (%)	0.2	0.0	0.2	0.2	0.8

Source: Company, Emkay Research

Specialty Chemicals business to be the key growth driver

SRF is expanding capabilities across chemistries in both — fluorinated/non-fluorinated molecules, in agrochemical technicals and pharma intermediates. It plans launching 6-7 active ingredients in coming 2-3 years which will drive the next leg of growth. SRF targets doubling its pharma mix in Specialty Chemicals within 3-5 years. Such expansion would be led by healthy R&D spend (Rs1.3bn in FY23) and over 400 members in the Chemicals Technology Group (CTG). SRF is a pioneer in some of the most complex products and is the global leader in supplying these to agro innovators worldwide. Company has been granted an impressive 139 patents in all, and has filed 408 processed patents. The specialty chemicals business is set to clock ~17% CAGR over FY23-26E.

Fluorochemicals business set for next-gen gases; near-term pricing pressure

Fluorochemicals business is mainly driven by refrigerant gases, with an overall capacity of ~77,500mtpa (post the 15,000-ton R32 expansion in FY24). Company's overall basket includes key refrigerant gases like R22, R32, R125 and R134a, and their blends. SRF leads the domestic market with ~60% share, and largely exports to the USA. We believe the first major phase down-led cut in HFCs in USA will put some pricing pressure on company's overall realization in FY24/25. However, SRF is well poised to capture the HFO market, where it has patented technology for HFO1234yf and well-devised routes to enter manufacturing of other vital HFOs like HFO1234ze and HFO1233zd.

Packaging films/Technical Textiles businesses to run into macro headwinds

SRF's packaging films business is facing significant headwinds due to the cyclical downturn, impelled by huge capacity additions across the Indian and overseas markets. BOPET is more impacted vs BOPP; however, SRF is able to register a more superior performance than peers owing to its value-added portfolio. The headwinds may last a few more quarters before the market sees consolidation and picks up pace. SRF is adding aluminum foil to its portfolio which is expected to commission in FY24. In the technical textiles business, nylon tyre cord fabric (NTCF) is witnessing higher pricing pressure than other segments, but overall business is largely stabilizing now and seeing consolidation.

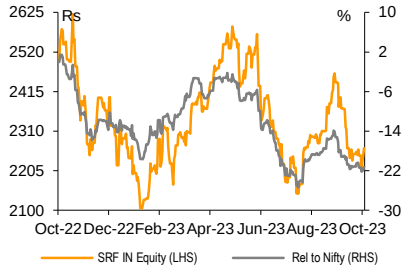
Target Price – 12M	Sep-24
Change in TP (%)	**NA**
Current Reco.	BUY
Previous Reco.	NA
Upside/(Downside) (%)	19.7
CMP (13-Oct-23) (Rs)	2,255.5

Stock Data	Ticker
52-week High (Rs)	2,640
52-week Low (Rs)	2,040
Shares outstanding (mn)	296.4
Market-cap (Rs bn)	669
Market-cap (USD mn)	8,030
Net-debt, FY24E (Rs mn)	35,407
ADTV-3M (mn shares)	1
ADTV-3M (Rs mn)	1,356.2
ADTV-3M (USD mn)	16.3
Free float (%)	-
Nifty-50	19,751
INR/USD	83.3
Shareholding, Jun-23	
Promoters (%)	50.5
FPIs/MFs (%)	20.0/13.7

Price Performance

(%)	1M	3M	12M
Absolute	(5.9)	3.8	(9.7)
Rel. to Nifty	(3.7)	2.8	(21.4)

1-Year share price trend (Rs)



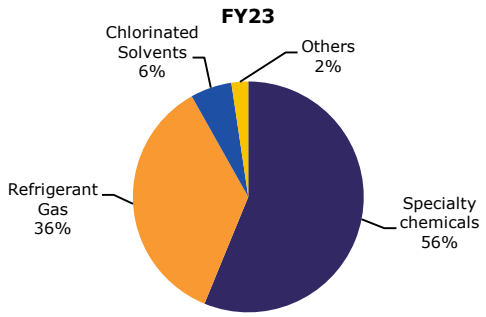
Meet Vora
meet.vora@emkayglobal.com
+91 22 6624 2474

Meet Gada
meet.gada@emkayglobal.com
+91 22 6612 1235

Chemicals Business

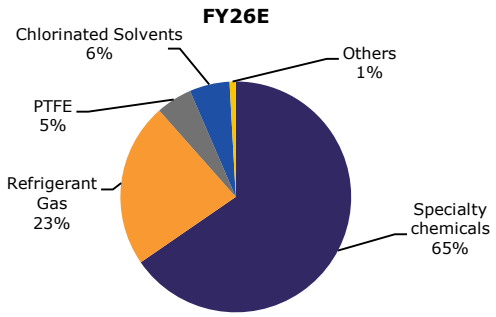
SRFs chemicals business (CB) comprises of the specialty chemicals (specialty agro technicals, pharma intermediates) as well as fluorochemicals (refrigerant gases, chloromethanes and now fluoropolymers) businesses. SRF initially started as a manufacturer of NTCF in 1970 and then gradually forayed into refrigerant gases (ref gases) in 1989 and packaging films in 1995. In 2004, SRF commenced its specialty chemicals business, capitalizing on its fluorine handling experience gained from ref gas; today, this business is the largest contributor to its revenue. We expect the specialty chemicals business to be the key growth driver, in sync with Company capex and focused capital allocation in CB. We estimate specialty business CAGR at ~17% and overall CB CAGR at ~11%, over FY23-26E (15% CAGR over FY24-26E).

Exhibit 92: CB — Segmental revenue mix in FY23



Source: Company, Emkay Research

Exhibit 93: CB — Segmental revenue mix in FY26E



Source: Company, Emkay Research

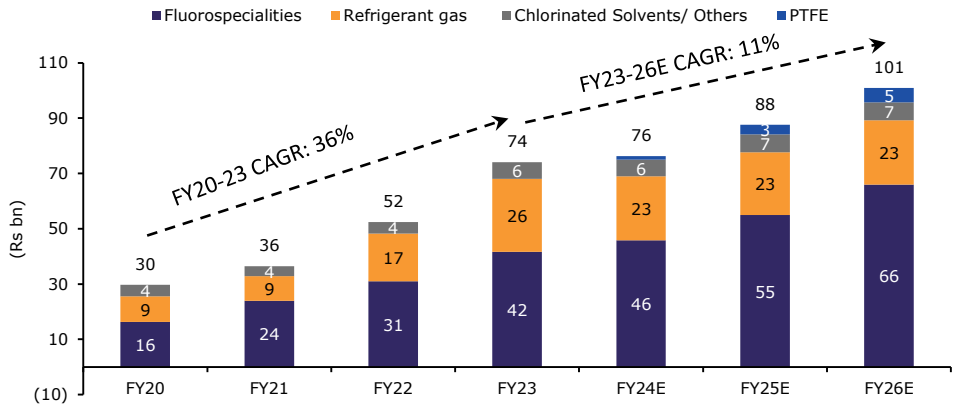
Exhibit 94: Specialty Chemicals business, the key growth driver

Chemical Business — Sub-segments	CAGR (%)		Revenue mix (%)	
	FY20-23	FY23-26E	FY23	FY26E
Specialty Chemicals	37	17	56	65
Refrigerant Gas	42	-4	36	23
Chlorinated Solvents	8	10	6	6
Fluoropolymers (PTFE)			0	5
Others			2	1

Source: Company, Emkay Research

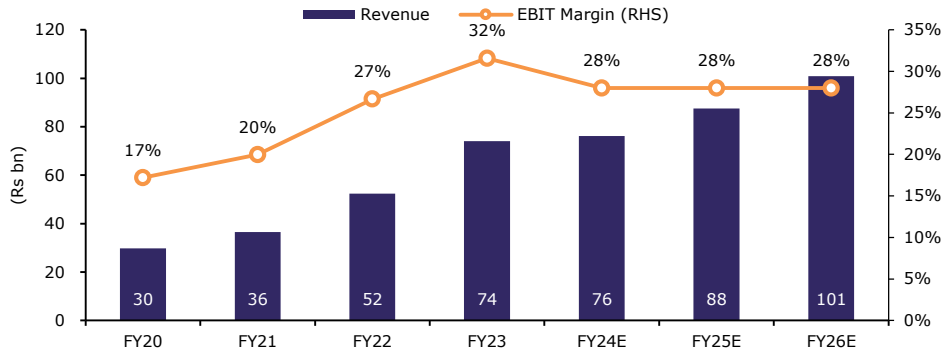
Overall CB revenue grew at 36% CAGR over FY20-23 for SRF, on the back of strong volume and pricing growth in ref gases and ramp up of its specialty chemicals portfolio with leading agro-chemical innovators like Bayer, BASF, Syngenta, etc. Average FY22 and FY23 growth was significantly higher, at ~42%, supported by increase in ref gas prices and moving up the value chain in the specialty chemical business.

Exhibit 95: Specialty chemicals to be the key growth driver; ref gases to moderate



Source: Company, Emkay Research

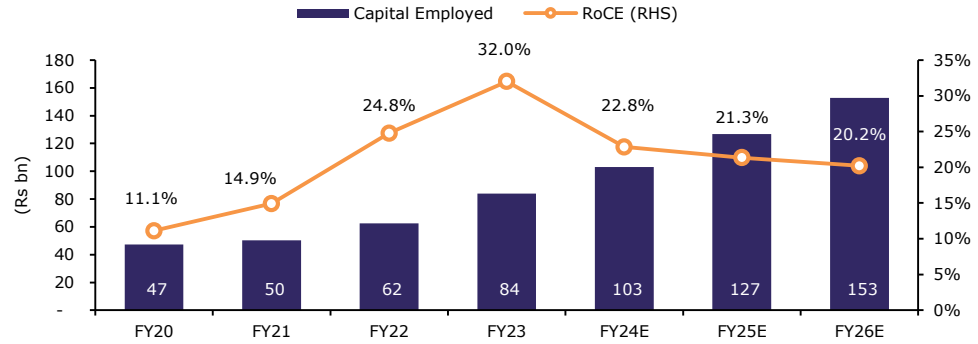
Exhibit 96: EBIT margin to moderate to ~28%



Source: Company, Emkay Research

SRF's EBIT CAGR stood at 66% over FY20-23 (EBIT margin increased, from 17% in FY20 to 32% in FY23). We expect overall EBIT CAGR of 6% over FY23-26E (high base in FY23, FY24-26E CAGR at 15%), on healthy contribution from specialty chemicals, albeit partially offset by pricing pressure on ref gases. Our workings of segmental RoCE suggest that CB RoCE will remain stable, at around 20%, given the higher base and gradual ramp up in capacities.

Exhibit 97: CB RoCE remains healthy, despite rising capital employed on high capex



Source: Company, Emkay Research

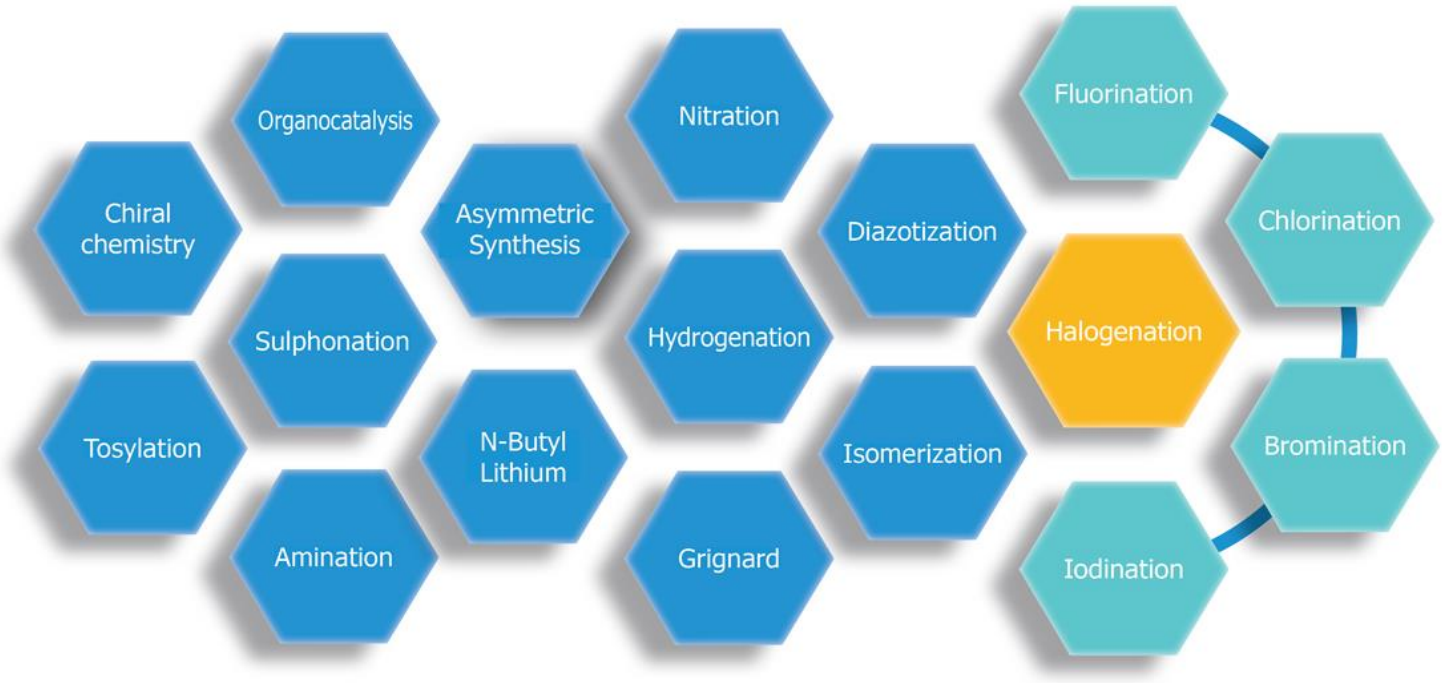
Specialty Chemicals business leading from the front

With more than 30 years of experience, SRF commands an enviable standing for its capabilities in the development & production of advanced intermediates for agro & pharma applications. SRF started production of refrigerant gases in the late 1990s, followed by foray into the specialty chemicals business, SRF has reached a sweet point of no return. To uphold this position, SRF has been continuously investing in people, plants and equipment.

The specialty chemicals division saw significant revenue growth till FY16. However, it encountered challenges due to a downturn in the global agrochemical sector over FY17-18, before making a recovery in FY19. During the slump, agrochemical intermediates accounted for >75% of specialty-chemical sales; SRF made aggressive investments then, in anticipation of a growth recovery, and capacities remained under-utilized, thereby denting margins. Such capacities were utilized on demand recovery and delivered strong revenue CAGR of 28% over FY17-20 and of 37% over FY20-23; we now expect 17% revenue CAGR over FY23-26E, mainly driven by the relatively slower growth in FY24. FY24 has been witnessing customers engaging in inventory rationalization to a certain extent, with rescheduling of some orders leading to relatively-slower growth.

SRF plans to launch 6-7 active ingredients over the next 2-3 years which will drive the next leg of growth for the specialty chemicals business. Company launched 2 new products each YTDFY24, in the agro and pharma spaces. SRF has several flexible and dedicated facilities, which are expected to augment the overall performance going forward. The potential market for specialty chemicals is considerably larger than SRF's current scale of operations. We believe that the intermediates opportunity for agrochemicals alone runs into several billion dollars which is more likely to come from heterocyclic compounds.

Exhibit 98: SRF's expertise in different chemistries



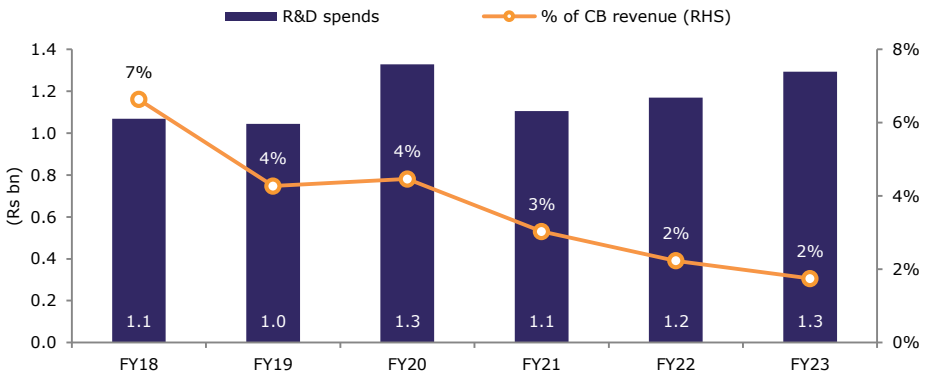
Source: Company

R&D remains the center-forward: In the field of fluorospecialties, SRF's core value proposition revolves around delivering cost-effective intermediates, typically crafted in-house through its proprietary process R&D. SRF's marketing team engages with customers to pinpoint their potential needs, and the R&D unit then formulates the manufacturing process accordingly.

If the molecule finds success, SRF has the capability to expand production to serve the specific requirements of a customer. This capability is justified by its initial synthesis laboratory; post development, the molecule is processed in the kilo lab from where the customer is provided with a sample, for checking the initial qualification and consistency; thereafter, the scale-up happens in the engineering lab, followed by a demo pilot plant and then a pilot plant.

This can be augmented to setting up a multipurpose plant in Company's Dahej facility. The number of chemistries that SRF is entering is progressively increasing. It has steadily enhanced its R&D expenditure to Rs1.3bn (~2% of CB revenue) with a strong R&D pipeline.

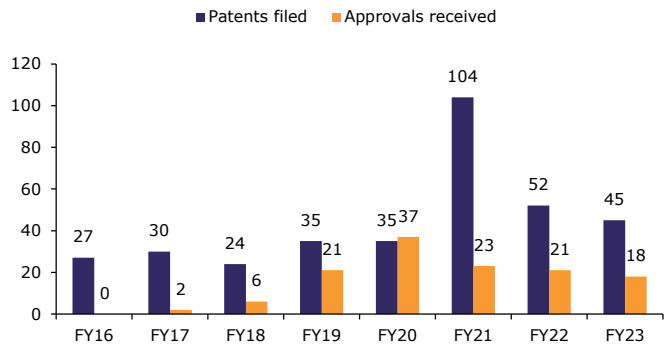
Exhibit 99: R&D revenue expenditure steadily increasing on higher base



Source: Company, Emkay Research

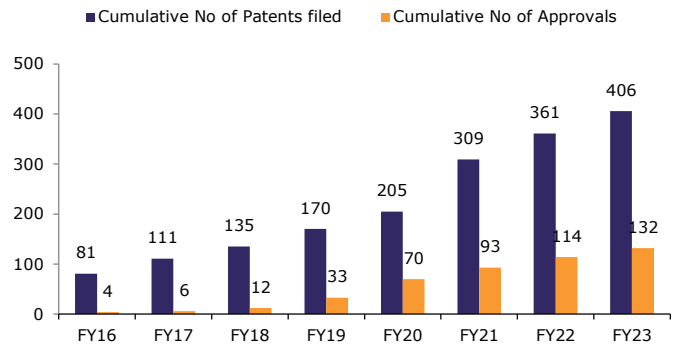
SRF has a Chemicals Technology Group (CTG), which is actively engaged in the development of new process technologies. Company's key focus is to develop high-end molecules that are more complex in nature. In FY23, R&D has worked on over 50 molecules and many products were successfully taken up for process development. More than 20 molecules were considered for scale-up studies and 70% were commercially produced in multipurpose and dedicated plants. SRF has two R&D centers in India, one each in Bhiwadi, Rajasthan and Gurugram, Haryana. YTDFY24, seven new process patents have been granted.

Exhibit 100: Consistent patent applications over the last 5 years



Source: Company, Emkay Research

Exhibit 101: Patents applied for & granted have grown exponentially



Source: Company, Emkay Research

Fluorochemicals business ready for next-gen refrigerant gases

SRF has gained significant market share in the USA, post imposition of ADD on Chinese ref gas. This, combined with a phase down-led impact, has effected a sharp rise in overall ref gas realizations, particularly for high GWP gases in FY23, aiding SRF's CB margin. Owing to its backward-integrated operations, such pricing benefits directly flow to the bottom-line. However, prices have now started correcting by 10-25%, on macro slowdown/lean summer season in FY24. Considering the 30% reduction in HFC consumption by the USA starting Jan-24 (from the 90% of baseline currently, to 60%), we expect ~20%-50% price reduction in high-GWP ref gases (R125, R134a and R410a) in FY25E. We expect overall ref gas pricing to decline, but SRF's new R32 capacity will largely compensate the overall revenue growth.

Exhibit 102: Fluorochemicals segment — Products, applications

Fluorochemicals segment	Products	Application
Refrigerants	R22, R32, R134a, R125, HFC Blends like R410a, etc	Room AC, Refrigerators, Mobile ACs, Commercial Refrigeration
Metered Dose Inhaler	Dymel R134a/P	Propellant in asthma inhalers
Chlorinated Solvents	MDC, Chloroform, CTC, Trichloroethylene, Perchloroethylene	Solvent in agro chemical & pharma intermediates; Feedstock for ref gases
Others	Cleaning chemicals	Floor & glass cleaning

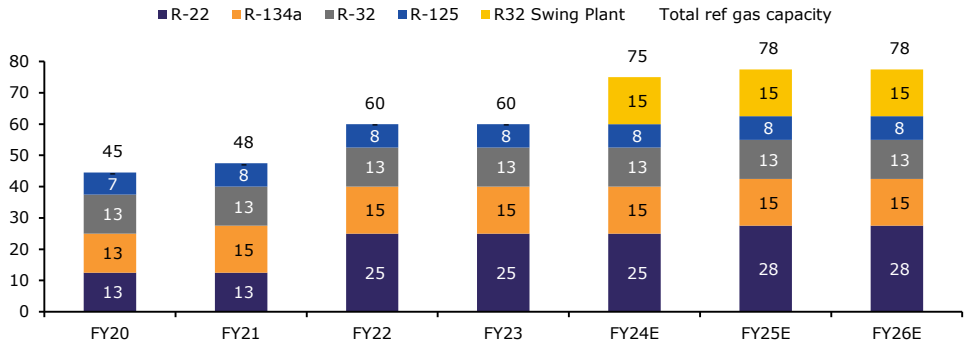
Source: Company, Emkay Research

Refrigerant gases to witness pricing pressure, but SRF structurally prepared for the next generation of gases

YTDFY24 ref gas export volumes have fallen due to Chinese dumping and circumvention in the form of unfinished blends. While the US authorities are investigating this circumvention, it will have short-term impact on pricing. We expect ref-gas revenues to dip ~14% YoY for FY24E, owing to falling realizations and weak demand in H1FY24. We model-in a 300bps dip in EBIT margin for the overall chemical business, factoring-in such dynamics.

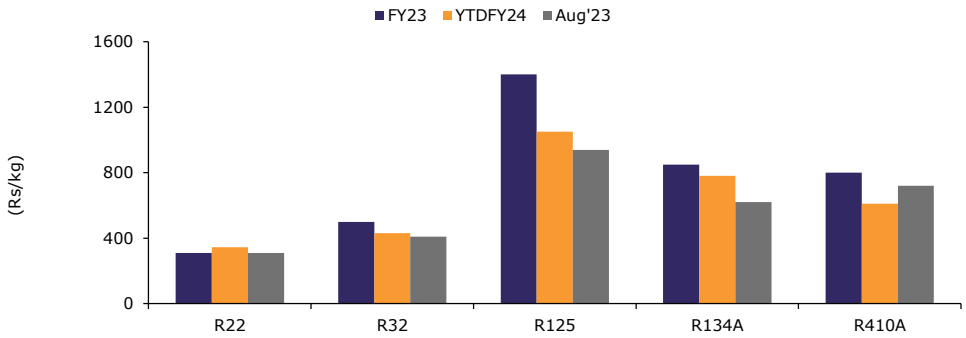
Globally, HFCs may face a phased shift towards HFOs, but replacement demand (much higher contributor to overall volumes) will continue to drive medium-term volume growth. Topping this, SRF is well poised to capture the HFO market, where it has patented technology for HFO1234yf and well devised routes to manufacture other important HFOs like HFO1234ze and HFO1233zd. Its R32 plant, which is coming on-stream, will also aid overall business, as R32 is the most-efficient gas in the HFC family and will aid transition to HFOS through blends. We believe SRF is the only Indian player prepared for the next generation of ref gases.

Exhibit 103: SRF refrigerant gas capacity ('000 ton)



Source: Company, Emkay Research

Exhibit 104: Ref-gas price trend down in FY24 compared with FY23



Source: Industry, Emkay Research

PTFE revenue estimated to grow from ~Rs1bn in FY24E to Rs5bn in FY26E, on ramp up in capacities

Fluoropolymers, the next potential growth driver

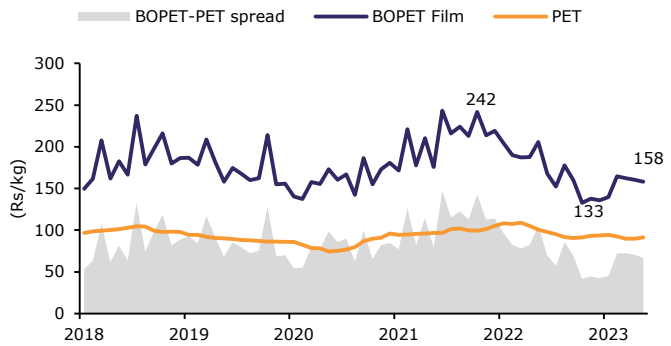
SRF's PTFE plant will be commissioned in FY24. Management expects healthy ramp-up, as it has been mapping target customers across domestic and exports. It has already started an application lab for such products which will help develop and gain market share in value-added products. Company targets stabilizing PTFE first and then expands into other large fluoropolymers. Overall, fluoropolymers is a USD5-6bn market globally, offering strong growth outlook across semi-conductors, solar panel manufacturing, battery chemicals, auto, etc.

India is a relatively small market for fluoropolymers, with estimated demand of ~12-15ktpa compared with global demand; however, Indian growth for fluoropolymers is much higher, at ~11-12%. Fluoropolymers business entails long gestation and product approval takes time. Once capacities get commissioned, stabilizing the product and establishing the market takes time. We believe SRF has the capability to penetrate the market and gain share from large global players like 3M leaving the market on account of the PFAS ban. We model-in gradual utilization of capacity over FY23-26E, from Rs1bn of revenue in FY24 to Rs5bn in FY26E.

Packaging Films Business

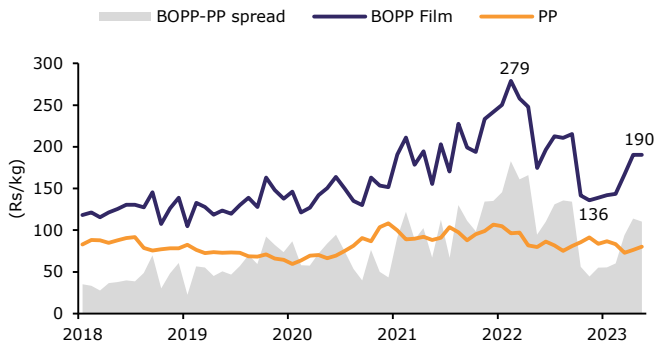
Packaging Films Business (PFB) by nature is a commoditized business, where demand is a linear function, whereas capacity build-up is a step function. Two years post the pandemic have been relatively good for cyclical industries, resulting in strong earnings growth in these businesses, driven by surge in demand. This attracted capacity addition by existing players as well as saw new entrants. However, once supply catches up with demand, prices fall; the FY24 situation is further aggravated by slower global demand and surging energy costs creating many headwinds. BOPET has major capacity additions vs BOPP. SRF also commissioned 40ktpa additional BOPET capacity in Thailand, a 2nd BOPP line with additional capacity of 60ktpa, and 15% debottlenecking in its South African plant.

Exhibit 105: BOPET-PET spread — Uptick due to sale of special grade



Source: Industry, Emkay Research

Exhibit 106: BOPP-PP spread increased due to metallic grade



Source: Industry, Emkay Research

Several Indian companies expanded overseas to serve global markets, flooding India with excess supply due to declining demand. This dual challenge has exerted pressure on Indian manufacturers, as they must now compete with both, imports and domestic production. Secondly, players added BOPET capacity despite weaker demand in FY23 and reducing prices. This led to new players not being able to recover their variable costs and ending up in cash losses to keep the plant running. Sooner or later, financially-weak companies may become bankrupt and see shut down. We expect these dynamics to last for a few more quarters before things start to improve and demand catches up with supply.

Exhibit 107: Indian BOPET & BOPP — Supply-Demand dynamics*

Packaging Films (ktpa)	BOPET	BOPP
Total Production Capacity (A)	1,200	1,300
Domestic Supply (B)	940	1,075
Imports (C)	200	200
Total Demand (D) = (B) + (C)	**940**	**1,075**
Net overcapacity (E) = (A) – (D)	260	225

*Source: Industry, Emkay Research; Note: *approximate figures based on our estimates*

Exhibit 108: SRF's packaging film business — Capacity over the years

BOPET/BOPP capacity (mn ton)	FY18	FY19	FY20	FY21	FY22	FY23	FY24E	FY25E	FY26E
BOPET									
India	1,05,500	1,05,500	1,05,500	1,05,500	1,05,500	1,31,500	1,31,500	1,31,500	1,31,500
Thailand	28,000	28,000	28,000	62,000	1,02,000	1,42,000	1,42,000	1,42,000	1,42,000
Hungary	-	-	-	40,000	40,000	40,000	40,000	40,000	40,000
BOPP									
India	-	20,000	34,000	34,000	34,000	34,000	94,000	94,000	94,000
Thailand	-	-	-	-	-	-	-	-	-
South Africa	27,550	30,000	30,000	30,000	30,000	34,500	34,500	34,500	34,500
Total capacity	**1,61,050**	**1,83,500**	**1,97,500**	**2,77,500**	**3,17,500**	**3,82,000**	**4,42,000**	**4,42,000**	**4,42,000**
Aluminium Foil capacity	-	-	-	-	-	-	21000	21000	21000

Source: Company, Emkay Research

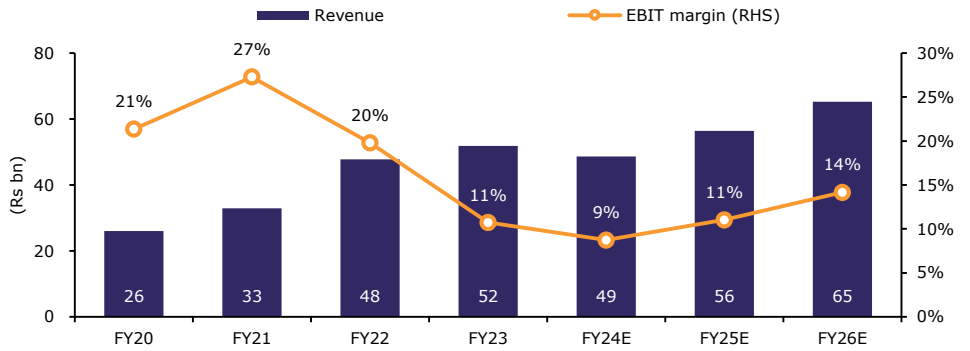
SRF enhanced its packaging films capacity (BOPET and BOPP) across India, Thailand, South Africa and Hungary in the past few years. Total PFB capacity stands at 382ktpa, with additional metalizing capacity of 75ktpa and embossing/offline coating capacity of 4ktpa. The company is diversifying into the complementing business of aluminium foil with an investment outlay of Rs4.25bn and expected commissioning in FY24.

SRF will become a one-stop-shop for packaging films after commercialization of its aluminium foil project. SRF's aluminium foil project of ~21ktpa is likely to commercialize in FY24E, with a capex of Rs4.25bn. India imported aluminium foil of 196ktpa in FY23, leading to Indian market size of Rs70bn. As customer profile remains the same as that of BOPP/BOPET, SRF is confident of achieving meaningful market share in the aluminium foil business over the long term.

In FY23, the PFB segment reported 8.4% YoY revenue growth and 10.7% EBIT margin. PFB EBIT was down 33% YoY on declining prices. To maintain its market share, SRF has focused on value-added products which help in maintaining average pricing. The BOPET exports from India have reduced ~80-90% YTDFY24. We model-in ~6% de-growth in revenue and 11% EBIT margin for FY24E. Return ratios would improve on cyclical recovery, possibly by FY26E.

PFB will remain cyclical and under pressure for a few more quarters

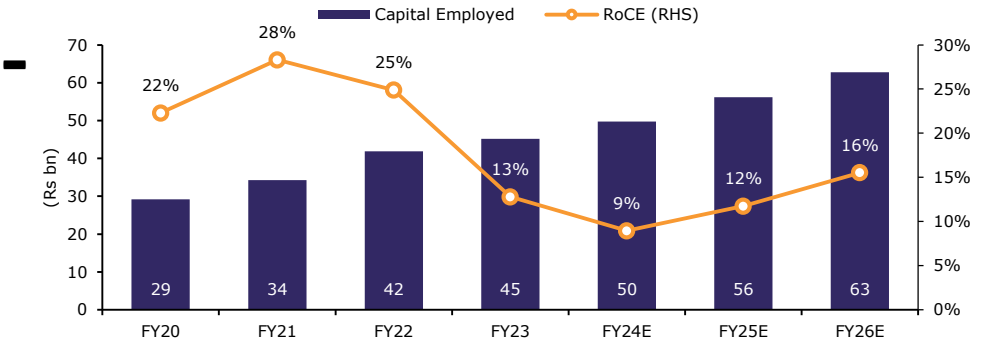
Exhibit 109: PFB — Margin to decline on pricing pressure



Source: Company, Emkay Research

RoCEs will improve, once the cycle reverses

Exhibit 110: PFB — RoCE to reduce in the near term, due to higher capex and margin pressure



Source: Company, Emkay Research

Technical Textile business

The Technical Textiles Business (TTB) involves textile materials & products that are used for their technical performance and functional properties, across a wide variety of industries — from agriculture to sports, and more. The market for technical textiles is believed to hold significant potential, driven by economic growth in India. The Indian market for technical textiles is the 5th largest in the world, clocking CAGR of 8-10% over the past 5 years, at USD22bn in FY22. The production of technical textiles accounted for USD19.5bn and imports accounted for USD2.5bn.

Exhibit 111: Advance value chain for the technical textile industry

Source: Industry, Emkay Research

SRF began as Shri Ram Fibres in 1970 to manufacture NTCF and established its first Tyre Cord Fabrics plant in Manali near Chennai in 1974. Such a fabric is used as reinforcement material in a wide range of tyres. In 1983, SRF started manufacturing belting fabrics used as reinforcement material in conveyor belts and other mechanical rubber equipment, at Viralimalai, Tamil Nadu.

Exhibit 112: Technical textile and SRF's product portfolio

Segment	Product	Application
Mobiltech	Tyre cord fabrics	Nylon – Trucks, Buses, Off-Road Vehicles Polyester – Passenger Cars & LCVs Cycle – Bicycle & Rickshaw Chafer Fabrics – To protect side wall
Indutech	Belting fabrics	Conveyor belts, etc
Agrotech	Fishnet twines, coated & laminated fabrics	Fishnets, grain covers, greenhouses, pond-liners
Buildtech	Coated fabrics, laminated fabrics	Tarpaulins, signages (hoardings), Hangars, etc
Sportstech	Coated fabrics	Pitch covers, sports mats, ropes & cordage, etc
Geotech	Polyester Industrial Yarn	Netting,etc
Hometech	Coated fabrics	Awnings, Ducting Covers, etc
Meditech	NA	Stitching, implants, etc
Protech	NA	Fireproof clothes, bullet proof jackets, etc
Echotech	NA	Used in landfill management
Clothtech	NA	Umbrella, sewing threads, shoelaces, etc
Packtech	NA	Jute sacks, luggage, tea bag filter paper, etc

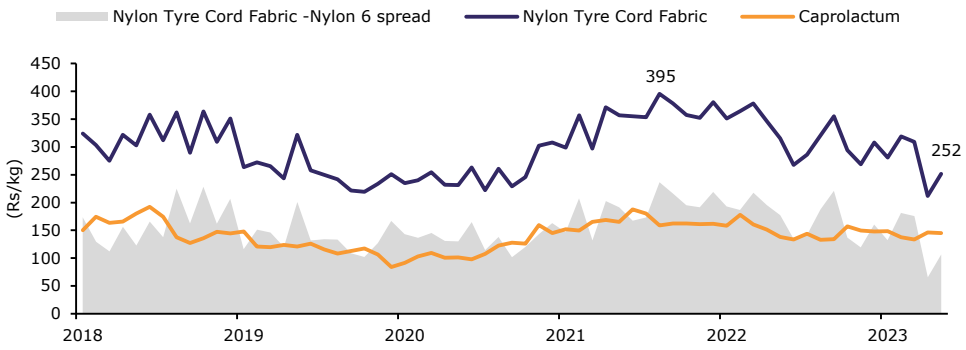
Source: Industry, Emkay Research

SRF, in its TTB segment, has installed capacity of 85ktpa in Nylon Tyre Cord Fabric (NTCF), 29ktpa in Chips, and 27ktpa in polyester yarns. The same is divided across its four manufacturing plants (3 in Tamil Nadu; 1 Madhya Pradesh — acquired from CEAT).

TTB to consolidate and stabilize in FY24, largely on recovery in NTCF

Despite low entry barriers and intense competition, FY22 was the best year in SRF's history. In FY23, TTB witnessed a subdued performance (owing to slowdown in industrial activity) for NTCF — the core business segment. That said, we are seeing trends for slight improvement in demand for NTCF and uptick in prices in H1FY24. Any decline in caprolactam prices (key RM) impacts revenues, as the nature of the business is where caprolactam prices are a pass-through. The company may ramp up the production in belting fabrics, to maintain the steady revenues vs last year, though witnessing reduced EBIT margin. Moreover, there will be industry consolidation and business will stabilize from upswings in FY24.

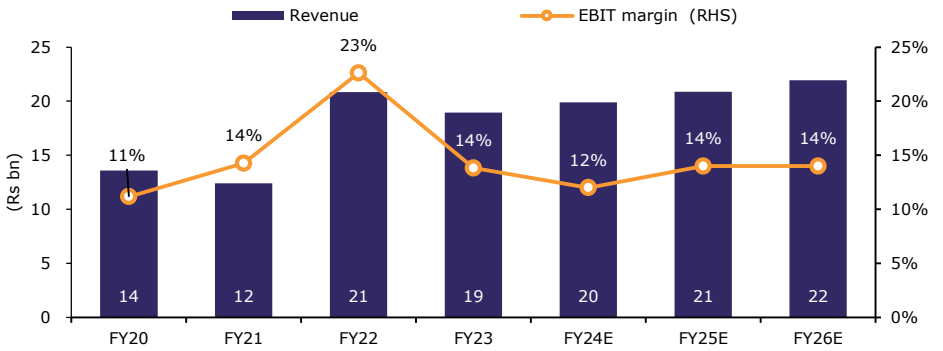
Exhibit 113: Steady spreads post the FY22 upcycle



Source: Industry, Emkay Research

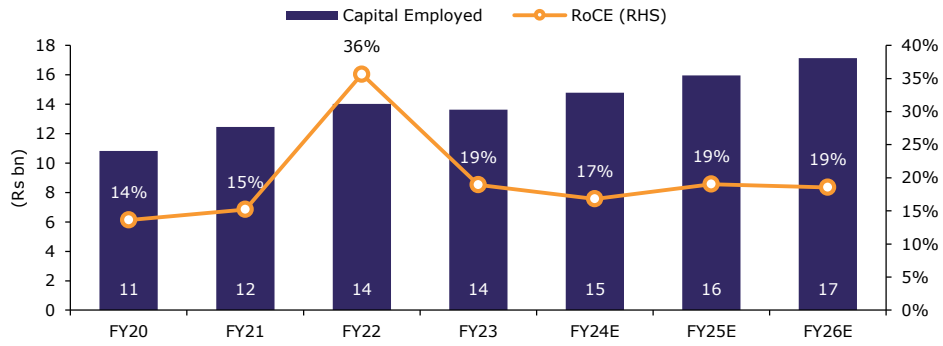
TTB business to largely remain a cash cow, with stable margins

Exhibit 114: TTB will largely remain a cash cow for SRF, going forward



Source: Company, Emkay Research

Exhibit 115: Business intact, with sustainable returns



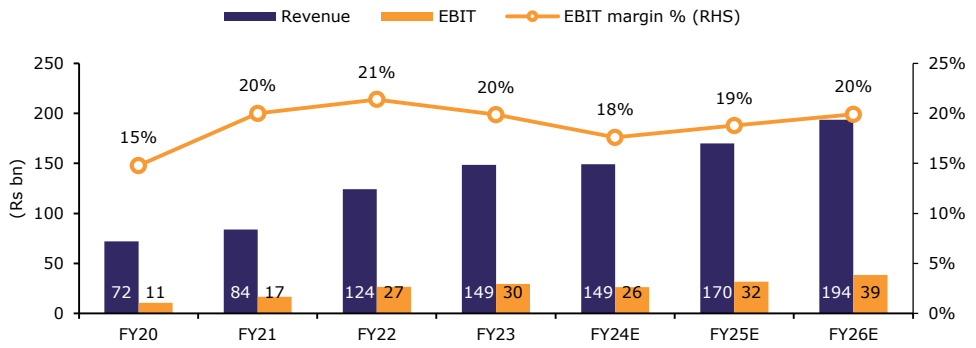
Source: Company, Emkay Research

The company wants to build a non-tyre market in order to de-risk TTB from NTCF. Further to this and given government focus on infrastructure development, management has approved capacity expansion and modernization of belting fabrics operations at Viralimalai, India, from 13.2ktpa to 21.6ktpa. This shall aid in expansion of market share, to achieve target of pulling up its global ranking in conveyor belting fabrics, from #3 to #1, and provide a steady margins.

Financial Analysis

SRF reported revenue/EBITDA/PAT CAGR of 27%/34%/33% over FY20-23, on strong performance in the chemicals business, led by ref-gas pricing and ramp-up in the specialty chemicals business. We expect SRF to report revenue/EBITDA/PAT CAGR of 9%/11%/9% over FY23-26E, on relatively slower growth in Specialty Chemicals in FY24 and pricing correction in ref gas (FY24-26E revenue/EBITDA/PAT CAGR stands at 14%/21%/25%). There will be addition of new revenue streams (R32, PTFE and aluminium foil). EBIT margins are expected to dip by ~200bps in FY24, on correction in ref-gas pricing and overall headwinds in PFB, and rebound thereafter in FY25/FY26, on higher contribution from specialty chemicals.

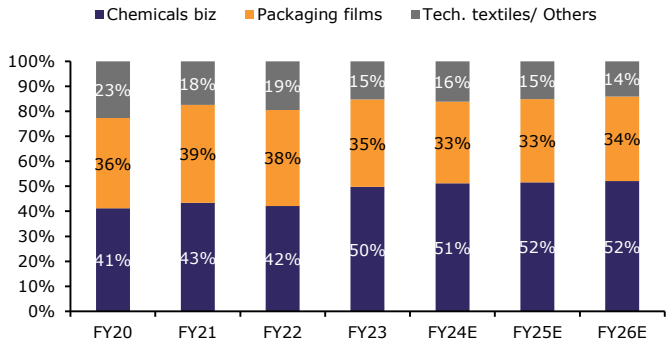
Exhibit 116: Revenue to post ~9% CAGR over FY23-26E



Source: Company, Emkay Research

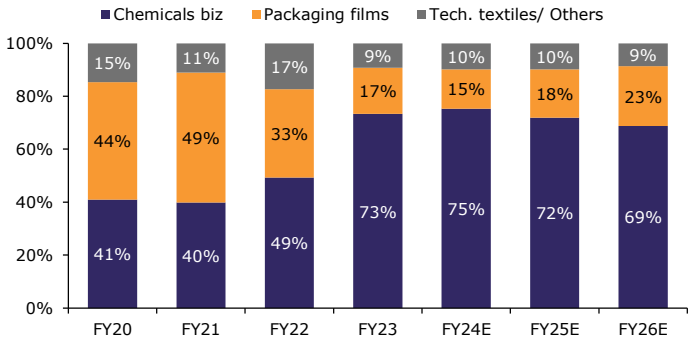
SRF's CB to gain a larger pie of the overall revenue over the next few years, owing to concentrated capital allocation and capex plans in CB. A large part of this will also drive the EBIT mix in favor of CB which will improve the overall EBIT margin profile for the company.

Exhibit 117: SRF's segmental revenue contribution mix



Source: Company, Emkay Research

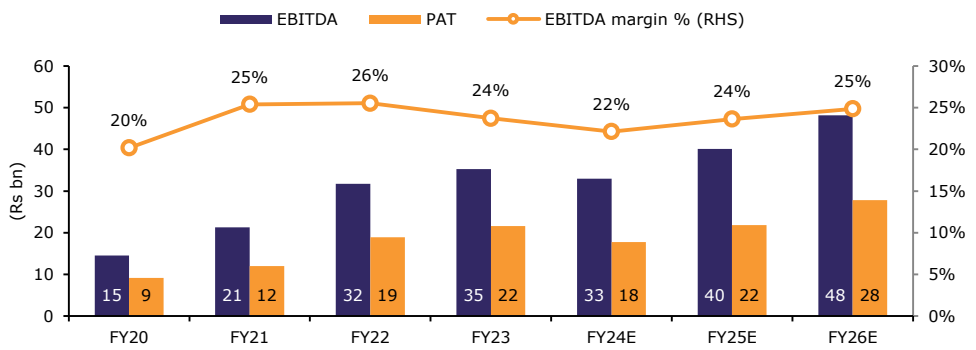
Exhibit 118: SRF's segmental EBIT contribution mix



Source: Company, Emkay Research

Quality of earnings to improve, on higher share from specialty chemicals

Exhibit 119: PAT to decline ~18% in FY24E; margins to gradually improve



Source: Company, Emkay Research

Exhibit 120: Efficient in managing working capital

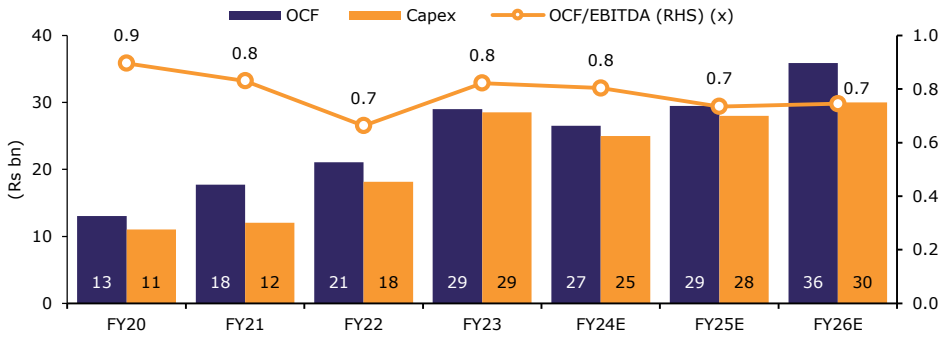
Working Capital days	FY20	FY21	FY22	FY23	FY24E	FY25E	FY26E
Inventory Days	61	64	63	56	56	56	56
Receivable Days	45	55	53	44	44	44	44
Trade Payables	56	69	62	55	55	55	55
Core WC Days / Cash Conv Cycle	**50**	**50**	**54**	**45**	**45**	**45**	**45**

Source: Company, Emkay Research

SRF will be funding all its capex initiatives through internal accruals. SRF's cash flow from operations has been extremely strong and consistently improved every year. Though FCF generation has been marginally positive due to rising capex intensity. Return ratios would taper, on high capex and relatively-slower earnings growth (a high base in FY23). Net debt/EBITDA would increase a tad in FY24, and significantly fall by FY26.

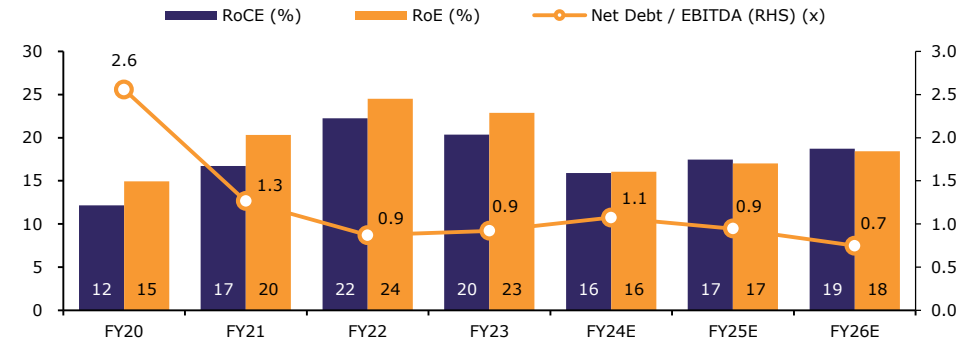
OCF to be sufficient for funding total capex over the next few years; moreover, the quality of capex is improving towards the CB

Exhibit 121: Capex to grow; OCF sufficient to fund the same



Source: Company, Emkay Research

Exhibit 122: Return ratios return to FY21 levels, due to heavy capex plans



Source: Company, Emkay Research

Valuation

SRF is accelerating its capex to >Rs30bn p.a. (vs. Rs13-14bnpa over FY19-21 and Rs18bn in FY22), to be largely spent towards the chemicals business (Specialty Chemicals, Ref gas and Fluorocarbons; >75%). Such a surge in capex (largely funded internally) will continue to drive strong growth in the chemicals business which, coupled with normalization in the Packaging Films Business (industry consolidating now), will drive a steady shift in its EBITDA contribution. We expect ~68% EBITDA contribution from the chemical business by FY26E vs. ~50% in FY22. We believe SRF's specialty chemicals business portfolio is far more complex than that of peers and, because of several internally-generated processes with backward integration in place, generates higher EBIT margin. This warrants a higher multiple compared with most of its specialty chemicals peers.

Exhibit 123: EBITDA contribution from the chemicals business to continue rising

Particulars	EBITDA contribution		EBITDA CAGR	Target EV/EBITDA (x)	Comments
	FY23	FY26E	FY23-26E		
Spec Chem	33%	38%	16%	28	Largely commoditized
Fluoro Chem	39%	30%	2%	14	Most specialty and margin accretive business
Packaging Films	20%	24%	18%	10	Structural business with few players
TTB/ Others	9%	8%	5%	8	Largely commoditized

Source: Company, Emkay Research

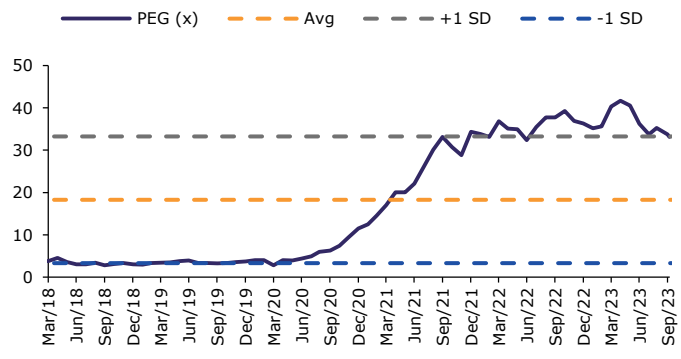
Exhibit 124: SoTP-based TP of Rs2,700/share, on Sep-25E

(Rs mn)	FY25E	FY26E
Consol EBITDA	40,135	48,136
Target multiple (x)	19.1	18.9
Target EV	764,762	909,777
Less: Net Debt	37,977	35,955
Target M-Cap	726,785	873,822
No of shares (mn)	297	297
Target Price (Rs/share)	2,444	2,938
Target Price (Sep-25E; Rs/share)		**2,700**
EPS (Rs/share)	73.4	93.6
Implied PER (x)	33.3	31.4

Source: Emkay Research

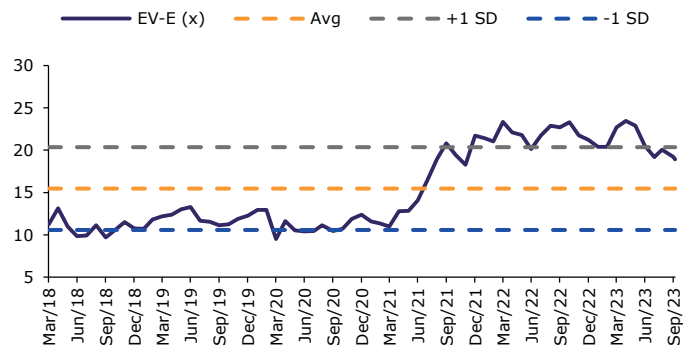
Key risks: i) Significant pricing pressure in ref gases: A higher-than-expected correction in ref-gas prices may impact SRF's chemicals business and result in lower margins. **ii) Slowdown in the global agrochemical cycle:** A large part of the specialty chemicals business is currently skewed towards agrochemicals, and a significant or long-lasting impact may impact its business. **iii) Supply additions in PFB:** A sustained capacity-additions situation may exert extended pressure on pricing, resulting in PFB margins being impacted.

Exhibit 125: 1-year forward P/E



Source: Company, Emkay Research

Exhibit 126: 1-year forward EV/EBITDA



Source: Company, Emkay Research

Company Overview

Incorporated in 1970, SRF started with nylon cord tyre manufacturing and, thereafter, diversified into production of refrigerant gases, specialty chemicals and packaging film, to name a few, in due course. The Chemicals division forms 43% of overall revenues, followed by packaging films (39%), technical textiles (15%) and others (3%). Anchored by a strong workforce of 7,000 employees from different nationalities working across 11 manufacturing plants in India and one each in Thailand, South Africa and Hungary, the company exports to more than 90 countries. Revenue from the overseas market constitutes 57% of the tootal pie, while the rest comes from the domestic market. Equipped with state-of-the-art R&D facilities, SRF has filed >400 patents for R&D and technology so far, of which 106 have been granted.

SRF Limited is an Indian, multi-business chemicals conglomerate engaged in the manufacturing of industrial and specialty intermediates. The company's operations are spread across a wide range of segments and products, which are:

Chemicals business: includes two segments, namely Specialty Chemicals and Fluoro Chemicals. In Fluoro chemicals, SRF is engaged in chloromethanes and refrigerant gases. Company is a significantly large player in refrigerant gases, with a wide product portfolio and leading market share in India. In specialty chemicals, SRF has built itself as a pioneer in synthesis of most complex products in the world, has a strong R&D backing and capabilities to handle several chemistries.

Packaging Film business: State-of-the-art facilities that have the capability to offer innovative solutions in BOPET and BOPP films. The spectrum of product mix includes transparent, metalized, coated, and other value-added films finding diverse applications in fast-moving consumer goods, food & agro, confectionery, soaps & detergents, solar panels, labelling, overwraps, embossing, etc.

Technical Textiles business: SRF is the largest manufacturer of technical textiles in India. Product basket for technical textiles includes tyre cord fabrics, belting fabrics and industrial yarn, and is used in varied applications such as tyres, seatbelts, conveyor-belts and other industrial applications.

Exhibit 127: SRF's manufacturing facilities

Plant	Location	Business Segment
Bhiwadi	Rajasthan, India	Fluorochemicals & Specialty Chemicals
Dahej	Gujarat, India	Fluorochemicals & Specialty Chemicals
Malanpur, Bhind	Madhya Pradesh, India	Technical Textiles
Manali	Tamil Nadu, India	Technical Textiles
Gummidipoondi	Tamil Nadu, India	Technical Textiles; Coated Fabrics
Viralimalai	Tamil Nadu, India	Technical Textiles
Kashipur	Uttarakhand, India	Packaging Films; Laminated Fabrics
Indore SEZ	Madhya Pradesh, India	Packaging Films
Bagdoon, Pithampur	Madhya Pradesh, India	Packaging Films
Industrial Growth Centre, Pithampur	Madhya Pradesh, India	Packaging Films
KwaZulu	Natal, South Africa	Packaging Films
Rayong	Thailand	Packaging Films
Jaszfenyszaru	Hungary	Packaging Films

Source: Company, Emkay Research

Exhibit 128: SRF's timeline

1970	• SRF began as Shri Ram Fibres to manufacture nylon tyre cord fabrics
1974	• Started manufacturing Nylon Tyre Cord Fabrics in Manali near Chennai
1977	• Production of Fishnet Twines started in the Manali plant. Stopped few years ago.
1979	• Engineering Plastics Business started, manufacturing more than 500 grades of engineering plastics
1982	• Registered the 'Society for Education and Welfare Development'
1983	• Started manufacturing belting fabrics that are used as reinforcement material in conveyor belts and other mechanical rubber equipment at Viralimalai, Tamil Nadu
1986	• Coated fabrics business was setup with a diverse range of products • SRF Finance, a 100% owned subsidiary, was setup
1989	• Entered the Chemicals Business to manufacture refrigerants at Bhiwadi, Rajasthan
1990	• Shri Ram Fibres renamed 'SRF'
1995	• Acquired a BOPET film plant at Kashipur in India from M/s Flowmore • SRF acquired the nylon tyre cord division of CEAT. Located at Malanpur, near Gwalior; cost of the acquisition was Rs3.25bn • SRF collaborated with Elf- Atochem, to manufacture Chloromethanes • Started a vision care division to manufacture plastic optical lenses in Bangalore
1996	• First international plant, SRF Overseas Limited set up in the Jebel AN Free Trade Zone, Dubai to manufacture nylon tyre cord fabric
1997	• Sold SRF Finance 50.5% stake to GE Capital (Mauritius) Investment Ltd • Sold its Vision Care Division to Essilor (Paris-based Group)
2000	• SRF acquired the facility with its purchase of DuPont subsidiary DuPont Fibres Ltd (DFL) in September 2000 and renamed it Tyre Cord Fabric Ltd
2004	• Commencement of the Specialty Chemicals business • To meet the growing demand for packaging films globally, a new manufacturing plant was set up in Indore in 2004
2008	• SRF acquired the Thai Baroda Industries Limited plant in Rayong • SRF acquired the belting fabrics business of Industex Technical Textiles (Pty) Limited, a South African company
2009	• Commenced production of Polyester Industrial Yarn with a capacity of 14.5ktpa located in Gummidipoondi
2010	• Laminated fabrics business commenced at Kashipur aimed at solutions for the printing, advertising & signage industry
2012	• Commissioned state-of-the-art chemicals complex at Dahej, Gujarat
2013	• Packaging Films facilities in Thailand and South Africa • Closure of SRF Overseas Ltd in Dubai
2015	• Acquired Global DuPont™ Dymel® HFA 134a/P, which is used in Metered Dose Inhalers as a propellant
2016	• The company set up a distribution network for refrigerants and chemicals in Thailand through SRF Industries (Thailand)
2017	• Packaging Films usiness, Domestic Tariff Area, Indore site • SRF acquired the HFC-125 assets and the technical know-how on an exclusive basis from Mexichem
2018	• Closure of SRF Industex Belting (Pty) Limited
2019	• Sold the Engineering Plastics Business to DSM • Closure of the Technical Textiles business manufacturing plant in Rayong, Thailand
2020	• Foray into Europe; Packaging Films Hungary Site, BOPET Capacity 40ktpa • 2nd BOPET Film Line and a Resin Plant at Rayong, Thailand
2021	• 1st BOPP Film Line at Rayong, Thailand with Capacity of 60ktpa
2022	• SRF Altech Limited is incorporated as a wholly-owned subsidiary of SRF Ltd., to engage in the manufacturing of Aluminium foil

Source: Company, Emkay Research

Exhibit 129: Current board of directors

Name of Director	Designation	Qualification	Experience / Expertise
Ashish Bharat Ram	Chairman & MD	B.A. Economics MBA - Johnson Graduate School	Experience in entrepreneurship
Kartik Bharat Ram	Joint MD	MBA – Cornell University	Experience in entrepreneurship
Pramod G Gujarathi	ED (Safety & environment)	B. Tech. in Chemical Engineering, PGDM Mumbai University	Experience of more than 4 decades has traversed many reputed multinational firms
Vellayan Subbiah	Non-ED	B. Tech in Civil Engineering, MBA – University of Michigan	Experience of over 23 years in consulting, technology and financial services; Ex-MD of Cholamandalam Investment & Finance Company Limited
Tejpreet S Chopra	ID	B.A. Economics MBA – Cornell University	Founder & CEO of Bharat Light & Power Group (BLP) Group; Ex-President & CEO of General Electric in India, Sri Lanka & Bangladesh.
Lakshman Lakshminarayan	ID	Mechanical Engineer, Alumni of London Business School	Chairman Emeritus of Rane Holdings Limited
Bharti Gupta Ramola	ID	B.Sc. in Physics, PGDM – IIM - Ahmedabad	Partner at PwC during 1984-2017 practicing in varied advisory businesses (Corporate Finance and Recovery, Project Finance, Sustainability)
Puneet Yadu Dalmia	ID	B. Tech, PGDM – IIM - Bangalore	MD of Dalmia Bharat Group, Founder and Trustee of Ashoka University.
Yash Gupta	ID	B.Sc. in Industrial Management, MBA - Harvard Business School	Founder YG Real Estate and BlueSky Ventures
Raj Kumar Jain	ID	Engineering Degree, MBA – Kellogg School of Business	Founded Bounce Inc.; Ex-CEO, Bennett, Coleman & Co. Ltd. (The Times Group); Spearheaded entry of Walmart Inc. into India

Source: Company, Emkay Research;

MD – Managing Director, ED – Executive Director, ID – Independent Director, B.Sc. – Bachelors in Science, B.A. – Bachelors in Arts

SRF : Consolidated Financials and Valuations

Profit & Loss

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Revenue	**1,24,337**	**1,48,703**	**1,49,116**	**1,69,843**	**1,93,572**
Revenue growth (%)	48.0	19.6	0.3	13.9	14.0
EBITDA	**31,759**	**35,292**	**33,004**	**40,135**	**48,136**
EBITDA growth (%)	48.9	11.1	(6.5)	21.6	19.9
Depreciation & Amortization	5,172	5,753	6,768	8,246	9,627
EBIT	**26,587**	**29,539**	**26,236**	**31,889**	**38,509**
EBIT growth (%)	58.2	11.1	(11.2)	21.5	20.8
Other operating income	0	0	0	0	0
Other income	428	749	772	795	819
Financial expense	1,159	2,048	2,743	2,748	2,132
PBT	**25,856**	**28,240**	**24,265**	**29,936**	**37,195**
Extraordinary items	0	0	0	0	0
Taxes	6,966	6,617	6,467	8,103	9,357
Minority interest	0	0	0	0	0
Income from JV/Associates	0	0	0	0	0
Reported PAT	**18,889**	**21,623**	**17,797**	**21,833**	**27,839**
PAT growth (%)	57.9	14.5	(17.7)	22.7	27.5
Adjusted PAT	**18,889**	**21,623**	**17,797**	**21,833**	**27,839**
Diluted EPS (Rs)	**63.5**	**72.7**	**59.8**	**73.4**	**93.6**
Diluted EPS growth (%)	(68.0)	14.5	(17.7)	22.7	27.5
DPS (Rs)	**7.1**	**7.2**	**8.5**	**7.0**	**8.5**
Dividend payout (%)	**11.2**	**9.9**	**14.2**	**9.5**	**9.1**
EBITDA margin (%)	25.5	23.7	22.1	23.6	24.9
EBIT margin (%)	21.4	19.9	17.6	18.8	19.9
Effective tax rate (%)	26.9	23.4	26.7	27.1	25.2
NOPLAT (pre-IndAS)	**19,423**	**22,618**	**19,243**	**23,257**	**28,822**
Shares outstanding (mn)	297.4	297.4	297.4	297.4	297.4

Source: Company, Emkay Research

Balance Sheet

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Share capital	2,974	2,974	2,974	2,974	2,974
Reserves & Surplus	82,679	1,00,296	1,15,574	1,35,333	1,60,628
Net worth	**85,654**	**1,03,271**	**1,18,548**	**1,38,308**	**1,63,603**
Minority interests	0	0	0	0	0
Deferred tax liability (net)	6,659	7,906	7,906	7,906	7,906
Total debt	**35,393**	**43,541**	**40,864**	**43,692**	**41,595**
Total liabilities & equity	**1,27,705**	**1,54,717**	**1,67,318**	**1,89,906**	**2,13,103**
Net tangible fixed assets	4,559	6,291	6,539	6,748	322
Net intangible assets	18	15	31	31	5
Net ROU assets	12	40	12	12	0
Capital WIP	16,716	24,055	15,000	15,000	15,000
Goodwill	0	0	0	0	0
Investments [JV/Associates]	0	0	0	0	0
Cash & equivalents	**7,803**	**11,107**	**5,457**	**5,757**	**5,682**
Current assets (ex-cash)	51,431	54,570	53,611	59,036	66,183
Current Liab. & Prov.	29,944	32,642	31,663	34,556	38,802
NWC (ex-cash)	**21,487**	**21,928**	**21,948**	**24,481**	**27,380**
Total assets	**1,27,705**	**1,54,717**	**1,67,318**	**1,89,906**	**2,13,103**
Net debt	27,591	32,434	35,407	37,935	35,913
Capital employed	1,27,705	1,54,717	1,67,318	1,89,906	2,13,103
Invested capital	**1,03,186**	**1,19,555**	**1,46,862**	**1,69,148**	**1,92,421**
BVPS (Rs)	288.0	347.2	398.6	465.0	550.0
Net Debt/Equity (x)	0.3	0.3	0.3	0.3	0.2
Net Debt/EBITDA (x)	0.9	0.9	1.1	0.9	0.7
Interest coverage (x)	0.0	0.1	0.1	0.1	0.1
RoCE (%)	**23.1**	**21.4**	**16.8**	**18.3**	**19.5**

Source: Company, Emkay Research

Cash flows

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
PBT	25,856	28,240	24,265	29,936	37,195
Others (non-cash items)	0	0	0	0	0
Taxes paid	(4,016)	(5,077)	(6,467)	(8,071)	(9,321)
Change in NWC	(3,166)	806	(20)	(2,533)	(2,900)
Operating cash flow	**21,057**	**29,017**	**26,517**	**29,499**	**35,879**
Capital expenditure	(19,763)	(29,020)	(25,000)	(28,000)	(30,000)
Acquisition of business	0	0	0	0	0
Interest & dividend income	58	79	100	120	0
Investing cash flow	**(15,877)**	**(29,614)**	**(24,228)**	**(27,205)**	**(29,181)**
Equity raised/(repaid)	105	0	0	0	0
Debt raised/(repaid)	1,483	8,148	(2,677)	2,829	(2,097)
Payment of lease liabilities	14	14	14	14	0
Interest paid	(1,159)	(2,048)	(2,743)	(2,748)	(2,132)
Dividend paid (incl tax)	(2,117)	(2,133)	(2,519)	(2,074)	(2,543)
Others	(370)	(1,794)	0	0	(1)
Financing cash flow	**(2,058)**	**2,172**	**(7,939)**	**(1,993)**	**(6,773)**
Net chg in Cash	3,122	1,575	(5,650)	301	(75)
OCF	21,057	29,017	26,517	29,499	35,879
Adj. OCF (w/o NWC chg.)	17,892	29,823	26,497	26,966	32,980
FCFF	1,294	(3)	1,517	1,499	5,879
FCFE	192	(1,972)	(1,126)	(1,129)	3,747
OCF/EBITDA (%)	66.3	82.2	80.3	73.5	74.5
FCFE/PAT (%)	1.0	(9.1)	(6.3)	(5.2)	13.5
FCFF/NOPLAT (%)	**6.7**	**0.0**	**7.9**	**6.4**	**20.4**

Source: Company, Emkay Research

Valuations and key Ratios

Y/E Mar	FY22	FY23	FY24E	FY25E	FY26E
P/E (x)	35.5	31.0	37.7	30.7	24.1
P/CE(x)	27.9	24.5	27.3	22.3	17.9
P/B (x)	7.8	6.5	5.7	4.9	4.1
EV/Sales (x)	5.6	4.7	4.7	4.2	3.7
EV/EBITDA (x)	22.0	19.9	21.4	17.7	14.7
EV/EBIT(x)	26.3	23.8	26.9	22.2	18.4
EV/IC (x)	6.8	5.9	4.8	4.2	3.7
FCFF yield (%)	0.2	0.0	0.2	0.2	0.8
FCFE yield (%)	0.0	(0.3)	(0.2)	(0.2)	0.6
Dividend yield (%)	0.3	0.3	0.4	0.3	0.4
DuPont-RoE split					
Net profit margin (%)	15.2	14.5	11.9	12.9	14.4
Total asset turnover (x)	1.1	1.1	0.9	1.0	1.0
Assets/Equity (x)	1.5	1.5	1.5	1.4	1.3
RoE (%)	**24.5**	**22.9**	**16.0**	**17.0**	**18.4**
DuPont-RoIC					
NOPLAT margin (%)	15.6	15.2	12.9	13.7	14.9
IC turnover (x)	0.0	0.0	0.0	0.0	0.0
RoIC (%)	**20.0**	**20.3**	**14.4**	**14.7**	**15.9**
Operating metrics					
Core NWC days	63.1	53.8	53.7	52.6	51.6
Total NWC days	**63.1**	**53.8**	**53.7**	**52.6**	**51.6**
Fixed asset turnover	1.2	1.3	1.0	1.0	0.9
Opex-to-revenue (%)	25.7	26.5	28.0	27.0	26.2

Source: Company, Emkay Research

BUY Anupam Rasayan

Moving in the right direction

Specialty Chemicals ▸ Initiating Coverage ▸ **October 15, 2023**

TARGET PRICE (Rs) : 1,050

Anupam is seeing healthy ramp-up in its: i) product portfolio: 2x over FY18-23; ii) R&D vertical: building capabilities across multiple chemistries; team strength doubled in the last 2 years; iii) client monetization: top-10 client revenue CAGR of 32% over FY18-23 (over 80% share); iv) new-client addition: 71 clients (27 MNCs) vs. 53 in FY18. Anupam's acquisition of Tanfac (26% stake) will aid backward integration into key building blocks and further expand its fluorination portfolio. Management has capex plans of Rs6.7bn (around Rs4.2bn in fluorination) for coming 2-3years which will enhance its overall revenue growth. Further, Anupam has recently signed letters of intent (LOIs) worth Rs50bn and has a ~Rs77bn order book—which grant it strong revenue visibility. We initiate coverage on Anupam with a BUY and SoTP-based TP of Rs1,050/sh.

Anupam Rasayan: Financial Snapshot (Standalone)

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Revenue	10,738	12,841	15,641	20,044	25,696
EBITDA	3,038	3,675	4,117	5,529	7,281
Adj. PAT	1,508	1,685	2,085	3,118	4,360
Adj. EPS (Rs)	15.0	15.7	19.4	29.0	40.6
EBITDA margin (%)	28.3	28.6	26.3	27.6	28.3
EBITDA growth (%)	56.9	21.0	12.0	34.3	31.7
Adj. EPS growth (%)	114.3	4.3	23.7	49.6	39.8
RoE (%)	9.2	8.3	8.6	11.8	14.7
RoIC (%)	8.7	9.2	9.6	12.0	14.6
P/E (x)	58.8	56.4	45.6	30.5	21.8
EV/EBITDA (x)	31.1	26.5	24.0	17.7	13.5
P/B (x)	5.2	4.0	3.8	3.4	3.0
FCFF yield (%)	(3.3)	0.8	(0.4)	1.5	0.5

Source: Company, Emkay Research

Strong order book led by multiple LoIs

Anupam recently signed four LOIs worth Rs50bn: a) Rs10bn revenue for the next 6 years; LOI with a Japanese company, for supplying a new-age advance intermediate for a life science active ingredient. b) Rs15bn for coming the 7 years; LOI with a Japanese MNC to manufacture and supply three high-value specialty chemicals. c) Rs4bn for the next 5 years; LOI with a US MNC, to supply a new-age specialty chemical advanced intermediate. d) Rs22bn for the next 5 years; LOI with a Japanese player to supply a new-age patented life-science active ingredient. Anupam is in advanced discussions with customers across geographies for various niche & high-value molecules; such LOIs offer strong revenue visibility for coming years and instill confidence in Anupam's capabilities.

Aggressive build-up of core strength

Anupam has focused on building up its core strength through ramp-up across R&D (doubled its team strength over the last two years—88 members vs. 40 members in FY20; enhanced spends to 1.3% of revenue now vs. 0.4-0.7% earlier). This has resulted in the expansion of its product portfolio (55 products now vs. 25 in FY18), with improving product monetization and gaining client wallet-share during FY18-23, at 32% CAGR for the top-10 clients and 24% for others (i.e. 30% CAGR overall). Further, Anupam has been stepping up client adds over FY21-23 — 71 in FY23 (incl. 27 MNCs) vs. 55 in FY20.

Tanfac acquisition to aid in backward integration, expand product portfolio

Anupam will be debottlenecking Tanfac's capacity, to ensure adequate supply for its key building blocks—HF and KF (hydrochloric acid/potassium fluoride) for fluorine-based products. Also, Mgmt targets the addition of new products in polymer intermediates like fluoro-elastomers and fluoro-electrolytes, which have applications in semiconductors, polymers, etc. Anupam has identified 14 niche molecules (value-added products) in the fluorination space that have been developed in own R&D and are at the pilot stage for 4-5 years; Mgmt expects Anupam to be the sole supplier for most of these products in Asia.

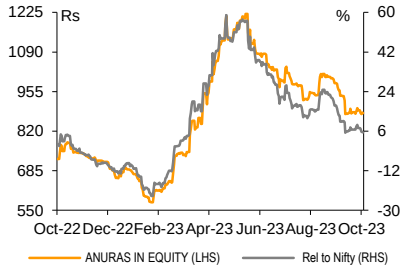
Target Price – 12M	Sep-24
Change in TP (%)	**NA**
Current Reco.	BUY
Previous Reco.	NA
Upside/(Downside) (%)	18.8
CMP (13-Oct-23) (Rs)	884.2

Stock Data	Ticker
52-week High (Rs)	1,250
52-week Low (Rs)	570
Shares outstanding (mn)	107.6
Market-cap (Rs bn)	95
Market-cap (USD mn)	1,143
Net-debt, FY24E (Rs mn)	3,588
ADTV-3M (mn shares)	-
ADTV-3M (Rs mn)	170.6
ADTV-3M (USD mn)	2.0
Free float (%)	-
Nifty-50	19,751
INR/USD	83.3
Shareholding, Jun-23	
Promoters (%)	60.8
FPIs/MFs (%)	9.8/3.8

Price Performance

(%)	1M	3M	12M
Absolute	(7.9)	(14.9)	21.2
Rel. to Nifty	(5.9)	(15.7)	5.5

1-Year share price trend (Rs)



Meet Vora
meet.vora@emkayglobal.com
+91 22 6624 2474

Meet Gada
meet.gada@emkayglobal.com
+91 22 6612 1235

Tanfac acquisition to aid expansion in fluorination

Anupam acquired a 26% stake in Tanfac (from the Aditya Birla Group) and became the joint promoter of the company, along with TIDCO (Tamil Nadu Industrial Development Corporation)

This acquisition will help Anupam further scale up its fluorine-based products (15% revenue share currently) as, over the years, it has gained the requisite skill-set, technical expertise, and know-how for handling KF as a fluorinating agent. The acquisition will aid Anupam in securing the supply of key raw materials (HF and KF) and facilitate the commercialization of HF (Hydrogen Fluoride)-based products, thus reducing import dependence on China. Anupam plans to launch HF-based products at a commercial scale, to which it has been devoting efforts for the last 4-5 years, on the R&D and pilot stage.

Tanfac acquisition to aid synergies in fluorination

The company plans the phased capex in Tanfac to increase capacities (of HF and KF) and build infrastructure for manufacturing advanced intermediates (Tanfac has a 60-acre manufacturing unit at Cuddalore, Tamil Nadu); this will further add new polymer intermediates such as fluoroelastomers and fluoroelectrolytes, which have application in polymers and semiconductors as well as in photoresist polymers.

Exhibit 130: Revenue potential of USD220-260mn in the fluorination portfolio

Focused Segments	Details of Few Molecules out of 14 Identified			Segment Revenue Potential
	Molecules	End Application	Customer	
Polymers	Product A	Elastomer	US MNC	$ 40 – 70 Mn.
	Product B	Semiconductor/Flame Retardant	Japanese MNC	
Pharmaceuticals	Product X/Y	Cardio/Anti-viral	Indian MNC	$ 80 – 90 Mn.
	Product Z	Oncology	Indian MNC	
Agrochem	Product M	Insecticide	Global MNC	$ 100 Mn.
	Product N	Herbicide	European Originator	

Anupam will source fluorinating agents (KF and HF) from Tanfac and manufacture **Value Added Products (VAPs) at Anupam**

All molecules in these series are high value high margin product

For most of this products, Anupam will be single supplier out of Asia on exclusive basis to originators

Addressable market of Targeted Series for Anupam*

$5+ Bn

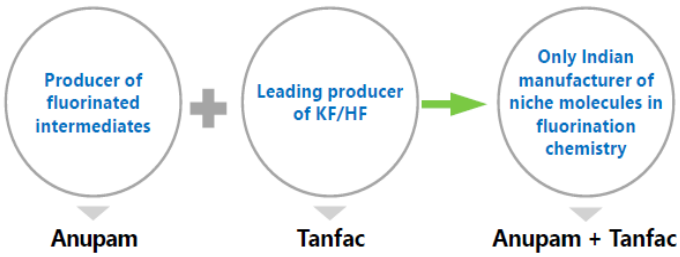
Revenue Potential for Anupam*

$220 - $260 Mn

Source: Company

The company has identified 14 niche molecules in the fluorination space (value-added products developed at its R&D center over the last 4-5 years, and are at the pilot stage now), wherein it will be the sole supplier in Asia (on an exclusive basis) for most. These niche molecules have an addressable market of >USD5bn, where Anupam targets revenue of USD220-260mnpa across polymers (USD40-70mnpa), pharma (USD80-90mnpa) and agrochem (USD100mnpa), as per a global consulting firm research.

Exhibit 131: Anupam-Tanfac synergies



Source: Company

Long-term LOIs provide strong revenue visibility

Anupam works with global innovators largely on patented products and is involved with them at the R&D stage for product development, wherein it offers custom synthesis manufacturing (CSM) solutions using its technology and processes (does not favor a tech pack from customers). Its strong thrust on R&D (process improvement and scaling-up into newer chemistry) helps it offer high-quality, cost-effective, and environment-friendly customized solutions, enhancing customer stickiness.

The company prefers operating on continuous production (over a batch), which helps to: a) maintain high-quality standards with lower impurities, and b) enhance cost efficiency with environment-friendly products. It follows a transparent cost model, passing cost efficiency benefits to clients, which enhances stickiness. These, along with the stretched process for customer validation and receiving approvals for a new supplier (12-24 months for new registration), create strong entry barriers.

Anupam has recently signed LOIs worth Rs50bn:

LOIs indicate MNCs' confidence in Anupam and provide long-term revenue visibility

- Rs10bn revenue for the next 6 years; LOI with a Japanese company for supplying a new-age advanced intermediate for a life-science active ingredient. Sales realization for this molecule will be one of the highest for the company. The molecule is based on fluorination chemistry, which further validates Anupam's strategy of expansion in fluorination. This product is being manufactured for the first time in India.
- Rs15bn for the next 7 years; LOI with a Japanese MNC for manufacturing and supplying three high-value specialty chemicals. The three molecules will be used as advanced intermediates for highly specialized polymers and liquid crystals. Anupam will be the exclusive supplier for the molecules outside India and this LOI is in line with the company's strategy of expansion in the fluoropolymer and electronic segments, manufacturing high-value molecules and moving up the value chain.
- Rs4bn for the next 5 years; LOI with a new US MNC for supplying a new-age specialty chemical advance intermediate. This molecule is an advanced intermediate, to be used as a key building block for manufacturing high-end engineering fluids as well as in active pharmaceutical ingredients.
- Rs22bn for the next 5 years; LOI with a Japanese company for supplying a new-age patented life science active ingredient. The product will be in the validation phase for the next 18 months and, on its successful validation, supply will commence from CY25. Anupam is fully backward-integrated for this molecule and can provide supply-chain assurance to the customer, without dependencies on supplies from other geographies

Such contracts depict Anupam's aggressive footing in the fluorination space, with acquisition of Tanfac. Some of these are new customers; thus, the LOIs lay the foundation for global majors to consider Anupam for fulfilling their requirement of fluorinated compounds going forward. Anupam's backward integration establishes it as a de-risked and assured supplier.

Exhibit 132: Anupam has signed LOIs/contracts worth Rs77bn

Date	Customer	Product	Value (Rs bn)	LOI/Contract	Tenure (no. of years)
13-Jun-23	Japanese specialty chemicals company	New age patented life science active ingredient	21.9	LOI	5
25-Apr-23	Leading American MNC	A niche fluorinated molecule to be used as the key building block for manufacturing high-end engineering fluids and active pharmaceutical ingredient	3.8	LOI	5
13-Apr-23	Japanese MNC	3 molecules will be used as advance intermediates for highly-specialized polymers and liquid crystals	15.0	LOI	7
23-Mar-23	Japanese MNC	New life science-related active ingredient	9.8	LOI	6
10-Jan-22	Crop-protection MNC	New life science-related active ingredient	7.0	LOI	5
15-Dec-21	Japanese MNC	Existing life science-related specialty chemical	1.4	Contract	4
28-Sep-21	European MNC	New life science-related active ingredient	1.4	Contract	3
18-May-21	Two MNCs	New life science-related active ingredient	5.4	Contract	5
28-Apr-21	Life Science MNC	Multiple life science products	11.0	LOI	5
Total			76.7		

Source: Company, Emkay Research

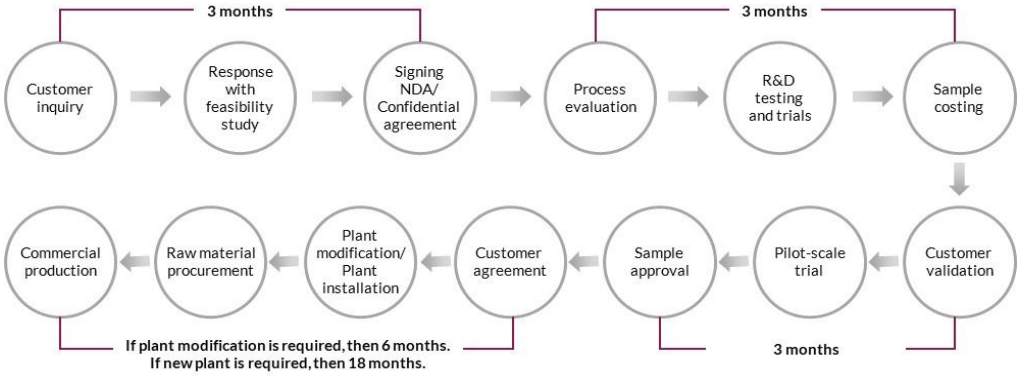
New product development and scaling up

Global innovators are looking to consolidate their vendor base (of outsourcing partners); hence, demand for: a) process engineering, which helps reduce the overall steps required in a multi-step reaction; and b) players who can offer a higher number of steps (across different chemistries), is on the rise. Anupam has strengthened its R&D team (88 members now vs. 25 in FY19; plans to double this team to >175 members in FY24), as it is attempting to move up the value chain and expand into more adjacencies, to garner higher wallet share from clients. In addition, the company plans to capitalize on its:

Anupam is the leader in flow chemistry, photo-chemistry, and multi-step synthesis

- **Flow chemistry:** Offers significant opportunity in improving chemical processes, especially in pharmaceuticals, as it significantly reduces cost and lead time. It also reduces the environmental impact as production scales up. Flow chemistry involves a continuous and accurate feeding of raw materials using flow pumps and continual withdrawal of the product, allowing for multi MT reactions while it requires a low concentration of chemicals.
- **Photo-chemistry:** Per this relatively new technology, photochemical reactions are induced through an electronically-agitated state and, consequently, chemical reactivity is considerably different from that of ground-state molecules. Photo-chemistry technology is done with microreactors, which ensures uniform irradiation of the entire reaction mixture, resulting in shorter, more selective reactions with high energy & efficient scale-up and reduction in by-product formation.

Exhibit 133: Anupam Rasayan's product approval cycle



Source: Company

Exhibit 134: Anupam's positioning across key parameters

Industry parameters	Anupam
Market Size of Products	Niche Market
Number of Reactions	3- to 10-Step Reactions
Pricing	High
Margins	High
Position in Supply Chain	N-1, N-2
Capital Requirement	Moderate-to-High
Focus	Process-Driven
Capacity	Low
Plant Structure	Multipurpose (Process Driven)

Source: Company, Emkay Research

Exhibit 135: Key chemistries and adjacencies

Etherification	Chlorination
Diazotization & hydrolysis	Bromination
Acylation	Williamson Synthesis
Cyclization	Oxidation
Hydrogenation	Claisen Condensation
Fluorination	Schiff-Based Hydrogenation
Alkylation	Selective Chlorination
Nitration	Sandmeyer Reaction
Amination	Ketal Reaction
Carboxylation	Cyanation
Esterification	
Aminolysis	

Source: Company, Emkay Research

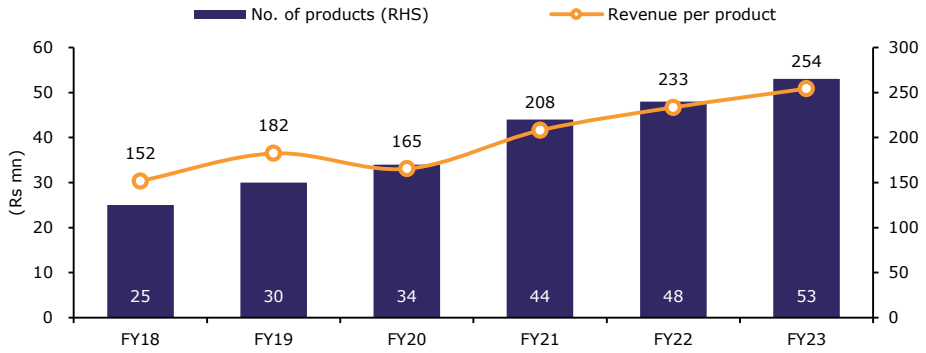
Encouraging operating metrics

Product portfolio doubled over FY19-23

Anupam has been rapidly expanding its product portfolio and has 55 products today vs 25 products in FY18

Anupam has almost doubled its product portfolio to 53 products in FY23 (55 products in Q1FY24) from 25 products in FY18. Though revenue potential per product varies, our broad workings point to improvement in revenue per product as well over FY18-23, suggesting better product monetization. Company commercialized 5 products in FY23 and targets launching another >10 products in FY24. Management has highlighted that it has ~90 products at various levels of R&D and pilot stage. This augurs well for steady product launches in coming years.

Exhibit 136: No. of products have risen by ~2x, with increase in revenue per product



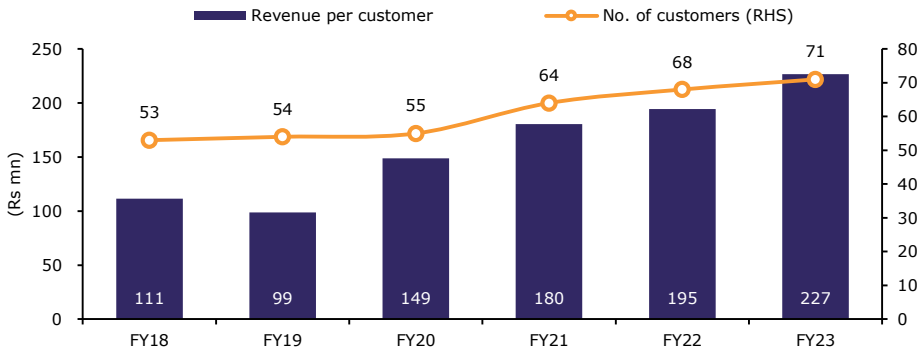
Source: Company, Emkay Research

Global client additions steady; revenue share from top-10 clients stable

Anupam has added quite a few customers over FY21-23, with the total at 71 customers in FY23 (including 27 MNCs)

Anupam witnessed a sharp rise in its clients to 53 in FY18 (from 37 in FY17) and has largely been stable at 53-55 clients over FY18-20. However, given the China +1 benefits playing out, it gained newer clients over FY21-23. Currently, Anupam has 71 global customers (68 in FY22), including 27 MNC customers. It added 2 new MNC customers in Q1FY24 as well.

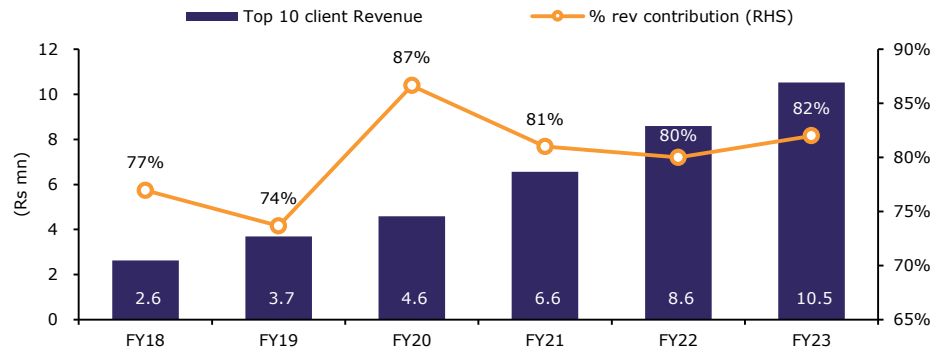
Exhibit 137: Client addition sees uptick over FY22-23; monetization intact



Source: Company, Emkay Research

Anupam typically enters into long-term contracts (ranging from 2-5 years), with customers to ensure sustainable growth, enhance growth visibility, and better operational planning and capex. Its revenue concentration remains high among top-10 customers, which account for >80% of its aggregate revenue (94% in Q1FY24 on sharp ramp-up; to normalize). Revenue from top-10 customers has registered 32% CAGR over FY18-23, while revenue from other clients has seen 24% CAGR (low base; overall revenue CAGR at 30% over FY18-23).

Exhibit 138: Gaining wallet share among top-10 clients; share maintained at >80%



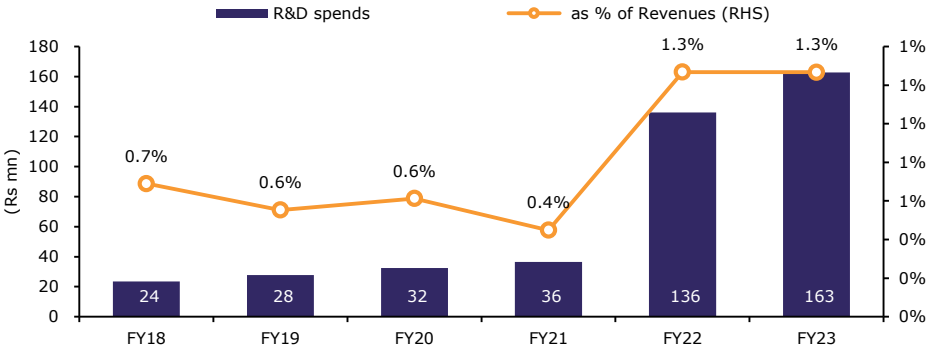
Source: Company, Emkay Research

R&D team investments on the rise; manpower doubled over the last 3 years

Anupam's R&D spends have increased to ~1.3% revenue in FY23 vs a mere 0.4-0.7% over FY18-21

Anupam ramped up its R&D spending over FY22-23. The R&D team has almost doubled over the last 2-3 years to 88 members now vs. 40 members in FY20. Also, R&D expenses have surged by 6x to Rs163mn in FY23 (Rs25-35mnpa over FY18-21), implying 1.3% of the revenue (vs. 0.4-0.7% of the revenue over FY18-21). Its dedicated in-house R&D facilities are located at Sachin Unit 2 Unit 6 (commissioned in FY21 and expanded in FY22 with 2 new labs).

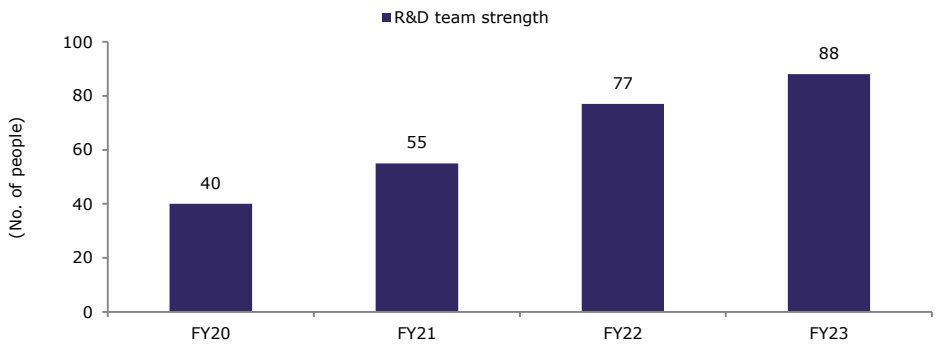
Exhibit 139: R&D expenses have surged by ~4x



Source: Company, Emkay Research

Anupam has increased its R&D team strength to 88 members now vs 40 members in FY20; plans to double this to >175 members by FY24E

Exhibit 140: R&D team strength has increased by ~2x over the last 3 years



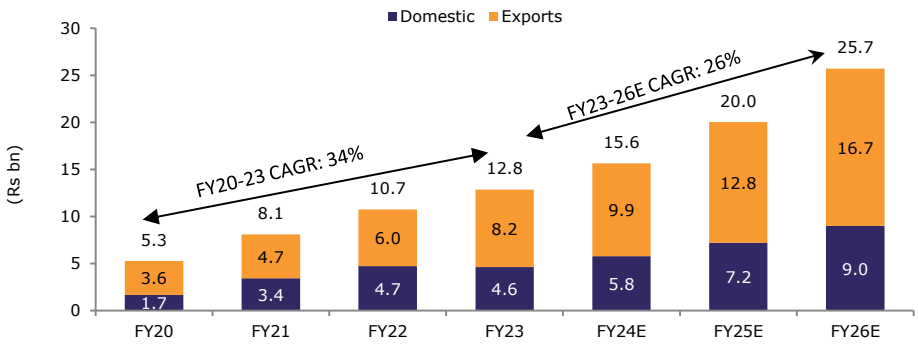
Source: Company, Emkay Research

Financial Analysis

Growth will be largely driven by exports revenue, as most LOIs are for overseas customers

Anupam's revenue CAGR stands at 34% over FY20-23, on strong organic growth. We expect revenue CAGR of 26% over FY23-26E, once contribution from LOIs starts translating into topline growth. Overall contribution of fluorinated products would increase going forward, as a large part of these LOIs is for advanced fluorinated intermediates.

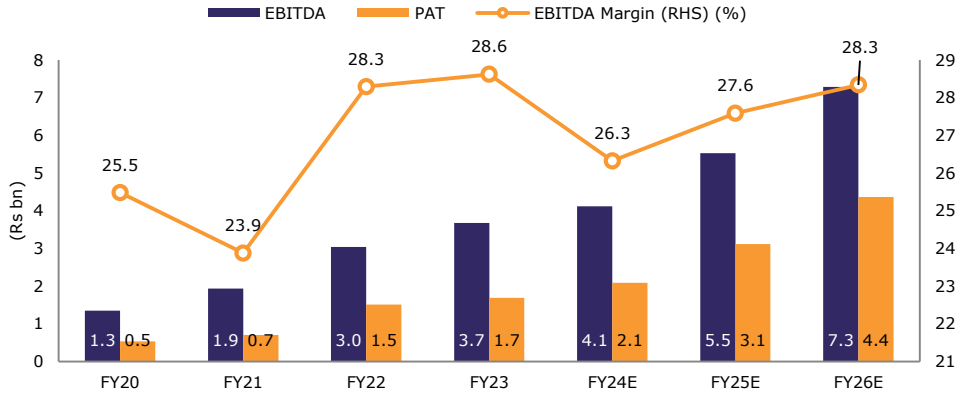
Exhibit 141: Revenue CAGR expected at 26% over FY23-26E



Source: Company, Emkay Research

EBITDA CAGR would register at 25% over FY23-26E, on strong topline growth. Margins to largely track the management guidance range of 26-28%, with positive bias, once contribution from value-added products (possibly fluorine derivatives) increases.

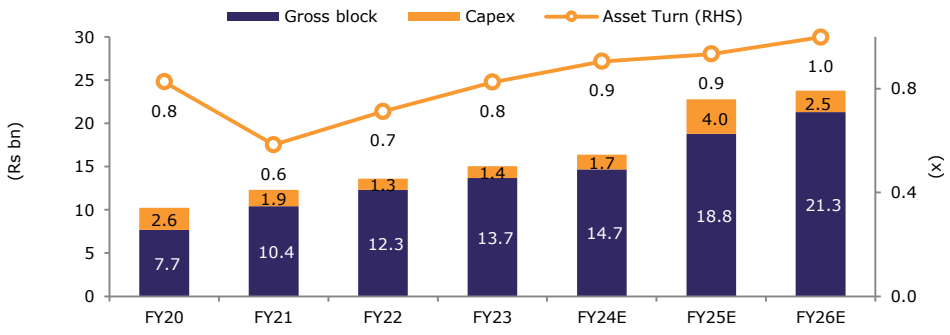
Exhibit 142: EBITDA CAGR expected at 25% over FY23-26E



Source: Company, Emkay Research

Asset turns to gradually improve once capex translates into revenues

Exhibit 143: Asset turns to improve on ramp-up in revenues



Source: Company, Emkay Research

Anupam's working capital rose sharply in FY22 to ~310 days (from ~220 days in FY21). This was largely led by: a) customers' request to hold higher inventory, given supply-chain challenges globally; and b) a surge in RM prices (though the denominator is still inflation-adjusted).

Management had assured that such upfront RM purchase is backed by an understanding with respective clients to pass through such high RM inflation, and it will also be compensated for higher inventory carrying cost. Management has guided for a strong focus on working capital reduction and expects a reduction to sub-200 days in the medium term (FY23 working capital was at 275 days). This would aid OCF generation and help fund its capex plans internally as well as reduce debt. We expect core working capital to stabilize at ~180 days over FY25-26E.

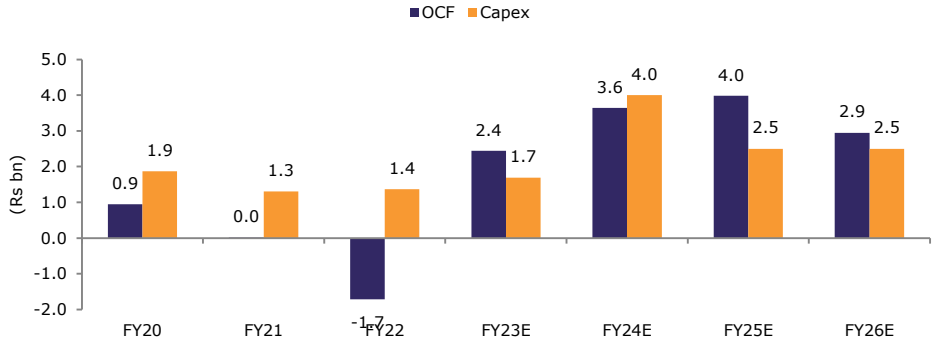
Exhibit 144: Working capital to reduce going forward, on strict inventory control

No. of days	FY20	FY21	FY22	FY23	FY24E	FY25E	FY26E
Inventory days	205	222	293	250	220	180	180
Receivable days	89	92	95	106	90	90	90
Payable days	90	90	77	81	90	90	90
Core Working Capital	**205**	**224**	**312**	**275**	**220**	**180**	**180**

Source: Company, Emkay Research

Generally in all high-growth chemical companies, a large part of OCF is being reinvested in capex and thus there is were low FCF. We believe these companies are in the midst of an investment cycle seeing strong growth opportunities and thus will see sustained investments. The current capex of Rs6.7bn (including Rs4.2bn towards fluorination) will suffice for all the LOIs signed till date and OCF would be sufficient to fund the capex. We expect debt to peak at FY23 levels and return ratios to rebound from FY25 onwards, on strong earnings growth.

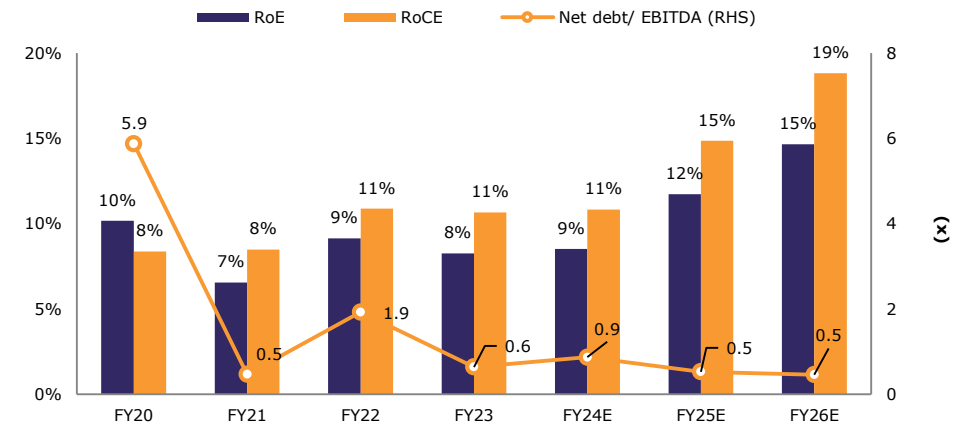
Exhibit 145: OCF to be sufficient to fund the capex



Source: Company, Emkay Research

Return ratios will improve to 15-18% by FY26E, on strong earnings growth and reduction in interest cost

Exhibit 146: Return ratios to improve going ahead



Source: Company, Emkay Research

Valuation and Outlook

Anupam's strong core expertise in custom synthesis manufacturing (CSM) places it in a sweet spot, given: a) technical understanding — the company uses its own technology and processes and is not dependent on any tech pack from customers; b) strong R&D thrust — especially on process engineering, as Company's R&D team starts working with global innovators on their patented products, offering high-quality, customized solution; and c) transparent cost model — Company passes-on cost efficiencies to clients, enhancing customer stickiness.

Anupam has accelerated its new product launches to 8-10 products over FY22-23 vs. 4-5 products annually earlier (aggregate 55 products now). Revenue per commercialized molecule has also seen a gradual uptick, as it typically takes 3-4 years to ramp up. The steady addition of new clients — works with 27 MNCs now vs. 2-3 clients 6-7 years ago — has worked well for the company and broad-based its overall growth as well, while it targets higher wallet share.

Tanfac acquisition opens up newer growth possibilities in fluorination-based products and will give Anupam ready access to both key RMs — Potassium Fluoride (KF) and Hydrochloric Acid (HF), which will: i) aid backward integration (margin accretive) and ii) help accelerate its presence in Fluorination-based products (~15% share currently; all KF based).

We expect the company to record revenue/EBITDA/PAT CAGR of 26%/25%/37%. The aggressive ramp-up of fluorine-based products through the Tanfac acquisition would be the key stock trigger (not factored into our estimates). We initiate coverage on the stock with a BUY recommendation and SoTP-based target price of Rs1,050/share (valuing the core business at 30x Sep-25E EPS and 26% stake in Tanfac post 20% Holdco discount).

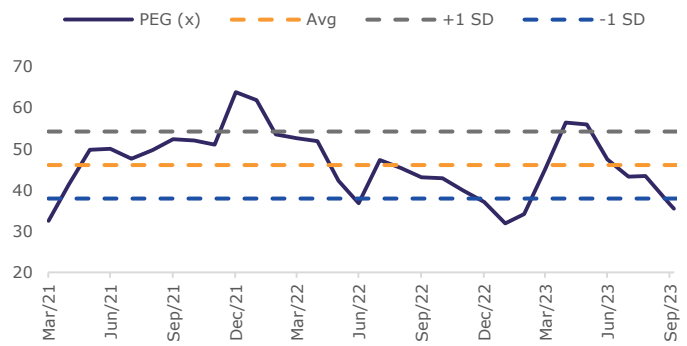
Exhibit 147: SoTP-based TP of Rs1,050/share (Sep-25E)

(Rs mn)	FY25E	FY26E
Core business - Net Profit	3,118	4,360
Target PER (x)	30	30
Attributable value	93,547	130,809
Tanfac's market cap, post 20% holdco discount	439	439
Aggregate value	93,986	131,248
No of shares (mn)	107	107
Target price (TP; Rs/share)	874	1,220
TP on Sept-25E EPS (Rs/share)		1,050
CMP (Rs/share)		884
Upside		19%

Source: Company, Emkay Research

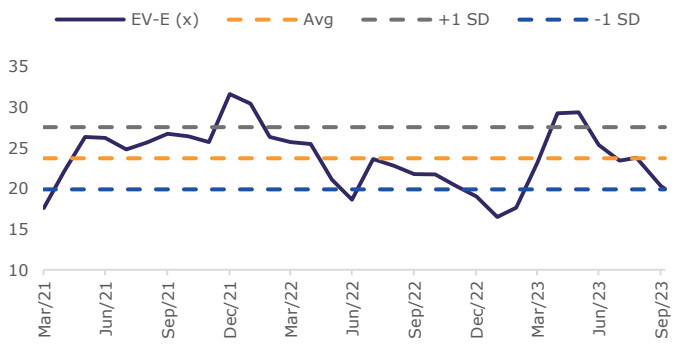
Key risks: i) Higher working capital: A higher-than-expected working capital may depress OCF generation and RoCEs. **ii) Pressure in RM:** An inflationary cycle leading to significantly higher RM prices may impact gross margin in the medium term; however, since Anupam operates a pass through mechanism there is an overall cushion for RM pressure.

Exhibit 148: : 1-year forward P/E



Source: Bloomberg, Emkay Research

Exhibit 149: 1-year forward EV/EBITDA



Source: Bloomberg, Emkay Research

Business Overview

Anupam is engaged in the custom synthesis and manufacture of specialty chemicals in India. The business segments are life science-related specialty chemicals (agrochemicals—insecticides, fungicides, herbicides, plant growth regulators; personal care—anti-bacterial and ultraviolet protection intermediates and active ingredients; and pharmaceuticals—intermediates and 'key starting materials' for APIs, material sciences and surface chemistry (90%) and other specialty chemicals (specialty pigment and dyes, polymer additives; 10%).

The company is mainly customer-centric, with ~82% of its revenue flowing from the top-10 customers in FY23. The company is committed to producing sustainable products by leveraging its state-of-the-art, continuous process technology, including flow chemistry and photochemistry. In addition, Anupam has significantly enhanced is R&D vertical as well as engineering capabilities, to provide even greater value to its customers, particularly for its intricate and multi-stage synthesis projects.

Some of its facilities are ISO 9001:2015 and ISO 14001:2015 certified, with sound technology, environment consciousness, rich history of innovation through research, and total commitment to excellence towards quality and sustainability.

Exhibit 150: Anupam's manufacturing facilities

Plant	Location	Number of plants
Units 1,2,3 and 6	Sachin, Gujarat, India	4
Units 4 & 5	Jhagadia, Gujarat, India	2

Source: Company, Emkay Research

Company focus for FY24 will be to enhance presence across key global markets, undertake improvement in its process and product portfolio to widen market share, reduce cost and improve sustainability efforts to strengthen its competitive position.

One of the key growth drivers will be from new polymer intermediates, including fluoro-elastomers, fluoro-polymides and fluoro surfactants, which is being made possible by leveraging its acquisition of Tanfac. This will strengthen Anupam's supply-chain in fluorination.

Company's capex plans are in place, to fuel its expansion strategy and cater to the resultant demand. A capex of Rs6.7bn has been envisaged towards setting up three brownfield MPPs within the existing units at Sachin and Jhagadia, for capacity expansion of newer molecules. Capacity expansion includes Rs2.5-billion facility at its Jhagadia unit for signed LOI/orders. Another two projects will be executed at the Sachin unit at a total capex of Rs4.2bn. These plants are aligned to the LOI contracts signed for fluorination-based molecules. A strong demand for these molecules will be adequately supported by this new capacity over the next 3-5 years. These capex projects are expected to be completed by Q1FY25.

Exhibit 151: Anupam's timeline

Source: Company, Emkay Research

Exhibit 152: Current board of directors

Name of Director	Designation	Qualification	Experience / Expertise
Dr. Kiran C Patel	Chairman & NED	BSc in Medicine & Surgery; Dipl. in Internal Medicine & Cardiovascular diseases	US-based Medial Practitioner
Anand S. Desai	MD	BSc	30 years of experience in the chemicals industry
Mona A. Desai	Vice Chairman & WTD	B.Sc. in Home Science	20 years of experience in the chemicals industry
Hetul Krishnakant Mehta	ID	Dipl. in Chemical Engineering	Patent application for preparation of clopidogrel polymorphous form 1 using seed crystals. Director in a few other companies
Dr. Namrata Dharmendra Jariwala	ID	Doctrate, Masters in Civil Engineering	Wrote several research papers and worked on several consultancy projects
Milan R. Thakkar	NED		Wide experience in the chemical industry, along with directorship in Arochem Industries Pvt
Vijay Kumar Batra	ID	Bachelors in Chemical Engineering; Exec MBA – Wharton	On the board of various Chemical and Pharma research companies
Vinesh Prabhakar Sadekar	ID	Bachelors in Chemical Engineering	Previous MD of Navin Fluorine and served as director in Ineos Styrolutions

Source: Company, Emkay Research;

MD – Managing Director, NED –Non-Executive Director, WTD – Whole time director, ID – Independent Director, B.Com. – Bachelors in Commerce, B.Sc. – Bachelors in Science

Anupam Rasayan : Standalone Financials and Valuations

Profit & Loss

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Revenue	**10,738**	**12,841**	**15,641**	**20,044**	**25,696**
Revenue growth (%)	32.4	19.6	21.8	28.2	28.2
EBITDA	**3,038**	**3,675**	**4,117**	**5,529**	**7,281**
EBITDA growth (%)	56.9	21.0	12.0	34.3	31.7
Depreciation & Amortization	601	656	737	883	993
EBIT	**2,437**	**3,019**	**3,380**	**4,647**	**6,289**
EBIT growth (%)	71.7	23.9	12.0	37.5	35.3
Other operating income	0	0	0	0	0
Other income	73	22	45	50	54
Financial expense	308	619	529	365	287
PBT	**2,202**	**2,422**	**2,896**	**4,331**	**6,056**
Extraordinary items	0	0	0	0	0
Taxes	694	737	811	1,213	1,696
Minority interest	0	0	0	0	0
Income from JV/Associates	0	0	0	0	0
Reported PAT	**1,508**	**1,685**	**2,085**	**3,118**	**4,360**
PAT growth (%)	115.0	11.8	23.7	49.6	39.8
Adjusted PAT	**1,508**	**1,685**	**2,085**	**3,118**	**4,360**
Diluted EPS (Rs)	**15.0**	**15.7**	**19.4**	**29.0**	**40.6**
Diluted EPS growth (%)	114.3	4.3	23.7	49.6	39.8
DPS (Rs)	**1.0**	**1.9**	**3.6**	**4.8**	**6.0**
Dividend payout (%)	**6.6**	**12.2**	**18.6**	**16.5**	**14.8**
EBITDA margin (%)	28.3	28.6	26.3	27.6	28.3
EBIT margin (%)	22.7	23.5	21.6	23.2	24.5
Effective tax rate (%)	31.5	30.4	28.0	28.0	28.0
NOPLAT (pre-IndAS)	**1,669**	**2,100**	**2,434**	**3,346**	**4,528**
Shares outstanding (mn)	100.2	107.5	107.5	107.5	107.5

Source: Company, Emkay Research

Balance Sheet

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Share capital	1,002	1,075	1,075	1,075	1,075
Reserves & Surplus	16,244	22,520	24,218	26,820	30,535
Net worth	**17,247**	**23,594**	**25,292**	**27,895**	**31,609**
Minority interests	0	0	0	0	0
Deferred tax liability (net)	546	728	728	728	728
Total debt	**7,959**	**7,876**	**5,676**	**3,676**	**3,676**
Total liabilities & equity	**25,751**	**32,199**	**31,696**	**32,299**	**36,013**
Net tangible fixed assets	4,559	6,291	6,539	6,748	322
Net intangible assets	18	15	31	31	5
Net ROU assets	12	40	12	12	0
Capital WIP	428	1,135	1,000	1,000	1,000
Goodwill	0	0	0	0	0
Investments [JV/Associates]	1,482	1,584	1,584	1,584	1,584
Cash & equivalents	**2,095**	**5,514**	**2,088**	**737**	**312**
Current assets (ex-cash)	12,827	15,055	15,814	17,367	21,561
Current Liab. & Prov.	3,111	3,492	4,590	5,807	7,368
NWC (ex-cash)	**9,715**	**11,563**	**11,224**	**11,560**	**14,192**
Total assets	**25,751**	**32,199**	**31,696**	**32,299**	**36,013**
Net debt	5,863	2,362	3,588	2,939	3,364
Capital employed	25,704	32,080	31,578	32,180	35,895
Invested capital	**21,699**	**23,847**	**26,905**	**28,859**	**32,999**
BVPS (Rs)	171.6	218.5	234.3	258.5	293.0
Net Debt/Equity (x)	0.3	0.1	0.1	0.1	0.1
Net Debt/EBITDA (x)	1.9	0.6	0.9	0.5	0.5
Interest coverage (x)	0.1	0.2	0.2	0.1	0.0
RoCE (%)	**11.0**	**10.5**	**10.8**	**14.7**	**18.6**

Source: Company, Emkay Research

Cash flows

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
PBT	2,202	2,422	2,896	4,331	6,056
Others (non-cash items)	0	0	0	0	0
Taxes paid	(355)	(540)	(790)	(1,180)	(1,653)
Change in NWC	(4,107)	(1,666)	340	(337)	(2,632)
Operating cash flow	**(1,714)**	**2,440**	**3,646**	**3,980**	**2,954**
Capital expenditure	(1,417)	(1,662)	(4,000)	(2,500)	(2,500)
Acquisition of business	(1,481)	(103)	0	0	0
Interest & dividend income	58	79	100	120	0
Investing cash flow	**(4,120)**	**(4,779)**	**(3,955)**	**(2,451)**	**(2,445)**
Equity raised/(repaid)	69	4,816	0	0	0
Debt raised/(repaid)	4,090	(83)	(2,200)	(2,000)	0
Payment of lease liabilities	14	14	14	14	0
Interest paid	(308)	(619)	(529)	(365)	(287)
Dividend paid (incl tax)	(100)	(205)	(387)	(516)	(646)
Others	93	(154)	0	0	(500)
Financing cash flow	**3,844**	**3,755**	**(3,116)**	**(2,881)**	**(1,433)**
Net chg in Cash	(1,990)	1,416	(3,426)	(1,352)	(924)
OCF	(1,714)	2,440	3,646	3,980	2,954
Adj. OCF (w/o NWC chg.)	(5,820)	774	3,985	3,644	321
FCFF	(3,131)	778	(354)	1,480	454
FCFE	(3,381)	238	(784)	1,235	166
OCF/EBITDA (%)	(56.4)	66.4	88.6	72.0	40.6
FCFE/PAT (%)	(224.2)	14.1	(37.6)	39.6	3.8
FCFF/NOPLAT (%)	**(187.6)**	**37.0**	**(14.6)**	**44.2**	**10.0**

Source: Company, Emkay Research

Valuations and key Ratios

Y/E Mar	FY22	FY23	FY24E	FY25E	FY26E
P/E (x)	58.8	56.4	45.6	30.5	21.8
P/CE(x)	42.0	40.6	33.7	23.7	17.7
P/B (x)	5.2	4.0	3.8	3.4	3.0
EV/Sales (x)	8.8	7.6	6.3	4.9	3.8
EV/EBITDA (x)	31.1	26.5	24.0	17.7	13.5
EV/EBIT(x)	38.8	32.2	29.2	21.1	15.6
EV/IC (x)	4.4	4.1	3.7	3.4	3.0
FCFF yield (%)	(3.3)	0.8	(0.4)	1.5	0.5
FCFE yield (%)	(3.8)	0.3	(0.8)	1.3	0.2
Dividend yield (%)	0.1	0.2	0.4	0.5	0.7
DuPont-RoE split					
Net profit margin (%)	14.0	13.1	13.3	15.6	17.0
Total asset turnover (x)	0.5	0.4	0.5	0.6	0.8
Assets/Equity (x)	1.4	1.4	1.3	1.2	1.1
RoE (%)	**9.2**	**8.3**	**8.6**	**11.8**	**14.7**
DuPont-RoIC					
NOPLAT margin (%)	15.5	16.4	15.6	16.7	17.6
IC turnover (x)	0.0	0.0	0.0	0.0	0.0
RoIC (%)	**8.7**	**9.2**	**9.6**	**12.0**	**14.6**
Operating metrics					
Core NWC days	330.2	328.7	261.9	210.5	201.6
Total NWC days	**330.2**	**328.7**	**261.9**	**210.5**	**201.6**
Fixed asset turnover	0.8	0.9	0.9	1.0	1.1
Opex-to-revenue (%)	37.1	31.4	33.7	32.9	32.7

Source: Company, Emkay Research

HOLD Navin Fluorine

Fluorinating spot-on

Specialty Chemicals ▸ Initiating Coverage ▸ **October 15, 2023**

TARGET PRICE (Rs) : 4,050

Navin Fluorine (NFIL) has a unique standing among contract manufacturers, given its niche expertise in the growing, albeit complex, fluorination chemistry space and presence in multiple industry verticals. NFIL's capex spending has accelerated over the last two years (~Rs12bn over FY22-23), on high-growth projects across all business verticals which have now started notably contributing to revenue growth. NFIL plans spending another ~Rs10bn over FY23-24 on new molecules and backward integration. However, MD Radhesh Welling's recent exit could induce some concern on medium-term growth visibility, till a successor takes up the baton. We estimate FY23-26E revenue/EBITDA/PAT CAGR of 23/26/24%. Awaiting clarity on further action by management, we initiate coverage on NFIL with a HOLD recommendation and TP of Rs4,050/share (30x Sep-25E EPS).

Navin Fluorine: Financial Snapshot (Consolidated)

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Revenue	14,534	20,774	25,980	33,043	38,786
EBITDA	3,548	5,503	7,015	9,417	11,055
Adj. PAT	2,631	3,752	4,695	6,305	7,096
Adj. EPS (Rs)	53.2	75.7	94.8	127.2	143.2
EBITDA margin (%)	24.4	26.5	27.0	28.5	28.5
EBITDA growth (%)	14.7	55.1	27.5	34.3	17.4
Adj. EPS growth (%)	2.2	42.5	25.1	34.3	12.6
RoE (%)	15.1	18.6	20.3	23.4	22.2
RoIC (%)	23.1	19.6	16.1	18.0	17.8
P/E (x)	69.5	48.8	39.0	29.0	25.8
EV/EBITDA (x)	51.6	34.7	27.5	20.4	17.4
P/B (x)	9.9	8.4	7.5	6.2	5.3
FCFF yield (%)	(3.5)	(3.9)	0.1	0.9	1.3

Source: Company, Emkay Research

Diversified business mix to mitigate cyclical risk

NFIL has taken a balanced approach, with focuses on both, pharma and agrochemicals, unlike peers. The legacy refrigerant gases and inorganic fluorides cater to a number of industries, such as air conditioning, fire extinguishing, and metals. The specialty chemicals business serves the agrochemical, pharmaceutical and performance material industries, with NFIL in the process of reducing its pharma share and replacing it with that of performance materials. CDMO business largely entails supply of fluorinated/non-fluorinated intermediates to pharma companies for their patented molecules. This diversified end-user industry base will help NFIL soften headwinds during a down-cycle.

Multiple projects under execution to motivate growth

NFIL has commissioned a number of high-growth capex projects in FY23, some of which it continues to execute in FY24. The new R32 capacity and debottlenecking/expansion of its hydrofluoroolefins (HFO) contract with Honeywell augurs well for NFIL's high-performance products (HPP) business. Specialty chemicals business will see the highest growth, backed by new, dedicated & multipurpose plants in FY23, with a significant delta also to be seen from the high-growth fluoro specialty molecule, which is set to commission in Dec-23. The CDMO (contract development & manufacturing organization) business will see strong growth, boosted by contribution from the cGMP4 plant.

We await Company's succession plan on MD's recent exit

Radhesh Welling, NFIL's MD, has resigned and Vishad Mafatlal, the Chairman, will be taking over as the executing MD in the interim. Mr Mafatlal's execution will remain key to watch as regards further growth plans for the company, till an external candidate is onboarded. Management claims there is no customer pushback—all customers have multiple touchpoints across the organization and all business segments have their respective CEO. We believe the recent exit of the MD raises some concerns about medium-term growth, and the new MD may take some time to attune to the business.

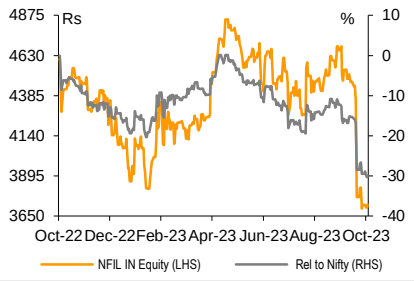
Target Price – 12M	Sep-24
Change in TP (%)	**NA**
Current Reco.	HOLD
Previous Reco.	NA
Upside/(Downside) (%)	9.7
CMP (13-Oct-23) (Rs)	3,691.6

Stock Data	Ticker
52-week High (Rs)	4,950
52-week Low (Rs)	3,650
Shares outstanding (mn)	49.6
Market-cap (Rs bn)	183
Market-cap (USD mn)	2,198
Net-debt, FY24E (Rs mn)	9,947
ADTV-3M (mn shares)	-
ADTV-3M (Rs mn)	1,181.5
ADTV-3M (USD mn)	14.2
Free float (%)	-
Nifty-50	19,751
INR/USD	83.3
Shareholding, Jun-23	
Promoters (%)	28.8
FPIs/MFs (%)	18.5/26.0

Price Performance

(%)	1M	3M	12M
Absolute	(17.5)	(14.8)	(19.8)
Rel. to Nifty	(15.7)	(15.6)	(30.2)

1-Year share price trend (Rs)



Meet Vora
meet.vora@emkayglobal.com
+91 22 6624 2474

Meet Gada
meet.gada@emkayglobal.com
+91 22 6612 1235

High-Performance Products

HPPs consist of inorganic fluorides and refrigerant gases. Inorganic fluorides have not been a key focus area for the management over the last few years. Under the refrigerants gas segment, the company manufactures R-22 and R-32 and has signed long-term contracts with Honeywell for manufacturing patented HFOs. The recent contract for HFO-1233zd (plans to debottleneck and double this capacity) and the new R32 capacity will be the key growth driver under this business. NFIL does not have any chloromethane capacity and, thus, is not backward integrated for any of its refrigerant gases (only AHF is manufactured in house).

The legacy business of inorganic fluorides and vintage refrigerant gases is less likely to be the key focus area; contribution to overall revenue is also likely to reduce

Inorganic Fluorides - NFIL primarily caters to domestic steel and glass segments, which are its largest clients. Besides, it also supplies inorganic fluorides to sectors like oil and gas, abrasives, electronic products, life science, and crop protection. NFIL has a wide range of inorganic fluorides in its portfolio, but it is largely focusing on selling ammonium bifluoride and AHF (dilutive) in the exports market. The company currently has AHF capacity of ~20,000 MTPA at Surat and has announced to set up a new capacity of 40,000 MTPA at Dahej at a capex of Rs4.5bn. This expansion project will cater to the growing demand for fluorochemicals in pharmaceutical, agro-chemical and emerging renewable sectors.

Refrigerant Gases – NFIL introduced refrigerants into India in 1967, shortly after commissioning its manufacturing plant at Surat. It was later backward integrated into manufacturing critical intermediates, namely sulfuric acid and hydrofluoric acid. NFIL primarily manufactures R-22 with a capacity of ~10,000 ton, of which 50% is exported to the Middle East and Vietnam and the balance is sold in India. R-22 is sold under the 'Mafron' brand in India. R-22 is under the phase-down process globally and the company is trying to expand into non-emissive applications such as feedstock for pharmaceuticals and agrochemicals segments to compensate for production cut in the emissive category.

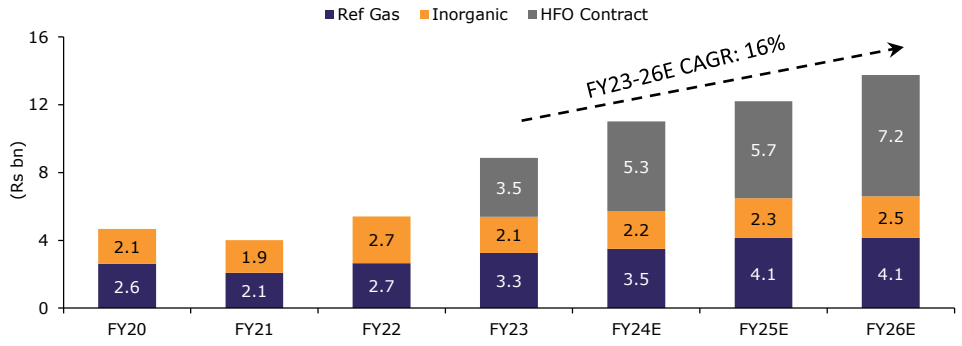
The company has set up R-32 plant with a capacity of 4,000 MT and a capex of Rs0.8bn (commissioned in Q2FY24). The idea behind this investment is that demand for R-32 will continue to increase, not just as a single ingredient, but also as part of a blend (HFC and HFO). NFIL is in discussion with its partners for a specific HFC-HFO blend, wherein NFIL will provide HFCs to them for supply to the global market and, in turn, the partner will allow NFIL to supply those blends in the Indian market. R-32 demand is likely to further grow for low GWP blends.

HFO contracts with Honeywell will be the key focus area and growth driver going forward

HFO contract with Honeywell – Announced in Feb-20, NFIL entered into a seven-year contract worth USD410mn (~Rs28bn) with Honeywell to manufacture HFO-1233zd in India under its proprietary Solstice range. HFO-1233zd is a new generation foam blowing agent, and for this contract, the company invested USD61.5mn (~Rs4.4bn). The said plant commercialized in FY23 and revenue guidance from this plant is Rs5.5–6.0bn at peak utilization levels.

NFIL is currently under the process of debottlenecking this plant by 25% by CY24, which will aid growth for CY25. The company is also in talks with Honeywell for potentially doubling this capacity, which if materializes will aid growth from CY26 (we do not factor any expansion into our estimates at this stage). This long-term contract not only demonstrates NFIL's execution capabilities but also instils global MNCs' confidence on proprietary technology transfer without IP violation.

Exhibit 153: HPP revenue to register 16% CAGR over FY23-26E



Source: Company, Emkay Research

Specialty Chemicals

NFIL's specialty chemicals segment primarily caters to domestic and global agrochemicals (including the innovators), pharma, and performance material companies. The company works on both long-term contracts (supplying to single customers) and catalogue-based products (supplying to multiple customers). Specialty chemicals operations are carried out from Surat, where they have integrated fluorochemicals complex. Further, expansions are being carried out in Dahej.

The company has been a pioneer in fluorine chemistry and started this business in 2000. NFIL began manufacturing basic building blocks such as Benzotrifluoride (BTF), Fluorobenzene (both commenced in 2000) and Trifluoroacetic Acid (TFA, since 2004). Over the years, the company has established several other basic building blocks and derivatives of these products.

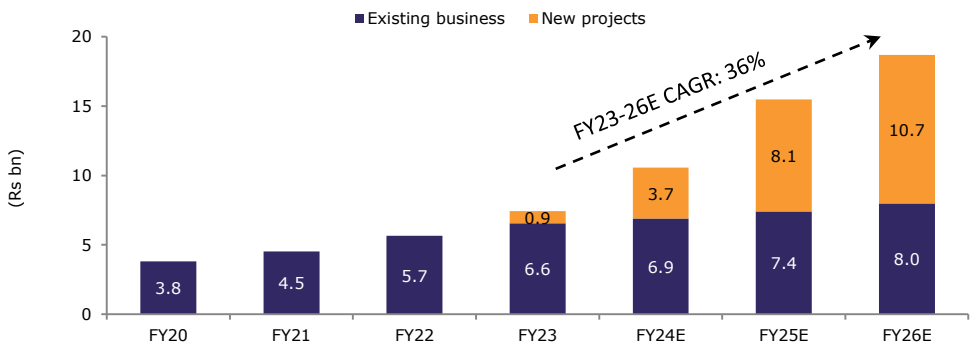
NFIL's specialty chemicals business is almost a decade older than the company's CRAMS business. NFIL has multi-purpose plants (MPP) to process multi-step products and intermediates that find application across pharmaceuticals, crop protection, hydrocarbon and fragrances. Margins are lower than in those CRAMS, because CRAMS is focused on patented pharma molecules, whereas specialty chemicals cater to off-patent pharma molecules as well as agrochemicals, which typically generate lower margins than pharma drugs. However, margins are better than those in inorganic fluorides or refrigerant gas businesses.

NFIL has recently done three major growth capex in this business:

A large part of the growth will come from the three new growth capex plans. MPP will take time to ramp up and the new fluoro specialty molecule will provide building blocks for the future

- Multi-purpose plant (MPP) – The MPP will lay the foundation for the next phase of growth. It will help enhance the company's product offerings and strengthen its customer relationships along with providing building blocks for future growth. NFIL has incurred a capex of Rs2.4bn and the plant was commissioned in FY23 with a peak expected asset turnover of 1.35-1.45x. The company is planning to launch five molecules from this MPP (4 agro and 1 pharma), of which four have already been launched in FY23 and one is expected to be launched in FY24. The capex is funded through internal accruals and debt, having margin profile similar to the current company level.
- Agro-chemical fluoro-intermediate – Navin Fluorine Advanced Sciences (NFASL), a wholly owned subsidiary of the company, entered into a multi-year agreement with a large multinational company for the manufacture and supply of a key agro-chemical fluoro-intermediate. This product had a capex of Rs1.3bn and total agreement value Rs8bn for five years. This product was commissioned one month before the expected timelines and supplies have started from end-FY23.
- New Fluoro Specialty Molecule – NFASL entered this multi-year contract with a large multinational company for the manufacture and supply of a key Fluoro Specialty Molecule. This molecule will involve a capex of Rs5.4bn and has an expected peak revenue potential of Rs6bn. This capacity is expected to come on stream in Dec-23. This project will strengthen the company's product offerings as well as key account relationship along with providing building blocks for future growth.

Exhibit 154: Specialty chemicals to post 36% CAGR over FY23-26E



Source: Company, Emkay Research

CDMO

NFIL offers customized services primarily to pharmaceutical clients. The company's services include route development, process and analytical development, and scale-up from lab scale to ton scale production. NFIL's primary focus is on fluorination, but it is gradually increasing capabilities on other chemistries as well to become a one-stop solution for its clients. CRAMS operations are based in Dewas and has a pilot facility and three cGMP-approved MPPs.

The company runs its R&D operations both from India and the U.K., through Manchester Organics Limited (MOL). NFIL acquired 51% stake in MOL in 2011 and the remaining 49% stake in 2016. MOL works directly with innovative pharma companies on the milligram to multi-kilo research phase.

The company's work in CRAMS is currently focused mainly on the area of new molecule development. The company produces and supplies fluorinated intermediates for use by pharma companies in their R&D stage. Order visibility is, therefore, limited to a quarter or two, and there can be lumpiness, depending on the success or failure of customers' R&D projects. However, NFIL is working with 30-50 pharma customers and is working on more than one molecule with some of them. This diversification helps mitigate risk.

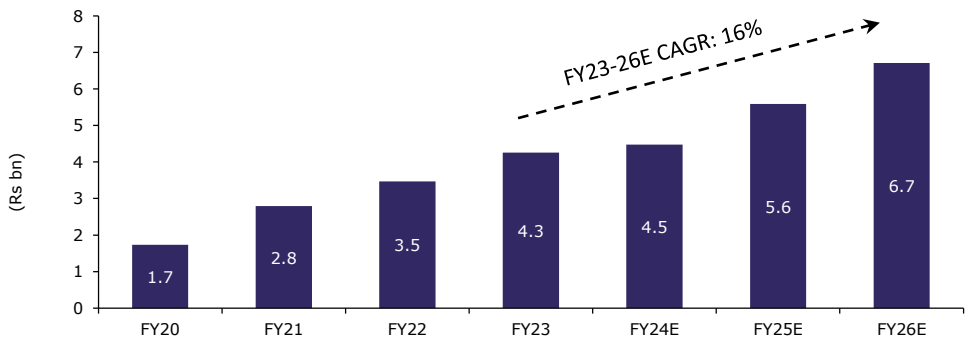
cGMP4 to drive the next leg of growth. The Fermion contract gives significant growth visibility even for non-fluorinated molecules; the vision for achieving USD100mn revenue stays intact

NFIL also intends to go beyond just fluorination for pharma's CDMO. In the same context, it has signed a contract with Fermion (non-exclusive) for three patented late-stage molecules; commercial supply will start in CY25. Management has given revenue visibility of USD40mn over a three-year contract period. This will be supplied from the cGMP4 facility, engineering work is on the verge of completion. The facility is expected to be completed by CY24-end. The company has a vision of achieving USD100mn revenue from CDMO in the next few years.

CDMO business has the following characteristics:

- Building critical mass at early stages of molecule development – A major portion of the revenue is dependent on the successful commercialization of molecules. The rate of successful commercialization of molecules is low, as it takes years since the initial collaboration; and NFIL's role in commercialization of these molecules is limited. To counter this volatility, NFIL is working on more projects at the initial stages of molecule development. This will result in a higher number of molecules getting commercialized.
- Targeting projects at the late stage of molecule development – NFIL has tweaked its earlier approach of collaborating with innovators at initial stages to now collaborating at Phase-2 and Phase-3 of molecule commercialization due to lower risks and higher success rate. Innovators do not prefer new supply-chain partners in the middle of molecule commercialization, resulting in limited opportunities. However, management believes that NFIL can make a compelling case in a few molecules, given its unique value proposition.
- Grabbing a higher share of the value chain – NFIL has so far been restricting itself to fluorination of intermediates. Customers collaborate with NFIL for these intermediates and then take them to API manufacturers. Formulations are prepared by the final pharma companies. NFIL is now developing API capabilities in its existing intermediates to become a one-stop solution for its customers.

Exhibit 155: CDMO business to register 16% CAGR over FY23-26E

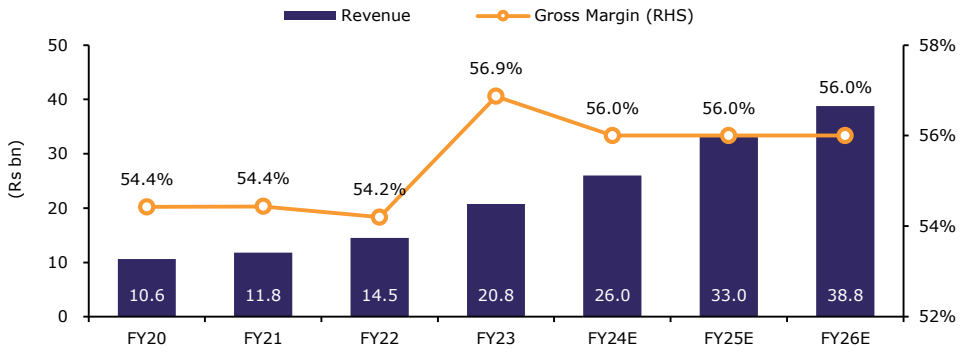


Source: Company, Emkay Research

Financial Analysis

NFIL's overall revenue registered a 25% CAGR over FY20-23 on account of ramp up in CDMO and specialty chemical business, which grew by 37% and 25%, respectively. The new HFO contract with Honeywell started contributing in the second half of FY23. Going forward, we expect overall revenue to register a 23% CAGR over FY23-26E on account of ramp up in the HFO contract, contribution from two dedicated plants and one MPP in the specialty business and cGMP-4 in CDMO business.

Exhibit 156: Revenue to report 23% CAGR over FY23-26E, with stable gross margin



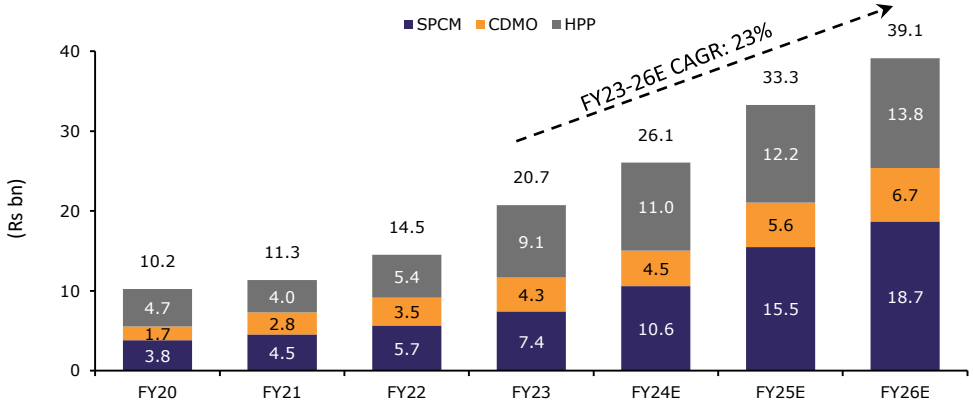
Source: Company, Emkay Research

NFIL benefited from carbon credits during FY09-13. The company earned more than Rs5bn during this period from carbon credits, and the proceeds helped it expand into the CDMO business and deleverage its balance sheet. Adjusted for carbon credits, the company's EBITDA margins have improved over the past few years. Margin improvement can be attributed to the increasing proportion of revenue from specialty chemicals and CRAMS and a pickup in margins in refrigerant gases and inorganic fluorides from the depressed levels of FY12 and FY13. Going forward, management's endeavor is to continue to move EBITDA margins higher by driving growth in higher-margin businesses.

Management is now focusing on getting new HFO contracts in the HPP business, new dedicated plants in specialty chemicals business and making the CDMO business less lumpy by working on late-stage molecules with global pharma innovators.

Specialty chemicals to be the key revenue contributor going forward. HPP to follow, led by the Honeywell contract

Exhibit 157: Segmental revenue break-up

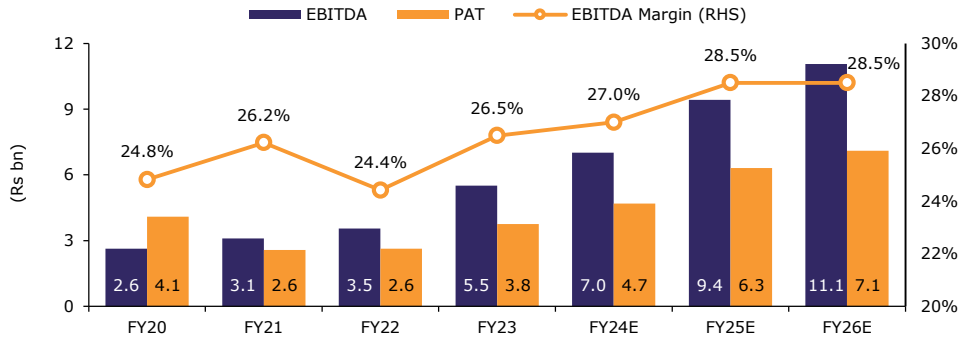


Source: Company, Emkay Research

EBITDA margin profile is likely to gradually improve from FY23 on account of ramp up of the CDMO business (highest margin) and large contribution from the specialty business, further aided by change in product mix towards higher-margin products. As indicated by management, HFO contract is largely garnering company-level margins. We expect EBITDA/PAT to register a CAGR of 26%/24% over FY23-26E.

Margins will improve going forward, on higher contribution from CDMO and shift in product mix from the specialty business

Exhibit 158: NFIL to register EBITDA/PAT CAGR of 26%/24% over FY23-26E

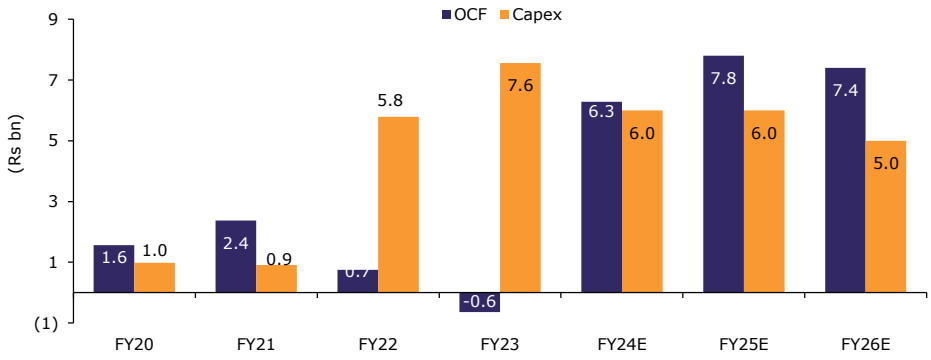


Source: Company, Emkay Research

NFIL has taken debt over the last two years to fund its aggressive capex. The current debt stands at Rs7.5bn, which should peak at Rs10bn in our view. Going forward, OCF will be sufficient to fund that year's capex and gradually debt should get repaid beyond FY26. The company targets that cash flows from an asset are sufficient to repay the debt taken to fund that capex. Return ratios have improved from 15-17% historically to 22-24% and are likely to sustain going forward.

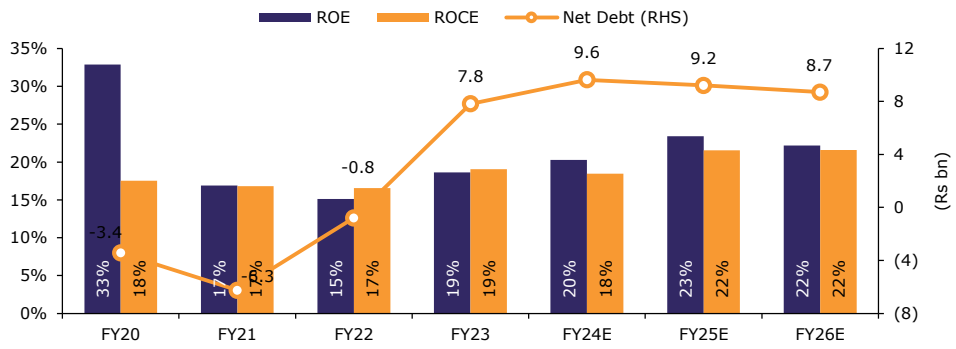
NFIL has taken debt over the last two years to fund capex, however future capex will be taken care of by the OCF. Return ratios will improve ahead, on strong earnings growth over FY23-26E

Exhibit 159: OCF to be largely sufficient for funding capex going forward



Source: Company, Emkay Research

Exhibit 160: Return ratios to gradually improve



Source: Company, Emkay Research

Valuation and outlook

In the HPP business, the proportion of refrigerants and inorganic fluorides is expected to decline to ~16% in FY26 from 45% in FY20. The newly commissioned R-32 capacity augurs well for growth in the HFC business (Indian quota would freeze in Jan-24). Debottlenecking of Honeywell contract (HFO1233zd capacity) by 25% is expected to be completed by CY24-end, while NFIL is also in negotiation with Honeywell for doubling of the contract volume. Management is in further discussions with Honeywell for other HFOs, which provide strong revenue visibility.

In the specialty chemicals business, the existing dedicated plant of agro-chemical fluoro-intermediate has achieved a full run rate, with revenue expectation of Rs2.0-2.5bn. The dedicated Rs5.4bn agrochem plant is expected to come up by Dec-23 and would take another 1-2 years for full ramp up, with revenue expectation of Rs6bn. The MPP will get ramped up by FY25 – four products have been launched and the fifth is expected to get launched in H2CY24 with a revenue expectation of Rs2.5-3bn. These plants will double the existing revenue of Rs7bn in the specialty business to Rs15bn by FY25.

In CDMO business, the company intends to focus on late-stage molecules. Completion of cGMP4 by CY24-end would further help it to execute larger projects for pharma innovator companies. Contract wins with customers like Fermion provide further comfort on the sticky business.

Over FY23-25E, the company will invest ~Rs10bn in HPP, specialty and CDMO business units along with AHF capacity expansion. The HPP, MPP and agro-chemical projects are all done through NFASL, a wholly owned subsidiary of the company, which will lay foundation for the next phase of growth. We forecast EPS CAGR of 24% for FY23-26E and acknowledge the strong potential of the company's upcoming projects; however, we await its succession plan and clarity on the next steps after the recent exit of MD Radhesh Welling. We initiate coverage on NFIL with a HOLD recommendation and TP of Rs4,050, valuing the stock at 30x Sep'25E EPS.

Key risks

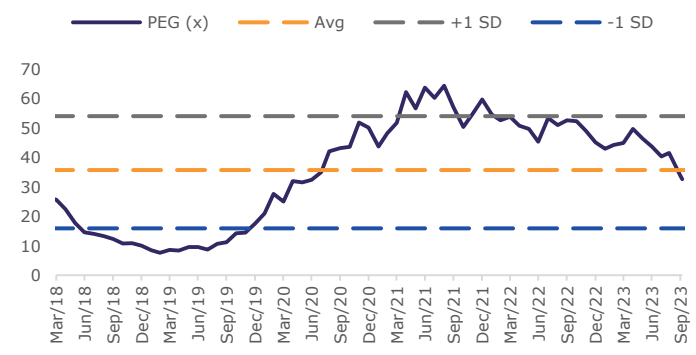
Leadership risk: Radhesh Welling, the current MD, has resigned and Vishad Mafatlal, the Chairman, will be taking over as the executing MD in the interim. Mr Mafatlal's execution will remain key to watch, as regards further growth plans for NFIL, till a competent candidate steps in.

Loss of customers, especially in CRAMS: CRAMS contributed ~20% to the topline, as of FY23. Any loss of customers, especially in the CRAMS business, is expected to cause deterioration to the company's performance.

A downturn in key user industries: The agrochemicals and pharmaceuticals industries together contribute around 80% to the company's overall topline. Any delay or downturn globally in such industries may impact the company's performance.

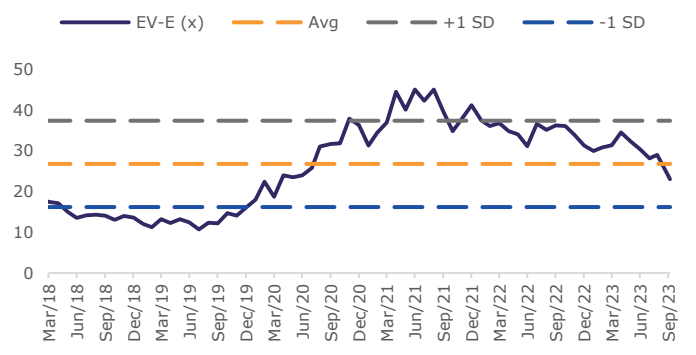
Sharp surge in raw-material prices can hurt margins: Any sharp surge or unavailability of raw material such as fluorspar would hit business operations and Company's performance.

Exhibit 161: 1-year forward P/E



Source: Bloomberg, Emkay Research

Exhibit 162: 1-year forward EV/EBITDA



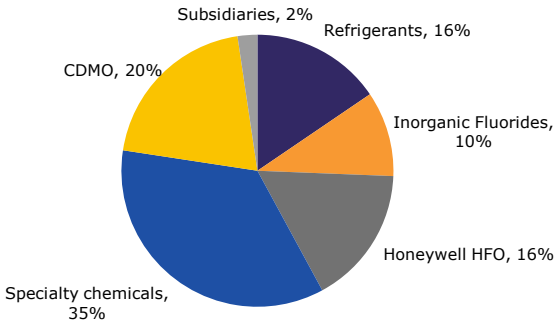
Source: Bloomberg, Emkay Research

Business Overview

Established in 1967, NFIL is the flagship company of Padmanabh Mafatlal Group. The company is the leader in refrigerant gas manufacturing and one of the largest integrated specialty chemical manufacturers with five decades of rich expertise in handling fluorine in India. Over the last few years, NFIL's refocused business strategy has been to grow in newer business lines of specialty chemicals and CDMO.

Today, NFIL's business portfolio comprises three divisions. The HPP business is classified into refrigerants, inorganic fluorides segment, and Honeywell HFO business. Refrigerant gases and inorganic fluorides (which mainly comprise bulk chemicals) represent the company's initial and lower-margin businesses, whereas specialty chemicals and CDMO are the newer and higher-margin businesses and focus areas for growth.

Exhibit 163: Breakdown of consolidated revenue in FY23



Source: Company, Emkay Research

The Group's marquee customers comprise large life science, crop science, and performance material companies, air-conditioner manufacturers, and petrochemical and stainless steel manufacturers, among others. Considering that these products are integral to modern-day lifestyles, there is an element of sustainable visibility built into the company's revenue.

Operational capabilities

NFIL's investments in advanced continuous and batch manufacturing technologies generated high process consistency, superior product quality, high capacity utilization, operational safety, and attractive yields.

The company invested into a larger R&D facility with a capex of Rs400mn at Surat facility. With Manchester Organics, the company registered a product catalog of ~50,000 compounds. NFIL added 655 vendor partners during the year under review; 28% of the company's supply chain partners had been associated with it for five years or more as on March 31, 2023. This has enabled the company to maintain continuous supply to customers.

Exhibit 164: NFIL's manufacturing facilities

Plant	Location	Year of set-up	Description
Surat	Gujarat, India	1967	Manufactures refrigerants and fluoro specialties
Dewas	Madhya Pradesh, India	1978	Production of Anilines and Toluidine; cGMP Plants
Manchester	United Kingdom	2011	R&D facilities and pilot plants
Dahej	Gujarat, India	2022	Plant supplies HFOs to Honeywell International Inc. and two specialty chemical plants to supply fluorine-based agri-intermediates.

Source: Company, Emkay Research

Exhibit 165: Company Timeline

1967	•Incorporated as a refrigerants and HF manufacturer in Surat, India
1969	•Commencement of commercial production of refrigerant gases
1978	•Set-up at Dewas to produce Alkylated Anilines and Toluidine
1982	•Capacity expansion at Surat for Smelter Fluorides and AIF3
1990	•CFC 113 plant commissioned at Surat
1999	•Commencement of organic and inorganic specialty fluoride production at Surat
2000	•Commencement of fluorobenzene and benzotrifluoride series production at Surat
2001	•Set up the first large-scale plant in South East Asia for the production of Boron Trifluoride Gas at Surat
2003	•Capacity expansion of specialty organic fluorides at Surat
2004	•Commissioned trifluoroacetic acid plant at Surat
2005	•Commissioned trifluoroethanol plant at Surat
2006	•Capacity expansion of boron trifluoride gas
2007	•Commissioned CDM plant at Surat
2008	•Inauguration of the new R&D center – Navin Research Innovation Centre (NRIC) at Surat
2009	•Start-up of a pilot plant for scale up of R&D molecules
2010	•Established a multi-purpose plant and CRO at Surat
2011	•Capacity expansion of boron trifluoride at Surat •Acquisition of land at Dahej for further expansion
2011	•Acquisition of Manchester Organics Limited, U.K. •Commissioning of the cGMP pilot plant at Dewas
2013	•Expansion of a multi-purpose plant at Surat
2015	•CRAMS cGMP multi-purpose plant •JV with Piramal Enterprises in Dahej
2018	•Added cGMP capacity and associated infrastructure in Dewas •Entered into a long-term contract with Honeywell
2022	•HFOs' commercialization for Honeywell

Source: Company

Exhibit 166: Current board of directors

Name of Director	Designation	Qualification	Experience/Expertise
Vishad P. Mafatlal	Chairman & ED	B.Sc. in economics	26 years in the textiles and chemicals industry
Mohan M. Nambiar	NED	Chartered Accountant; B.Com.	26 years with Associated Cement Company Limited
Pradip N. Kapadia	ID	B.A.; Advocate & Solicitor	46 years of experience in the legal field
Sunil S. Lalbhai	ID	M.Sc. in chemistry; M.Sc. in Economic Planning & Policy	33 years of experience in chemicals and general management
Sudhir G. Mankad	ID	IAS; M.A. in History; Dipl. in Development Studies	Chief Secretary to the Government of Gujarat from 2005 to 2007
Harish H. Engineer	ID	B.Sc.; Dipl. in Business Management	44 years of experience in the banking sector
Radhika V. Haribhakti	ID	B.Com; PGDM IIM-Ahmedabad	30 years of experience in commercial and investment banking
Atul K. Srivastava	ID	Chartered Accountant; B.Sc. (Hons)	46 years of experience in large corporates, with expertise in finance, accounting, taxation, and commerce
Ashok U. Sinha	ID	B.Tech in Electrical Engineering; PGDM IIM-Bangalore	33-year tenure at Bharat Petroleum Corporation Limited
Sujal A. Shah	ID	Chartered Accountant; B.Com.	30 years in the areas of valuation, due diligence, corporate restructuring, audit, and advisory
Apurva S. Purohit	ID	PGDM IIM-Bangalore	30 years of experience in the media and entertainment industry
Radhesh R. Welling^	MD	B.Sc. in Mechanical Engineering; Masters in International Business; MBA	26 years of experience in various functions such as innovation, sales and marketing, corporate strategy, and manufacturing, across multiple geographies

Source: Company, Emkay Research; ^Resigned and last working day to be December 15, 2023

MD – Managing Director, ED – Executive Director, NED – Non-Executive Director, ID – Independent Director, B.Com. – Bachelors in Commerce, B.Sc. – Bachelors in Science, B.Tech – Bachelors in Technology

Navin Fluorine : Consolidated Financials and Valuations

Profit & Loss

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Revenue	**14,534**	**20,774**	**25,980**	**33,043**	**38,786**
Revenue growth (%)	23.2	42.9	25.1	27.2	17.4
EBITDA	**3,548**	**5,503**	**7,015**	**9,417**	**11,055**
EBITDA growth (%)	14.7	55.1	27.5	34.3	17.4
Depreciation & Amortization	479	626	856	1,253	1,835
EBIT	**3,069**	**4,877**	**6,159**	**8,164**	**9,220**
EBIT growth (%)	15.8	58.9	26.3	32.6	12.9
Other operating income	0	0	0	0	0
Other income	392	357	393	432	476
Financial expense	19	275	454	409	480
PBT	**3,442**	**4,959**	**6,098**	**8,188**	**9,216**
Extraordinary items	0	0	0	0	0
Taxes	812	1,207	1,402	1,883	2,119
Minority interest	0	0	0	0	0
Income from JV/Associates	0	0	0	0	0
Reported PAT	**2,631**	**3,752**	**4,695**	**6,305**	**7,096**
PAT growth (%)	2.2	42.6	25.1	34.3	12.6
Adjusted PAT	**2,631**	**3,752**	**4,695**	**6,305**	**7,096**
Diluted EPS (Rs)	**53.2**	**75.7**	**94.8**	**127.2**	**143.2**
Diluted EPS growth (%)	2.2	42.5	25.1	34.3	12.6
DPS (Rs)	**10.9**	**11.0**	**22.7**	**28.4**	**38.2**
Dividend payout (%)	**20.6**	**14.5**	**24.0**	**22.3**	**26.6**
EBITDA margin (%)	24.4	26.5	27.0	28.5	28.5
EBIT margin (%)	21.1	23.5	23.7	24.7	23.8
Effective tax rate (%)	23.6	24.3	23.0	23.0	23.0
NOPLAT (pre-IndAS)	**2,346**	**3,690**	**4,742**	**6,286**	**7,100**
Shares outstanding (mn)	49.5	49.6	49.6	49.6	49.6

Source: Company, Emkay Research

Balance Sheet

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Share capital	99	99	99	99	99
Reserves & Surplus	18,343	21,750	24,411	29,307	34,511
Net worth	**18,442**	**21,850**	**24,510**	**29,406**	**34,610**
Minority interests	0	0	0	0	0
Deferred tax liability (net)	201	348	348	348	348
Total debt	**1,208**	**8,487**	**10,428**	**10,000**	**10,000**
Total liabilities & equity	**19,851**	**30,684**	**35,285**	**39,754**	**44,957**
Net tangible fixed assets	4,559	6,291	6,539	6,748	322
Net intangible assets	18	15	31	31	5
Net ROU assets	12	40	12	12	0
Capital WIP	7,421	2,786	2,000	1,000	1,000
Goodwill	878	878	878	878	878
Investments [JV/Associates]	667	644	644	644	644
Cash & equivalents	**958**	**348**	**481**	**475**	**985**
Current assets (ex-cash)	9,775	15,573	15,824	16,055	18,572
Current Liab. & Prov.	4,003	4,609	5,535	6,039	7,028
NWC (ex-cash)	**5,772**	**10,964**	**10,289**	**10,016**	**11,545**
Total assets	**19,851**	**30,683**	**35,285**	**39,754**	**44,957**
Net debt	250	8,138	9,947	9,525	9,015
Capital employed	19,851	30,684	35,285	39,754	44,957
Invested capital	**10,805**	**26,906**	**32,161**	**37,635**	**42,329**
BVPS (Rs)	372.6	441.0	494.6	593.5	698.5
Net Debt/Equity (x)	0.0	0.4	0.4	0.3	0.3
Net Debt/EBITDA (x)	0.1	1.5	1.4	1.0	0.8
Interest coverage (x)	0.0	0.1	0.1	0.0	0.0
RoCE (%)	**19.0**	**20.7**	**19.9**	**22.9**	**22.9**

Source: Company, Emkay Research

Cash flows

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
PBT	3,442	4,959	6,098	8,188	9,216
Others (non-cash items)	0	0	0	0	0
Taxes paid	(781)	(1,098)	(1,362)	(1,828)	(2,075)
Change in NWC	(1,140)	(5,046)	675	273	(1,528)
Operating cash flow	**748**	**(636)**	**6,287**	**7,807**	**7,406**
Capital expenditure	(7,122)	(6,900)	(6,000)	(6,000)	(5,000)
Acquisition of business	17	24	0	0	0
Interest & dividend income	58	79	100	120	0
Investing cash flow	**(1,724)**	**(6,556)**	**(5,607)**	**(5,568)**	**(4,524)**
Equity raised/(repaid)	38	17	0	0	0
Debt raised/(repaid)	1,183	7,279	1,941	(428)	0
Payment of lease liabilities	14	14	14	14	0
Interest paid	(19)	(275)	(454)	(409)	(480)
Dividend paid (incl tax)	(542)	(543)	(1,126)	(1,409)	(1,890)
Others	(245)	101	0	0	0
Financing cash flow	**415**	**6,579**	**362**	**(2,245)**	**(2,370)**
Net chg in Cash	(561)	(613)	1,042	(6)	511
OCF	748	(636)	6,287	7,807	7,406
Adj. OCF (w/o NWC chg.)	(393)	(5,682)	6,962	8,079	5,877
FCFF	(6,375)	(7,536)	287	1,807	2,406
FCFE	(6,336)	(7,732)	(67)	1,518	1,926
OCF/EBITDA (%)	21.1	(11.6)	89.6	82.9	67.0
FCFE/PAT (%)	(240.8)	(206.1)	(1.4)	24.1	27.1
FCFF/NOPLAT (%)	**(271.8)**	**(204.2)**	**6.1**	**28.7**	**33.9**

Source: Company, Emkay Research

Valuations and key Ratios

Y/E Mar	FY22	FY23	FY24E	FY25E	FY26E
P/E (x)	69.5	48.8	39.0	29.0	25.8
P/CE(x)	58.8	41.8	33.0	24.2	20.5
P/B (x)	9.9	8.4	7.5	6.2	5.3
EV/Sales (x)	12.6	9.2	7.4	5.8	4.9
EV/EBITDA (x)	51.6	34.7	27.5	20.4	17.4
EV/EBIT(x)	59.6	39.2	31.3	23.6	20.8
EV/IC (x)	16.9	7.1	6.0	5.1	4.5
FCFF yield (%)	(3.5)	(3.9)	0.1	0.9	1.3
FCFE yield (%)	(3.5)	(4.2)	0.0	0.8	1.1
Dividend yield (%)	0.3	0.3	0.6	0.8	1.0
DuPont-RoE split					
Net profit margin (%)	18.1	18.1	18.1	19.1	18.3
Total asset turnover (x)	0.8	0.8	0.8	0.9	0.9
Assets/Equity (x)	1.0	1.3	1.4	1.4	1.3
RoE (%)	**15.1**	**18.6**	**20.3**	**23.4**	**22.2**
DuPont-RoIC					
NOPLAT margin (%)	16.1	17.8	18.3	19.0	18.3
IC turnover (x)	0.0	0.0	0.0	0.0	0.0
RoIC (%)	**23.1**	**19.6**	**16.1**	**18.0**	**17.8**
Operating metrics					
Core NWC days	145.0	192.6	144.5	110.6	108.6
Total NWC days	**145.0**	**192.6**	**144.5**	**110.6**	**108.6**
Fixed asset turnover	2.2	1.7	1.2	1.2	1.1
Opex-to-revenue (%)	29.8	30.4	29.0	27.5	27.5

Source: Company, Emkay Research

SELL Gujarat Fluorochemicals

Leader in fluoropolymers; expanding in adjacencies

Specialty Chemicals ▸ Initiating Coverage ▸ **October 15, 2023**

TARGET PRICE (Rs) : 2,500

Gujarat Fluorochemicals (GFL) is: i) aggressively expanding capacities in new fluoropolymers (given that its PTFE business has matured) to meet the markedly high demand from emerging segments such as EV batteries, solar panels, hydrogen fuel cell and semiconductors; ii) entering the battery chemicals space owing to adjacencies of manufacturing salts ($LiPF_6$), additives and electrolytes. GFL saw an upcycle in its bulk chemicals & refrigerant gas businesses in FY23; with prices now starting to correct, revenue is likely to taper down. Fluoropolymers business entails a long gestation and product approval cycle; GFL being an early entrant will be able to capitalize on the opportunity, but ramp-up in new fluoropolymers capacity will be gradual. Fluoropolymers will see some pricing pressure in FY24, which will remain a sluggish year due to global inventory destocking and Chinese dumping (PTFE will see de-growth). We expect FY23-26E revenue/EBITDA/PAT CAGR of 2%/-2%/-3.5%. We initiate coverage on GFL with a SELL recommendation and TP of Rs2,500/share, valuing the stock at 25x Sep-25E EPS.

Gujarat Fluorochemicals: Financial Snapshot (Consolidated)

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Revenue	39,536	56,847	47,599	53,824	61,059
EBITDA	11,685	19,653	13,592	15,748	18,304
Adj. PAT	7,759	13,230	8,867	10,167	11,882
Adj. EPS (Rs)	70.6	120.4	80.7	92.5	108.1
EBITDA margin (%)	29.6	34.6	28.6	29.3	30.0
EBITDA growth (%)	96.1	68.2	(30.8)	15.9	16.2
Adj. EPS growth (%)	0.0	70.5	(33.0)	14.7	16.8
RoE (%)	20.0	27.1	14.9	14.7	14.8
RoIC (%)	13.9	22.5	12.4	12.2	12.7
P/E (x)	40.5	23.7	35.4	30.9	26.5
EV/EBITDA (x)	28.2	16.7	23.9	20.6	17.5
P/B (x)	7.4	5.7	4.9	4.2	3.6
FCFF yield (%)	0.3	(1.8)	1.0	(0.1)	0.4

Source: Company, Emkay Research

PTFE business has matured; new fluoropolymers to lead the growth now

GFL has built leadership position in PTFE over the last 15 years; after establishing the commodity grade, it moved its portfolio towards more value-added grades. Due to the long gestation period in the fluoropolymers business, the time invested by the company in establishing its product portfolio is now bearing fruit. However, the PTFE business is now mature, clocking steady cashflows; hence, GFL is currently investing capex for expanding capacities in new fluoropolymers like PVDF, PFA and FKM, which have their end-use in sunrise sectors like EV batteries, solar panel and semi-conductors. We believe GFL is well-poised to capture this opportunity, but we believe capacity ramp up in new fluoropolymers business will take some time (FY23-26E CAGR: ~5.8%).

Refrigerant gas and bulk chemicals to de-grow

GFL's refrigerant-gas (R125 and R22) business saw a pricing upcycle in FY23. This helped the company earn strong cash-flows and frontload its fluoropolymers capex. But these gases are now being phased out — phase out of R22 has already begun in India and R125 will see the first major step towards phase-out in USA, in CY24, with quotas being decided over FY24-26 in India. This situation will put pressure on prices to a large extent — price corrections have already started (H1FY24); thus, overall revenue will de-grow by ~8% in FY23-26E. The bulk chemicals business and prices of caustic soda and chloromethane have also seen an upcycle over FY22-23; but prices have started correcting now; thus, the bulk chemicals business is also likely to de-grow, by ~6.7% over FY23-26E.

Battery chemicals revenue visibility from FY25

GFL is expanding into battery chemicals by establishing a salt ($LiPF_6$), additives and electrolyte capacity supported by capex of Rs7-8bn (expected peak asset-turn of 1.5x). Moreover, it has huge investment plans for establishing an integrated battery complex. India does not have Li-ion battery capacity at present, but some players are eyeing setting-up such capacities by FY25-26. GFL expects to export $LiPF_6$ by FY25 (capacity will come in FY24) and expand the capacity in phases, once demand picks up.

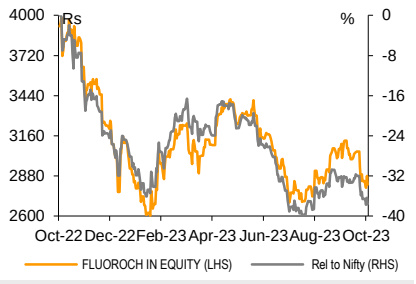
Target Price – 12M	Sep-24
Change in TP (%)	**NA**
Current Reco.	SELL
Previous Reco.	NA
Upside/(Downside) (%)	(12.6)
CMP (13-Oct-23) (Rs)	2,860.0

Stock Data	Ticker
52-week High (Rs)	4,097
52-week Low (Rs)	2,534
Shares outstanding (mn)	109.9
Market-cap (Rs bn)	314
Market-cap (USD mn)	3,773
Net-debt, FY24E (Rs mn)	10,383
ADTV-3M (mn shares)	-
ADTV-3M (Rs mn)	485.7
ADTV-3M (USD mn)	5.8
Free float (%)	-
Nifty-50	19,751
INR/USD	83.3
Shareholding, Sep-23	
Promoters (%)	63.8
FPIs/MFs (%)	4.8/7.7

Price Performance

(%)	1M	3M	12M
Absolute	(6.5)	4.8	(28.3)
Rel. to Nifty	(4.4)	3.8	(37.6)

1-Year share price trend (Rs)



Meet Vora
meet.vora@emkayglobal.com
+91 22 6624 2474

Meet Gada
meet.gada@emkayglobal.com
+91 22 6612 1235

PTFE has matured; GFL now expanding capacities in new fluoropolymers

Over the past 15 years, GFL has expanded its fluoropolymer portfolio into: i) more grades of PTFE with focus on higher quality/value-added products; and ii) other variants of fluoropolymers, including FKM, PFA, PVDF, FEP, additives and others with multiple and diverse applications. GFL has backward integrated its fluoropolymers operations to become a low-cost and reliable supplier globally. Company has continuously improved its product quality and consistency, and has gained customer approvals for all its grades.

GFL has established itself as a reliable PTFE supplier, and is now expanding capacities in new fluoropolymers

GFL has started working on more customized supplies, which has led to increased customer stickiness. It focuses on producing many variants suitable for each industry requirement and has expanded its warehouse footprint to facilitate smaller supplies and reduce lead time. This is aimed to establish itself as a reliable supplier geographically close to customers. Company has engaged business development and technical professionals who help it to quicken the process of market access and product acceptance as well as provide customer support.

GFL has established itself as a reliable PTFE supplier globally and created large capacities. Company has, in the past six years, been working on new fluoropolymers which puts it in an advantageous position, with a large portfolio of different product categories. It launched fluoroelastomer (FKM) in 2015 and has, subsequently, added PFA (2016), FEP (2018), additives (2018) and PVDF (2020).

Exhibit 167: Fluoropolymers and their applications

PRODUCTS	PTFE	MICRO POWDERS	PFA	PVDF	FEP	FKM	PPA
APPLICATIONS	• Oil & Gas • Pharma & CPI • Food • Automotive • Aero-space & Defense • Electricals • Electronics & Semi-conductors • Cookware • Construction & Mechanical Parts	• Printing Inks • Engineering Plastics • Coatings • Industrial Finishes • Paints • Elastomers • Oils & Greases	• Semi-conductors • Aero-space • Chemical Processing • Corrosion Resistant Fluid Transfer • Wire & Cables • Telecom	• Chemical Processing • Electronics • Architecture • Pharma • EV Batteries • Solar Panels • Water Treatment Membranes • Oil & Gas	• Wire & Cable • Defense • Aerospace • Telecom • Chemical Processing	• Automotive • Chemicals • Refineries • Semiconductors • Aviation • Food & Pharma	• Improve Surface Finish & Gloss for LLDPE • HDPE & PP Films • Partitioning Agent

Source: Company

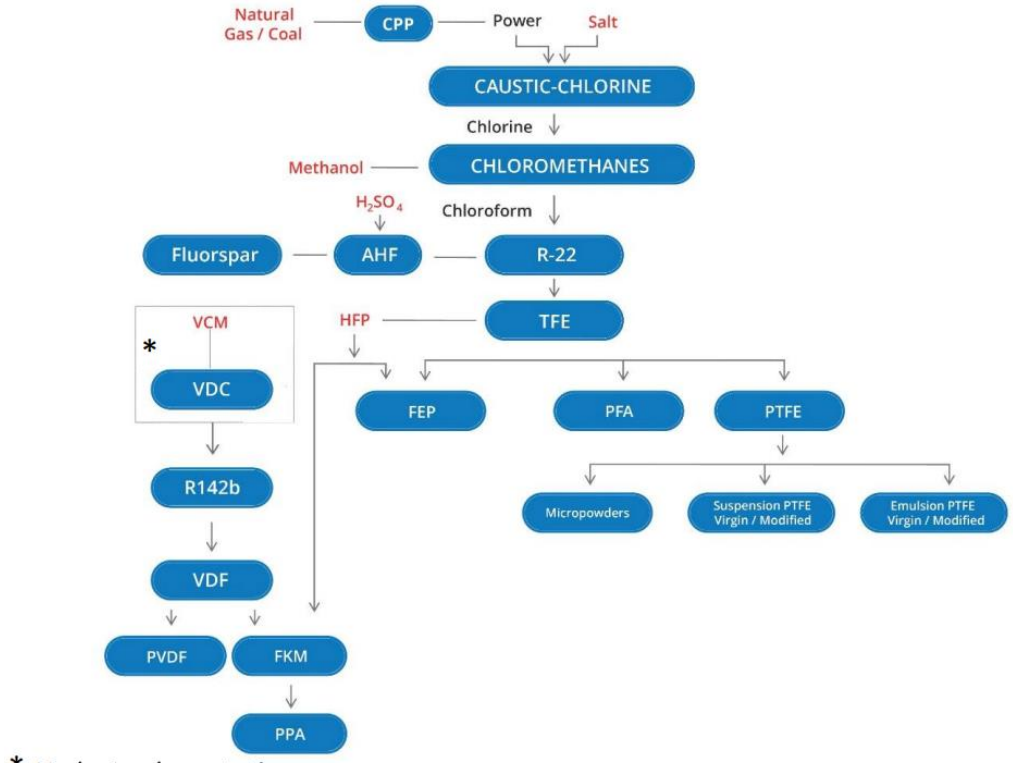
GFL's business is integrated forward into manufacturing PTFE and backward into HCFC, anhydrous hydrogen fluoride, chloroform as well as chlorine. The new fluoropolymer products such as polyvinylidene fluoride (PVDF), fluoroelastomers (FKM) and polymer processing aids (PPA) fit seamlessly into the production cycle as they are manufactured from the same raw material, such as fluorspar and R142b. In-house production of Vinyl Chlorine Monomer (VCM) is in the pipeline.

GFL has not only built global-scale production capacity, but also established a technical sales team to drive application expertise and a robust supply chain with local warehouses in the USA and Europe. Europe and USA are key markets for GFL (it has strong sales teams, warehousing services, and a large basket of product approvals in the two regions). All this is backed by a team of >125 researchers, scientists and product specialists, and has its own R&D laboratory. We believe the company has made painstaking efforts over the past decade to scale up its business. This ensures that competition too must undergo a similar tedious exercise if it plans to enter the category.

Demand for new fluoropolymers is driven by rising application of high-performance polymers in industrial manufacturing, and new demand coming from new-age verticals like EV batteries, solar panels, hydrogen fuel cell, etc. GFL is currently the sole manufacturer in India and is among the very few players outside China to have a large fluoropolymer portfolio. SRF is now entering the fluoropolymers space by commissioning PTFE first and the new fluoropolymers thereafter, which will largely change the dynamics of the domestic fluoropolymers market.

GFL has announced manufacturing of fluoropolymers using non-fluorinated surfactants, which are not soluble in water and do not classify as PFAS. GFL has maintained a high level of customer stickiness due to value-added products, while Chinese companies are mainly present in commodity grade segments. Going forward, with rigorous competition and pricing correction, a few Chinese manufacturers have started focusing on specialized products.

Exhibit 168: GFL's integrated operations

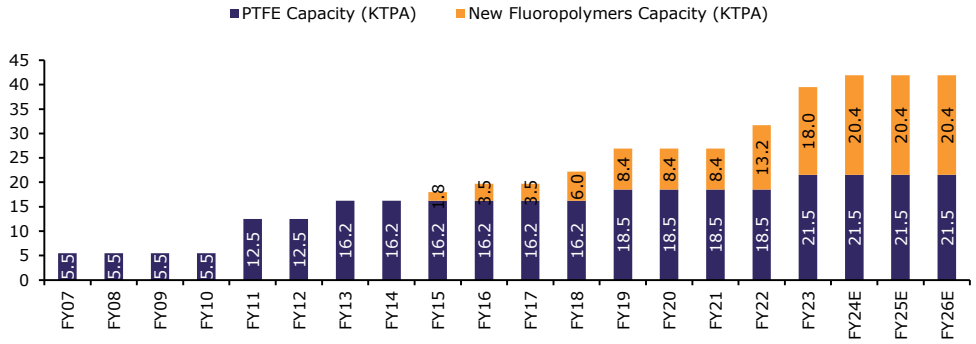


Source: Company

GFL has strong backward integration in fluorspar, salt and power

Company will likely benefit from rising demand for value-added PTFE/new fluoropolymers. GFL is backward integrated for most products which enables it to expand capacity faster than global peers and earn a premium IRR vs peers. It has a JV in Morocco for fluorspar procurement, and is expanding its AHF capacity. Company also sees opportunities arising from supplying R142b to global peers as part of the China+1 strategy.

Exhibit 169: PTFE and new fluoropolymers capacity



Source: Company, Emkay Research

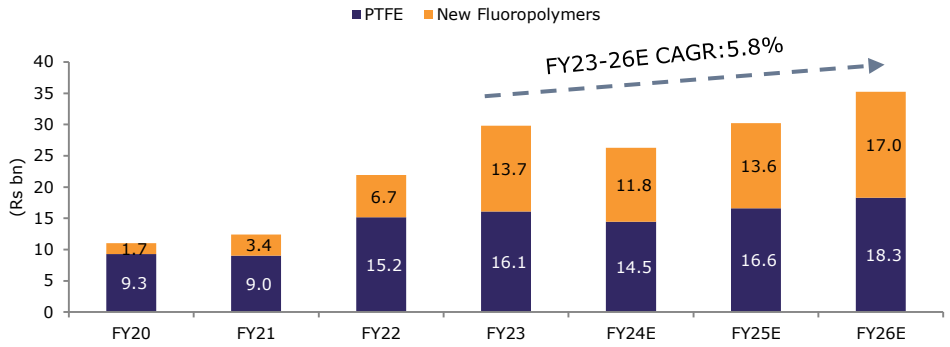
GFL is expanding capacities in new fluoropolymers like PVDF, PFA, FKM, expected to reach 1,800tpa in FY25

GFL has a capacity of ~18ktpa (~10% of global demand) and is among one of the largest manufacturers of the product. It is leader in the Indian market, with >50% market share, and is in the process of debottlenecking its capacity by ~3ktpa by FY24. Further, it is expanding its new fluoropolymers capacity to 1,700-1,900tpa by FY25-end (earlier, GFL had planned this capacity expansion by FY24; this spillover into the next fiscal is on account of the uncertain demand environment in fluoropolymers in FY24).

GFL's aggressive capex plan and fully-integrated business operations place it favorably to benefit from the high-growth opportunity in the new fluoropolymer space from new-age verticals such as EV battery, solar panel and hydrogen fuel cell. We believe battery/solar grade PVDF and semi-conductor grade PFA will be in the forefront of this growing demand. This remains the key focus area for Company Management and is bound to grow compared to their legacy fluoropolymers, bulk chemicals and fluorochemicals business (ref gases and fluorospecialty).

We believe GFL is well poised to benefit from: i) market-share gains in the PTFE segment and ii) rising end-use of new fluoropolymers in different applications. However, the growth in new fluoropolymers will be more gradual, as product approval cycles take time and capacities get utilized over FY23-26E. We expect fluoropolymers revenue CAGR of ~5.8% over FY23-26E, on account of expansion in new fluoropolymer capacities and debottlenecking of PTFE.

Exhibit 170: Fluoropolymers revenue to clock 5.8% CAGR over FY23-26E



Source: Company, Emkay Research

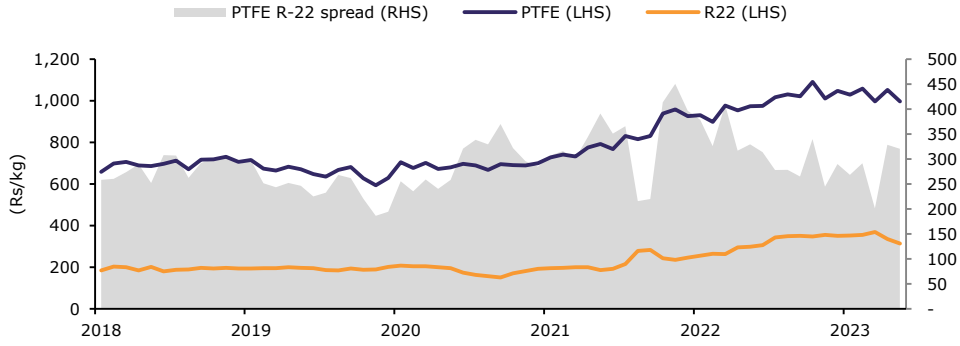
PTFE now mature; new fluoropolymers to see gradual growth

GFL's new fluoropolymers capacity utilization will be linked to uptick in demand; PTFE to largely de-grow in FY24E and rebound by FY26E

We analyzed GFL's fluoropolymers business segment over FY20 to Q1FY24. Our workings suggest that:

- PTFE prices have seen an upcycle in FY23 which was the primary reason for growth in profitability. A part of this price uptick for GFL was carved out by entering more value-added grades and is expected to sustain. GFL has now reached a stage of maturity in the PTFE market and is expected to register a gradual 4-5% growth, in line with industry growth, led by debottlenecking capacities and has moderate room to see improvement in grades.
- Reduced prices in H1FY24 and lower volumes will contribute to the decline in FY24E PTFE revenues. Higher stocking of inventory in FY23 due to Chinese supply uncertainty and upcycle in ref gas prices compared with PTFE prices resulted in partial moderation in spreads.
- Going forward, PTFE R22 spreads are expected to remain stable, considering future correction in R22 prices due to phase down; PTFE prices are expected to remain stable for GFL on account of entering more value-added grades.
- New fluoropolymer prices too have seen an upcycle in FY23 and now tapered off in H1FY24. While GFL is focusing more on PVDF and PFA for new-age industries, we believe FKM is more commoditized and should be most impacted in this downward pricing cycle. Going forward, we expect good volume ramp up in PVDF and PFA, but prices would remain largely stable at H1FY24 levels. Overall, new fluoropolymer capacity utilization will be more gradual.

Exhibit 171: PTFE — R22 spread



Source: Emkay Research

Foray into battery chemicals

GFL is expanding its footprint in the new-age verticals of battery chemicals, solar panels and hydrogen fuel cells (electrolytes). GFL will initially sell fluoropolymers used across the three segments and will later expand into other product categories like salts, additives, etc. GFL has a huge addressable market in new-age verticals.

By CY30, combined demand for batteries used in EVs, energy storage systems, and consumer electronics is projected to be ~2,633gigawatt-hours (GwH). This high demand for batteries represents a significant revenue opportunity within the EV battery supply chain, estimated to reach USD300bn by CY30. Simply put, the growing need for batteries in these industries is expected to generate substantial income, with the EV sector being a major contributor.

The fluoropolymers used in batteries are PVDF (for electrode binders, separators), micro powders, etc. PVDF sheets are also used as back sheet in solar panels, while hydrogen fuel cells use multiple fluoropolymers including FKM, PTFE and FEP.

PVDF will be the most used fluoropolymer in battery chemicals, irrespective of the type of battery; GFL has announced huge capex plans for creating an integrated battery chemicals complex

GFL has presence in PVDF, which is used in electrode (cathode) binders. The company also has micro powders that find application in battery casing. It is planning to set up an integrated battery chemicals complex, starting with phosphorus pentachloride (lithium carbonate will be imported) for $LiPF_6$. The components supplied by GFL will account for 13% of battery manufacturing costs. GFL has already developed PVDF grades for cathode binder application. The company is talking to both, battery makers and vehicle OEMs, for supplies in India and across the globe.

GFL's capex for its $LiPF_6$ capacity is Rs8bn, which could potentially generate peak asset turnover of 1.5x. The plant is likely to be commissioned by FY24, while ramp up may take some quarters, given the customer validation process. Company sees huge demand for battery chemicals from Indian EV battery manufacturers; it also perceives an export opportunity to markets like the USA and Europe for its salt, as electrolyte cannot be transported.

GFL has announced an investment of Rs45–50bn in the next three years in EV batteries, solar panels, hydrogen fuel cells and electrolyzers. GFL's integrated battery chemicals complex is coming up at Jolva (in Surat district, Gujarat) and is under commissioning. The first phase will produce $LiPF_6$, a key electrolyte salt to make lithium-ion batteries, with an initial capacity of 3kpta. The capacity will be further enhanced in phases, as demand increases for lithium-ion batteries.

Exhibit 172: New-age vertical applications

APPLICATIONS	ELECTRIC VEHICLES	SOLAR PANELS	HYDROGEN FUEL CELLS / ELECTROLYZERS
PRODUCTS	• PVDF Electrode Binders • Battery Chemicals • LiPF6 • Additives • Electrolyte Formulations	• PVDF Film • Back-sheet	• Fluoropolymers(FKM, PTFE, FEP) • Membranes • Charging Accessories

Source: Company

In the solar panels sub-segment, GFL is setting up India's first PVDF film plant for solar panels, which will be commissioned in the next financial year. The GoI has announced a highly ambitious target of achieving 450GW of renewable energy by 2030. GFL has integrated PVDF manufacturing facilities and solar panels contain back-sheets based on PVDF film, which is one of the most important raw materials for manufacturing solar panels. Though PVF has shown better resistance to environmental wear & tear compared with PVDF, Company is confident about its grade of PVDF back-sheets.

We model-in revenue from FY25E, as GFL is likely to commercialize its $LiPF_6$ and LFP capacity in FY24 and gradually ramp up its revenue. This segment has more growth opportunities from EV batteries and solar panels for the next 3-5 years. Hydrogen fuel cell manufacturing will take time to establish and see growth only in the next decade.

While these sectors are extra lucrative, Chinese companies have set-up abundant capacities to cater to future world demand. Two Chinese companies (Tinci Material and Do-Fluoride), given their expanded capacities, can themselves cater to the entire global demand by FY25. We await visibility on revenue and margin as well as clarity on growth forecasts.

Fluorochemicals

Refrigerant Gases

GFL is the largest producer of R22 in India. The product is under phase-out, as per the Montreal Protocol, due to its ozone depletion and high global-warming potential. India had frozen R22 production in 2013 and saw 10% cut from the base line in 2015 and another 25% (cumulative 35%) cut from the base line in 2020.

Another two rounds of phase-out will take place in 2025 and 2030, with equal cuts of 32.5% each in the two timeframes. Post-2030, R22 will be prohibited from being used as a ref-gas, though it could be used as feedstock for making other products such as fluoropolymers, pharma and agrochemical intermediates.

Though consumption of R22 in India is low, the country is allowed to manufacture more than its consumption quota, to cater to its export markets where restricted consumption is allowed but which lack manufacturing quota (e.g. the Middle-East). In such regions, manufacturers in India and China compete for garnering higher share of the export market for R22.

Refrigerant gases' segmental revenue to decline on volume and pricing pressure, because of phase down

GFL has started manufacturing R125 from Q1FY23, with 5ktpa capacity. GFL leveraged its existing capacity and started production due to sharp upside in R125 prices. Company makes R125 through the TFE route, which is ideally more expensive than the perchloroethylene route. However, upcycle in pricing added revenue of Rs6-6.5bn from R125 in FY23, helping the company frontload its fluoropolymer capex. Prices of R125 have started tapering; we model-in de-growth, at ~8% CAGR over FY23-26E in fluorochemicals revenue, on decline in refrigerant-gas pricing.

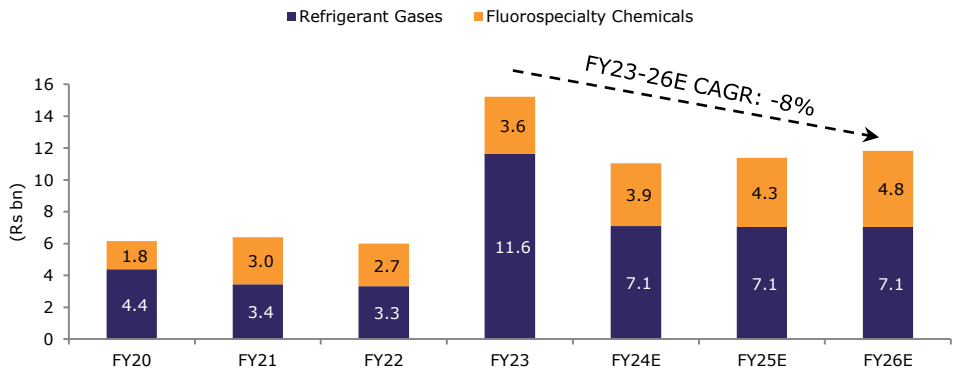
Specialty chemicals

Specialty Chemicals is not the focus area for Management; going forward, revenue to stabilize at Rs4.5-5bn

GFL makes a range of intermediate products that form part of the final agrochemicals, pharmaceutical APIs and other industrial chemicals. Fluorine-based intermediates have been growing at a higher rate (6-7%) compared with the other segments (3-4%) and the trend is expected to follow due to the evolving need in end-use applications. Pharmaceuticals are among the fastest-growing segments. The importance of fluorine is rising due to many advantages, such as potency, selectivity, metabolic stability, and solubility, among others.

However, this is not a key focus area for Management. GFL has not announced any new capex in specialty chemicals while it has 23 molecules in its R&D pipeline. We do not see any major movement in this business segment; revenues will peak at Rs4.5-5bn.

Exhibit 173: Fluorospecialty revenue to de-grow, at 8% CAGR over FY23-26E



Source: Company, Emkay Research

Bulk chemicals

Caustic soda

Caustic soda and chlorine are joint products manufactured by the electrolysis of sodium chloride solution (brine), with hydrogen being produced as a byproduct. GFL has an installed capacity of 135ktpa of caustic soda and has been operating at 90-95% of its capacity. Over the past few years, the company has witnessed increased capacity utilization, leading to better operating leverage.

Caustic soda prices dropped in FY20 and FY21 on account of subdued demand due to Covid; however, prices rose ~2x in FY22 because of dual control on energy consumption in China (shutdown of capacities) and maintenance-led shutdowns in some plants. Prices have moderated in FY23 and are expected to normalize in FY24. Demand for caustic soda in India is ~3.5mt, largely being met through domestic manufacturers. It is expected to post CAGR of ~11% over FY23-26. Grasim is the largest producer of caustic soda in India, with 27% market share; DCM Shriram has 14%, and GACL has 10%, while GFL has ~ 3% market share.

Chloromethanes

Chloromethanes refers to a group of products—methyl chloride, methylene chloride (MDC), chloroform and carbon tetra chloride (CTC). MDC is primarily used as a solvent in pharmaceuticals, as raw material in refrigerants & agrochemicals, and as a foam blowing agent. Chloroform is primarily used as a solvent in pharmaceuticals and as raw material in manufacturing fluoro polymers. CTC is mainly used as raw material in cypermethrin, an insecticide, and as raw material in new generation refrigerants, namely hydrofluoro olefins.

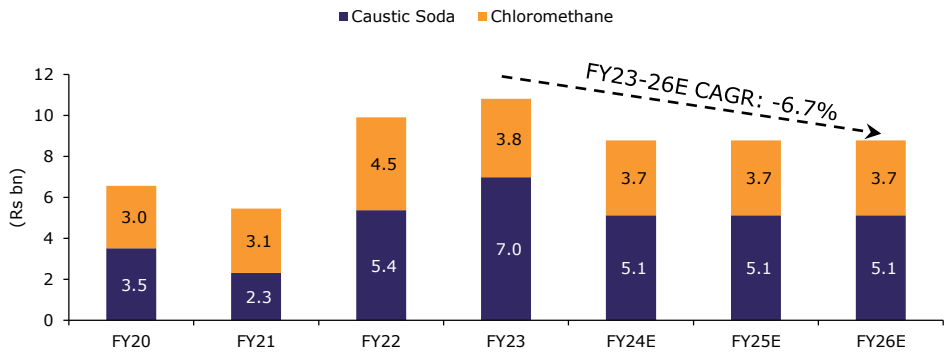
Demand for chloromethanes in India stood at ~524ktpa in FY22, likely to see ~13% CAGR over FY23-26E. In FY22, domestic demand for MDC grew 16%, from 295ktpa to 340ktpa, driven by the pharma sector, which remains the single-largest consumption sector.

Chloroform demand remained stagnant at 155ktpa with no growth, as consumption was weak in the pharma sector. CTC (Carbon Tetra Chloride) demand grew 8% to 27ktpa, with good demand from the synthetic pyrethroids segment. The MDC segment is expected to lead the growth in demand, driven by its high application in the pharma industry.

The caustic soda and chloromethanes businesses to largely de-grow, on correction in prices (saw the peak in FY23)

Chloromethanes are the result of GFL's value addition on chlorine; Company has 109ktpa capacity in its chloromethanes plant. Caustic soda price soared from ~Rs25/kg in FY21 to ~Rs55/kg in FY23; we expect the price to normalize at Rs40-45/kg. MDC is the major part of GFL's chloromethane business and we assume prices for MDC will remain stable at Rs45/kg. With no new capacity addition and prices staying steady, we model-in overall bulk chemicals revenue de-growth, at 6.7% CAGR over FY23-26E.

Exhibit 174: Bulk Chemicals revenue to de-grow, at 6.7% CAGR over FY23-26E

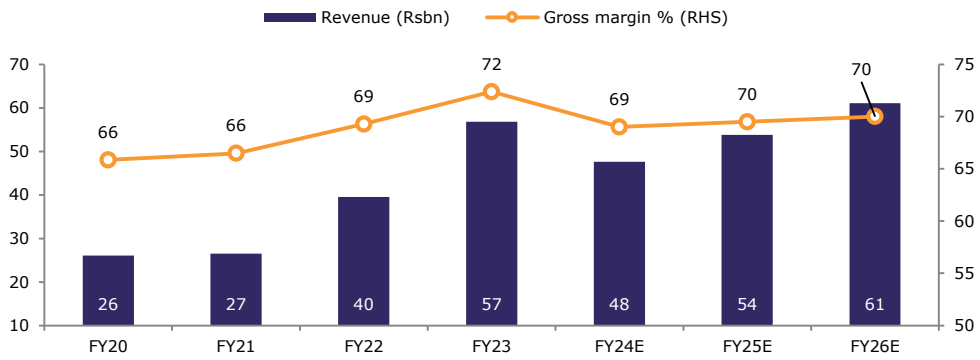


Source: Company, Emkay Research

Financial Analysis

We expect overall revenue to de-grow by ~12% in FY24E, with reduced volumes and pressure on pricing, on account of destocking of inventory. We expect revenue CAGR of ~2% over FY23-26E, on the high FY23 base. Overall revenue mix is improving more towards new fluoropolymers, which will be the key growth driver going forward. Gross margins would remain largely stable, with gradual improvement.

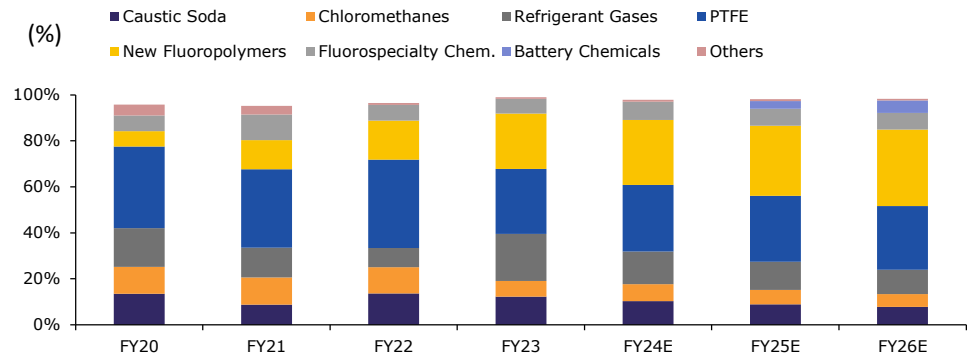
Exhibit 175: Revenue to post 2% CAGR over FY23-26E



Source: Company, Emkay Research

Contribution from new fluoropolymers will rise which will largely drive overall revenue growth

Exhibit 176: GFL's segmental revenue contribution mix

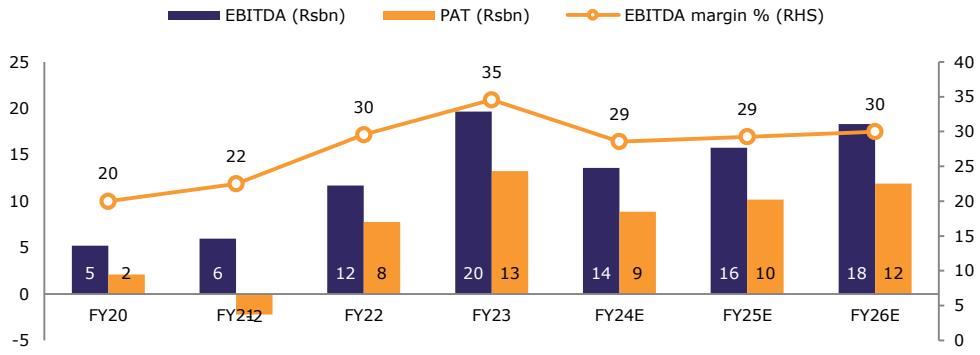


Source: Company, Emkay Research

EBITDA to see sharp decline in FY24E (~30% YoY) on margin pressure from correction in fluoropolymer & ref-gas prices (due to China dumping). We expect a rebound in EBITDA and PAT from FY25E, on recovery in prices and spreads.

EBITDA to decline in FY24E and rebound by FY26E on ramp up in new fluoropolymers

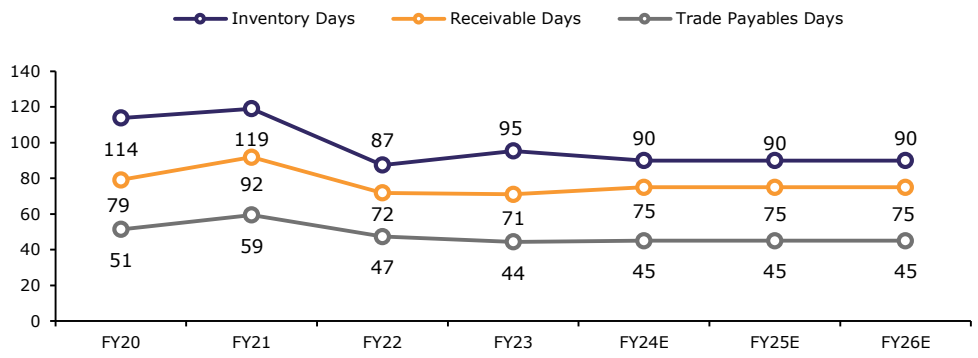
Exhibit 177: EBITDA to decline ~30% in FY24E; margins to gradually improve



Source: Company, Emkay Research

GFL's working capital would remain balanced on account of internal accruals; Company will maintain its net cash position in FY24E. Inventory days have been stable at 90-95, while receivable days stand at 70-75. Trade payable days are 45-50, keeping working capital at a 4-month cycle (based on industry credit period of 120-150 days).

Exhibit 178: Working capital to largely remain stable

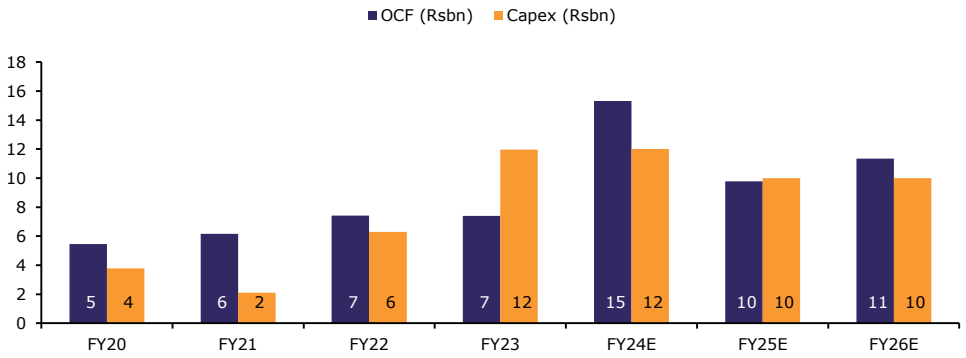


Source: Company, Emkay Research

OCF would be sufficient to fund Company capex in new fluoropolymers and battery chemicals. However, aggressive capex in battery chemicals may require external debt. Return ratios would decline during FY24E (on account of fall in PAT) and largely remain stable thereafter.

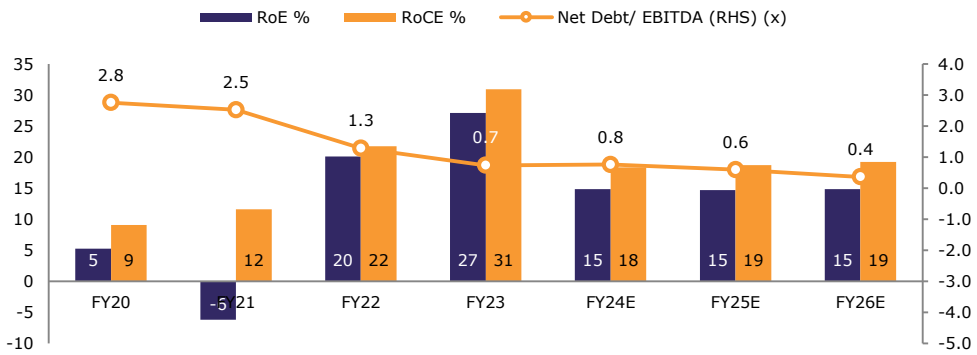
OCF will be sufficient to fund capex from FY24E; return ratios to dip in FY24 and remain stable thereafter

Exhibit 179: OCF to be sufficient for funding capex



Source: Company, Emkay Research

Exhibit 180: Return ratios to dip in FY24E and remain stable thereafter



4Source: Company, Emkay Research

Valuation and outlook

GFL's key focus areas going forward are new fluoropolymers and battery chemicals. Company saw an upcycle in FY23 in its business segments. Going forward, we expect the bulk chemicals and fluorochemicals segments to register revenue de-growth, primarily on correction in pricing. Within the fluoropolymers segment, we expect PTFE to de-grow in FY24 and recover thereafter by FY26, on gradual ramp up in demand.

Within the new fluoropolymers basket, we expect PVDF and PFA to take the lead on account of their application in new-age industry verticals, while FKM may see some slowdown owing to pressure from Chinese players and lack of any significant uptick in the automotive industry. We expect overall fluoropolymers revenue to register modest growth of ~5.8% over FY23-26E. Large capacity additions by Chinese players may put further pressure on pricing in the medium term.

The battery chemicals vertical is very niche at this stage, and we await better clarity on product approvals and revenue expectations. Chinese players are coming up with large capacities in this space, and there is potential pressure on pricing.

GFL has demonstrated a robust financial track record, with revenue/EBITDA/PAT CAGR of 20%/24%/28% over FY19-23. However, going forward, we expect revenue/EBITDA/PAT to register ~2%/-2%/-3.5% CAGR over FY23-26E. We initiate coverage on GFL with a SELL recommendation and target price of Rs2,500/share, valuating the stock at 25x Sep-25E EPS. Our turning constructive on the stock is contingent on any strong ramp up in their new fluoropolymers business (PVDF, PFA, FKM) which we believe is still some time away.

Key risks

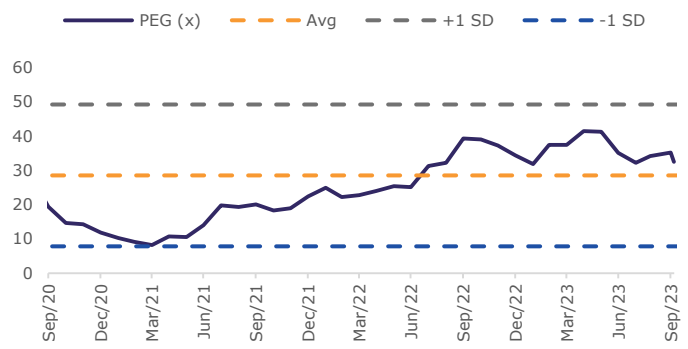
Surprise in battery chemicals: Currently, battery chemicals is a grey area and is still evolving; any significant uptick in battery chemicals revenue can cause us to change our estimates.

Uptick in new fluoropolymers: Faster than expected uptick in new fluoropolymers ramp-up will lead to significantly-high growth in fluoropolymers which is not factored into our estimates.

Surge in key user industries: Cyclical uptick in automotive and other sectors, where fluoropolymers are used, can significantly improve the company's growth estimates.

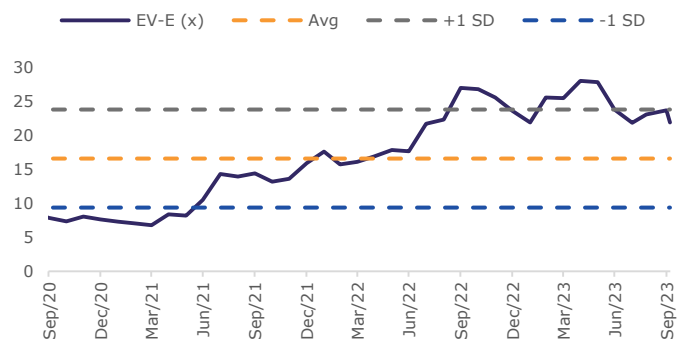
Expansion of spreads: Any sharp decline in RMs such as fluorspar, HF and R22 can quickly turnaround margins; this is not factored into our estimates

Exhibit 181: 1-year forward P/E



Source: Bloomberg, Emkay Research

Exhibit 182: 1-year forward EV/EBITDA



Source: Bloomberg, Emkay Research

Company Overview

Incorporated in 1989, Gujarat Fluorochemicals (GFL) started operations as India's largest refrigerant manufacturing company, based in Ranjit Nagar, Gujarat. GFL expanded its operations into various chemicals, including caustic soda and chloromethane, which are byproducts from backward integration of chlorine (for chloromethane plant) and chloroform (for R22)—the key feedstocks, apart from AHF (anhydrous hydrofluoric acid). Besides R22 (the largest component of ref-gas for GFL), the company has forayed into other ref-gases, such as R125 and R410a, which are replacing R22 in residential ACs.

In 2007, the company entered into fluoropolymers (PTFE) and, over the past few years, it has expanded its product portfolio into polymers, in addition to elastomers and additives. In FY20, GFL had ~11% of global PTFE capacity, which makes it one of the large manufacturers of PTFE globally. It has entered the fluorospecialty segment, to manufacture intermediate products for pharmaceuticals and agrochemicals.

GFL has 74% equity stake in GFL GM Fluorspar SA, along with JV partner Global Mines Sarl, Morocco, for a captive fluorspar mine since 2011. It is also eyeing entry into the energy market with battery chemicals, including electrolyte salt ($LiPF_6$), electrolyte formulation, fluoropolymers, solar modules with PVDF back sheets, and various fluoropolymers in green hydrogen (electrolyzer).

Exhibit 183: GFL's manufacturing facilities

Plant	Location	Set-up	Description
Ranjit Nagar	Gujarat, India	1989	Manufactures refrigerants and fluorospecialties; 4 MPPs
Dahej A	Gujarat, India	2007	Fluoropolymers (PTFE, PFA, FEP, FKM, PVDF & additives & Chemicals (Chloralkalis & Chloromethanes)
Taourirt	Morocco	2011	Fluorspar Mining and Beneficiation
Dahej B	Gujarat, India	2019	New facility for further expansion of fluoropolymers and fluoroelastomers
Jolva	Gujarat, India	2022	Fluoropolymers for new age verticals & battery chemicals; under phased commissioning

Source: Company, Emkay Research

Exhibit 184: GFL's timeline

1987	•Incorporated as a Refrigerants manufacturer in India
1988	•Launched public issue and set up a CFC Ref-gas plant and an HF plant in Panchmahal, Gujarat
1989	•Entered into technical collaboration with US-based entities •Commissioned a plant in Vadodra
1999	•GFL diversified into the entertainment business through INOX Leisure Limited
2006	•Implemented the Clean Development Mechanism (CDM) Project, entailing reduction of greenhouse gas emissions by thermal oxidation of HFC-23 •Received Carbon Credits issued by the UNFCCC
2007	•Established a chemicals complex comprising 30MW capitve power plant, 54ktpa caustic soda & chlorine plant, 41.6ktpa chloromethane plant, 5.5kpta PTFE plant at Dahej, Gujarat •JV in China for manufacturing AHF and allied activites
2009	•Incorporated 100% subsidiary in America for business operations across the subcontinent •Diversified into the wind energy business through Inox Wind Limited
2011	•Increased caustic soda capacity to 115kpta, chloromethane capacity to 105kpta & PTFE capacity to 12.5kpta •Entered into a JV with Moroccan entity MeturisSarl, for supply of fluorspar
2013	•Incorporated 100% subsidiary in Hamburg, Germany for business operations across EMEA •Increased caustic soda capacity to 135kpta, chloromethanes capacity to 109ktpa, refrigerants capacity to 65kpta and PTFE capacity to 16ktpa •Introduced PFOA-free PTFE resins and dispersions
2015	•Launched FKM brand *Fluonox*
2016	•Added two more pruducts (FEP and PFA) under brand *INOFLON* post the success of PTFE
2018	•Started with additives brand *INOLUB* for marketing PTFE micropowders (1.2ktpa) and PPA (0.6tpa) •Commissioned FEP capacity: 1ktpa; PFA: 0.75ktpa; VDF capacity: 2.3ktpa; FKM capacity: 1.8ktpa
2019	•Introduced PVDF brand *INOFLAR* with 1.4ktpa capacity •PTFE capacity increased to 18ktpa •NCLT order for demerger of the fluorochemical and wind business
2023	•Debottlenecking of PTFE plant to increase capacity to 21ktpa
2024	•To commercialize its $LiPF_6$ plant with initial capacity of 3ktpa

Source: Company, Emkay Research

Exhibit 185: Current board of directors

Name of Director	Designation	Qualification	Experience / Expertise
Devendra Kumar Jain	Chairman, NED	Graduate in History (Hons)	63 years of experience in business management & international trade
Vivek Jain	MD	B.Com (DU), IIM-Ahmedabad	40 years of experience in setting up and managing several businesses
Sanath Kumar Muppirala	WTD	M.Tech in Chemical Engineering	36 years of experience in petrochemical plants – in manufacturing, projects, planning & commissioning
Jay Shah	WTD	M.Tech in Chemical Engineering	24 years of experience in heading various chemical, specialty & fine chemicals plants
Niraj Agnihotri	WTD	B.Tech in Chemical Engineering	32 years of experience in the chemical and pharma sectors, and has domain expertise in manufacturing, plant commissioning & operation, new product validations, project management and strategic planning
Shailendra Swarup	ID	Senior Advocate, SC & HC	45 years of experience in handling wide-ranging legal matters
Shanti Prashad Jain	ID	Chartered Accountant	Specializing in the domain of taxation at various reputed companies and banks
Om Prakash Lohia	ID	B.Com.	Chairman & MD of Indo Rama Synthetics (India) Limited
Vanita Bhargava	ID	B.Com. & LLB	18 years of experience as a practicing advocate at the SC, HC, Company Law Board, National Green Tribunal, Mining Tribunal, Consumer Forums and its Appellate Authorities
Chandra Prakash Jain	ID	Chartered Accountant, LLB, Advance dipl. In Management	Former Chairman & MD of NTPC Limited

Source: Company, Emkay Research

MD – Managing Director, WTD – Whole Time Director, ID – Independent Director, B.Com. – Bachelors in Commerce, M.Tech – Masters in Technology, LLB – Bachelors in Law

Gujarat Fluorochemicals : Consolidated Financials and Valuations

Profit & Loss

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Revenue	**39,536**	**56,847**	**47,599**	**53,824**	**61,059**
Revenue growth (%)	49.2	43.8	(16.3)	13.1	13.4
EBITDA	**11,685**	**19,653**	**13,592**	**15,748**	**18,304**
EBITDA growth (%)	96.1	68.2	(30.8)	15.9	16.2
Depreciation & Amortization	2,054	2,361	2,605	3,316	3,816
EBIT	**9,630**	**17,292**	**10,987**	**12,432**	**14,489**
EBIT growth (%)	144.5	79.6	(36.5)	13.2	16.5
Other operating income	0	0	0	0	0
Other income	1,606	1,723	1,809	1,900	1,995
Financial expense	784	1,168	974	775	640
PBT	**10,452**	**17,847**	**11,822**	**13,557**	**15,844**
Extraordinary items	0	0	0	0	0
Taxes	2,693	4,617	2,956	3,389	3,961
Minority interest	0	0	0	0	0
Income from JV/Associates	0	0	0	0	0
Reported PAT	**7,759**	**13,230**	**8,867**	**10,167**	**11,880**
PAT growth (%)	0.0	70.5	(33.0)	14.7	16.8
Adjusted PAT	**7,759**	**13,230**	**8,867**	**10,167**	**11,882**
Diluted EPS (Rs)	**70.6**	**120.4**	**80.7**	**92.5**	**108.1**
Diluted EPS growth (%)	0.0	70.5	(33.0)	14.7	16.8
DPS (Rs)	**2.0**	**4.0**	**0.0**	**0.0**	**0.0**
Dividend payout (%)	**2.8**	**3.3**	**0.0**	**0.0**	**0.0**
EBITDA margin (%)	29.6	34.6	28.6	29.3	30.0
EBIT margin (%)	24.4	30.4	23.1	23.1	23.7
Effective tax rate (%)	25.8	25.9	25.0	25.0	25.0
NOPLAT (pre-IndAS)	**7,149**	**12,819**	**8,240**	**9,324**	**10,866**
Shares outstanding (mn)	109.9	109.9	109.9	109.9	109.9

Source: Company, Emkay Research

Balance Sheet

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
Share capital	110	110	110	110	110
Reserves & Surplus	42,441	55,097	63,964	74,131	86,014
Net worth	**42,551**	**55,207**	**64,074**	**74,241**	**86,124**
Minority interests	0	0	0	0	0
Deferred tax liability (net)	2,592	2,410	2,410	2,410	2,410
Total debt	**15,527**	**14,782**	**10,501**	**9,619**	**6,981**
Total liabilities & equity	**60,670**	**72,400**	**76,985**	**86,270**	**95,515**
Net tangible fixed assets	4,559	6,291	6,539	6,748	322
Net intangible assets	18	15	31	31	5
Net ROU assets	12	40	12	12	0
Capital WIP	6,798	11,424	5,000	5,000	5,000
Goodwill	0	0	0	0	0
Investments [JV/Associates]	9	9	9	9	9
Cash & equivalents	**255**	**240**	**118**	**155**	**234**
Current assets (ex-cash)	36,643	40,807	34,287	37,977	42,266
Current Liab. & Prov.	8,356	11,311	9,479	10,605	11,913
NWC (ex-cash)	**28,287**	**29,495**	**24,807**	**27,372**	**30,353**
Total assets	**60,422**	**72,400**	**76,985**	**86,270**	**95,515**
Net debt	15,272	14,543	10,383	9,464	6,747
Capital employed	60,670	72,400	76,985	86,270	95,515
Invested capital	**53,360**	**60,727**	**71,858**	**81,107**	**90,272**
BVPS (Rs)	387.4	502.6	583.0	675.5	783.7
Net Debt/Equity (x)	0.4	0.3	0.2	0.1	0.1
Net Debt/EBITDA (x)	1.3	0.7	0.8	0.6	0.4
Interest coverage (x)	0.1	0.1	0.1	0.1	0.0
RoCE (%)	**19.7**	**28.6**	**17.1**	**17.6**	**18.1**

Source: Company, Emkay Research

Cash flows

Y/E Mar (Rs mn)	FY22	FY23	FY24E	FY25E	FY26E
PBT	10,452	17,847	11,822	13,557	15,844
Others (non-cash items)	0	0	0	0	0
Taxes paid	(2,320)	(4,700)	(2,956)	(3,389)	(3,961)
Change in NWC	(2,744)	(1,390)	4,688	(2,564)	(2,981)
Operating cash flow	**7,414**	**7,389**	**15,325**	**9,794**	**11,363**
Capital expenditure	(6,357)	(13,146)	(12,000)	(10,000)	(10,000)
Acquisition of business	0	0	0	0	0
Interest & dividend income	58	79	100	120	0
Investing cash flow	**(5,839)**	**(4,764)**	**(10,191)**	**(8,100)**	**(8,005)**
Equity raised/(repaid)	0	0	0	0	0
Debt raised/(repaid)	(327)	(745)	(4,281)	(882)	(2,638)
Payment of lease liabilities	14	14	14	14	0
Interest paid	(784)	(1,168)	(974)	(775)	(640)
Dividend paid (incl tax)	(220)	(439)	0	0	0
Others	(324)	(728)	0	0	0
Financing cash flow	**(1,655)**	**(3,080)**	**(5,256)**	**(1,658)**	**(3,278)**
Net chg in Cash	(80)	(455)	(122)	36	80
OCF	7,414	7,389	15,325	9,794	11,363
Adj. OCF (w/o NWC chg.)	4,669	5,999	20,013	7,230	8,382
FCFF	1,057	(5,757)	3,325	(206)	1,363
FCFE	331	(6,846)	2,450	(861)	723
OCF/EBITDA (%)	63.4	37.6	112.7	62.2	62.1
FCFE/PAT (%)	4.3	(51.7)	27.6	(8.5)	6.1
FCFF/NOPLAT (%)	**14.8**	**(44.9)**	**40.3**	**(2.2)**	**12.5**

Source: Company, Emkay Research

Valuations and key Ratios

Y/E Mar	FY22	FY23	FY24E	FY25E	FY26E
P/E (x)	40.5	23.7	35.4	30.9	26.5
P/CE(x)	32.0	20.2	27.4	23.3	20.0
P/B (x)	7.4	5.7	4.9	4.2	3.6
EV/Sales (x)	8.3	5.8	6.8	6.0	5.3
EV/EBITDA (x)	28.2	16.7	23.9	20.6	17.5
EV/EBIT(x)	34.2	19.0	29.6	26.0	22.2
EV/IC (x)	6.2	5.4	4.5	4.0	3.6
FCFF yield (%)	0.3	(1.8)	1.0	(0.1)	0.4
FCFE yield (%)	0.1	(2.2)	0.8	(0.3)	0.2
Dividend yield (%)	0.1	0.1	0.0	0.0	0.0
DuPont-RoE split					
Net profit margin (%)	19.6	23.3	18.6	18.9	19.5
Total asset turnover (x)	0.7	0.9	0.6	0.7	0.7
Assets/Equity (x)	1.5	1.4	1.3	1.2	1.1
RoE (%)	**20.0**	**27.1**	**14.9**	**14.7**	**14.8**
DuPont-RoIC					
NOPLAT margin (%)	18.1	22.6	17.3	17.3	17.8
IC turnover (x)	0.0	0.0	0.0	0.0	0.0
RoIC (%)	**13.9**	**22.5**	**12.4**	**12.2**	**12.7**
Operating metrics					
Core NWC days	261.2	189.4	190.2	185.6	181.4
Total NWC days	**261.2**	**189.4**	**190.2**	**185.6**	**181.4**
Fixed asset turnover	1.1	1.4	0.9	0.8	0.8
Opex-to-revenue (%)	39.7	37.8	40.4	40.2	40.0

Source: Company, Emkay Research

GENERAL DISCLOSURE/DISCLAIMER BY EMKAY GLOBAL FINANCIAL SERVICES LIMITED (EGFSL):

Emkay Global Financial Services Limited (CIN-L67120MH1995PLC084899) and its affiliates are a full-service, brokerage, investment banking, investment management and financing group. Emkay Global Financial Services Limited (EGFSL) along with its affiliates are participants in virtually all securities trading markets in India. EGFSL was established in 1995 and is one of India's leading brokerage and distribution house. EGFSL is a corporate trading member of BSE Limited (BSE), National Stock Exchange of India Limited (NSE), MCX Stock Exchange Limited (MCX-SX), Multi Commodity Exchange of India Ltd (MCX) and National Commodity & Derivatives Exchange Limited (NCDEX) (hereinafter referred to be as "Stock Exchange(s)"). EGFSL along with its [affiliates] offers the most comprehensive avenues for investments and is engaged in the businesses including stock broking (Institutional and retail), merchant banking, commodity broking, depository participant, portfolio management and services rendered in connection with distribution of primary market issues and financial products like mutual funds, fixed deposits. Details of associates are available on our website i.e. www.emkayglobal.com.

EGFSL is registered as Research Analyst with the Securities and Exchange Board of India ("SEBI") bearing registration Number INH000000354 as per SEBI (Research Analysts) Regulations, 2014. EGFSL hereby declares that it has not defaulted with any Stock Exchange nor its activities were suspended by any Stock Exchange with whom it is registered in last five years. However, SEBI and Stock Exchanges had conducted their routine inspection and based on their observations have issued advice letters or levied minor penalty on EGFSL for certain operational deviations in ordinary/routine course of business. EGFSL has not been debarred from doing business by any Stock Exchange / SEBI or any other authorities; nor has its certificate of registration been cancelled by SEBI at any point of time.

EGFSL offers research services to its existing clients as well as prospects. The analyst for this report certifies that all of the views expressed in this report accurately reflect his or her personal views about the subject company or companies and its or their securities, and no part of his or her compensation was, is or will be, directly or indirectly related to specific recommendations or views expressed in this report.

This report is based on information obtained from public sources and sources believed to be reliable, but no independent verification has been made nor is its accuracy or completeness guaranteed. This report and information herein is solely for informational purpose and shall not be used or considered as an offer document or solicitation of offer to buy or sell or subscribe for securities or other financial instruments. Though disseminated to all the clients simultaneously, not all clients may receive this report at the same time. The securities discussed and opinions expressed in this report may not be suitable for all investors, who must make their own investment decisions, based on their own investment objectives, financial positions and needs of specific recipient.

EGFSL and/or its affiliates may seek investment banking or other business from the company or companies that are the subject of this material. EGFSL may have issued or may issue other reports (on technical or fundamental analysis basis) of the same subject company that are inconsistent with and reach different conclusion from the information, recommendations or information presented in this report or are contrary to those contained in this report. Users of this report may visit www.emkayglobal.com to view all Research Reports of EGFSL. The views and opinions expressed in this document may or may not match or may be contrary with the views, estimates, rating, and target price of the research published by any other analyst or by associate entities of EGFSL; our proprietary trading, investment businesses or other associate entities may make investment decisions that are inconsistent with the recommendations expressed herein. In reviewing these materials, you should be aware that any or all of the foregoing, among other things, may give rise to real or potential conflicts of interest including but not limited to those stated herein. Additionally, other important information regarding our relationships with the company or companies that are the subject of this material is provided herein. All material presented in this report, unless specifically indicated otherwise, is under copyright to Emkay. None of the material, nor its content, nor any copy of it, may be altered in any way, transmitted to, copied or distributed to any other party, without the prior express written permission of EGFSL . All trademarks, service marks and logos used in this report are trademarks or registered trademarks of EGFSL or its affiliates. The information contained herein is not intended for publication or distribution or circulation in any manner whatsoever and any unauthorized reading, dissemination, distribution or copying of this communication is prohibited unless otherwise expressly authorized. Please ensure that you have read "Risk Disclosure Document for Capital Market and Derivatives Segments" as prescribed by Securities and Exchange Board of India before investing in Indian Securities Market. In so far as this report includes current or historic information, it is believed to be reliable, although its accuracy and completeness cannot be guaranteed.

This report has not been reviewed or authorized by any regulatory authority. There is no planned schedule or frequency for updating research report relating to any issuer/subject company.

Please contact the primary analyst for valuation methodologies and assumptions associated with the covered companies or price targets.

Disclaimer for U.S. persons only: Research report is a product of Emkay Global Financial Services Ltd., under Marco Polo Securities 15a6 chaperone service, which is the employer of the research analyst(s) who has prepared the research report. The research analyst(s) preparing the research report is/are resident outside the United States (U.S.) and are not associated persons of any U.S. regulated broker-dealer and therefore the analyst(s) is/are not subject to supervision by a U.S. broker-dealer, and is/are not required to satisfy the regulatory licensing requirements of Financial Institutions Regulatory Authority (FINRA) or required to otherwise comply with U.S. rules or regulations regarding, among other things, communications with a subject company, public appearances and trading securities held by a research analyst account.

This report is intended for distribution to "Major Institutional Investors" as defined by Rule 15a-6(b)(4) of the U.S. Securities and Exchange Act, 1934 (the Exchange Act) and interpretations thereof by U.S. Securities and Exchange Commission (SEC) in reliance on Rule 15a 6(a)(2). If the recipient of this report is not a Major Institutional Investor as specified above, then it should not act upon this report and return the same to the sender. Further, this report may not be copied, duplicated and/or transmitted onward to any U.S. person, which is not the Major Institutional Investor. In reliance on the exemption from registration provided by Rule 15a-6 of the Exchange Act and interpretations thereof by the SEC in order to conduct certain business with Major Institutional Investors. Emkay Global Financial Services Ltd. has entered into a chaperoning agreement with a U.S. registered broker-dealer, Marco Polo Securities Inc. ("Marco Polo"). Transactions in securities discussed in this research report should be effected through Marco Polo or another U.S. registered broker dealer.

RESTRICTIONS ON DISTRIBUTION

This report is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contrary to law or regulation. Except otherwise restricted by laws or regulations, this report is intended only for qualified, professional, institutional or sophisticated investors as defined in the laws and regulations of such jurisdictions. Specifically, this document does not constitute an offer to or solicitation to any U.S. person for the purchase or sale of any financial instrument or as an official confirmation of any transaction to any U.S. person. Unless otherwise stated, this message should not be construed as official confirmation of any transaction. No part of this document may be distributed in Canada or used by private customers in United Kingdom.

ANALYST CERTIFICATION BY EMKAY GLOBAL FINANCIAL SERVICES LIMITED (EGFSL)

The research analyst(s) primarily responsible for the content of this research report, in part or in whole, certifies that the views about the companies and their securities expressed in this report accurately reflect his/her personal views. The analyst(s) also certifies that no part of his/her compensation was, is, or will be, directly or indirectly, related to specific recommendations or views expressed in the report. The research analyst (s) primarily responsible of the content of this research report, in part or in whole, certifies that he or his associated persons1 may have served as an officer, director or employee of the issuer or the new listing applicant (which includes in the case of a real estate investment trust, an officer of the management company of the real estate investment trust; and in the case of any other entity, an officer or its equivalent counterparty of the entity who is responsible for the management of the issuer or the new listing applicant). The research analyst(s) primarily responsible for the content of this research report or his associate may have Financial Interests2 in relation to an issuer or a new listing applicant that the analyst reviews. EGFSL has procedures in place to eliminate, avoid and manage any potential conflicts of interests that may arise in connection with the production of research reports. The research analyst(s) responsible for this report operates as part of a separate and independent team to the investment banking function of the EGFSL and procedures are in place to ensure that confidential information held by either the research or investment banking function is handled appropriately. There is no direct link of EGFSL compensation to any specific investment banking function of the EGFSL.

[1] An associated person is defined as (i) who reports directly or indirectly to such a research analyst in connection with the preparation of the reports; or (ii) another person accustomed or obliged to act in accordance with the directions or instructions of the analyst.

[2] Financial Interest is defined as interest that are commonly known financial interest, such as investment in the securities in respect of an issuer or a new listing applicant, or financial accommodation arrangement between the issuer or the new listing applicant and the firm or analysis. This term does not include commercial lending conducted at the arm's length, or investments in any collective investment scheme other than an issuer or new listing applicant notwithstanding the fact that the scheme has investments in securities in respect of an issuer or a new listing applicant.

COMPANY-SPECIFIC / REGULATORY DISCLOSURES BY EMKAY GLOBAL FINANCIAL SERVICES LIMITED (EGFSL):

Disclosures by Emkay Global Financial Services Limited (Research Entity) and its Research Analyst under SEBI (Research Analyst) Regulations, 2014 with reference to the subject company(s) covered in this report-:

1. EGFSL, its subsidiaries and/or other affiliates and Research Analyst or his/her associate/relative's may have Financial Interest/proprietary positions in the securities recommended in this report as of October 15, 2023
2. EGFSL, and/or Research Analyst does not market make in equity securities of the issuer(s) or company(ies) mentioned in this Report
   Disclosure of previous investment recommendation produced:
3. EGFSL may have published other investment recommendations in respect of the same securities / instruments recommended in this research report during the preceding 12 months. Please contact the primary analyst listed in the first page of this report to view previous investment recommendations published by EGFSL in the preceding 12 months.
4. EGFSL, its subsidiaries and/or other affiliates and Research Analyst or his/her relative's may have material conflict of interest in the securities recommended in this report as of October 15, 2023
5. EGFSL, its affiliates and Research Analyst or his/her associate/relative's may have actual/beneficial ownership of 1% or more securities of the subject company at the end of the month immediately preceding the October 15, 2023
6. EGFSL or its associates may have managed or co-managed public offering of securities for the subject company in the past twelve months.
7. EGFSL, its affiliates and Research Analyst or his/her associate may have received compensation in whatever form including compensation for investment banking or merchant banking or brokerage services or for products or services other than investment banking or merchant banking or brokerage services from securities recommended in this report (subject company) in the past 12 months.
8. EGFSL, its affiliates and/or and Research Analyst or his/her associate may have received any compensation or other benefits from the subject company or third party in connection with this research report.

Emkay Rating Distribution

Ratings	Expected Return within the next 12-18 months.
BUY	Over 15%
HOLD	Between -5% to 15%
SELL	Below -5%

Emkay Global Financial Services Ltd.

CIN - L67120MH1995PLC084899

7th Floor, The Ruby, Senapati Bapat Marg, Dadar - West, Mumbai - 400028. India
Tel: +91 22 66121212 Fax: +91 22 66121299 Web: www.emkayglobal.com

OTHER DISCLAIMERS AND DISCLOSURES:

Other disclosures by Emkay Global Financial Services Limited (Research Entity) and its Research Analyst under SEBI (Research Analyst) Regulations, 2014 with reference to the subject company(s) -:

EGFSL or its associates may have financial interest in the subject company.

Research Analyst or his/her associate/relative's may have financial interest in the subject company.

EGFSL or its associates and Research Analyst or his/her associate/ relative's may have material conflict of interest in the subject company. The research Analyst or research entity (EGFSL) have not been engaged in market making activity for the subject company.

EGFSL or its associates may have actual/beneficial ownership of 1% or more securities of the subject company at the end of the month immediately preceding the date of public appearance or publication of Research Report.

Research Analyst or his/her associate/relatives may have actual/beneficial ownership of 1% or more securities of the subject company at the end of the month immediately preceding the date of public appearance or publication of Research Report.

Research Analyst may have served as an officer, director or employee of the subject company.

EGFSL or its affiliates may have received any compensation including for investment banking or merchant banking or brokerage services from the subject company in the past 12 months. . Emkay may have issued or may issue other reports that are inconsistent with and reach different conclusion from the information, recommendations or information presented in this report or are contrary to those contained in this report. Emkay Investors may visit www.emkayglobal.com to view all Research Reports. The views and opinions expressed in this document may or may not match or may be contrary with the views, estimates, rating, and target price of the research published by any other analyst or by associate entities of Emkay; our proprietary trading, investment businesses or other associate entities may make investment decisions that are inconsistent with the recommendations expressed herein. EGFSL or its associates may have received compensation for products or services other than investment banking or merchant banking or brokerage services from the subject company in the past 12 months. EGFSL or its associates may have received any compensation or other benefits from the Subject Company or third party in connection with the research report. EGFSL or its associates may have received compensation from the subject company in the past twelve months. Subject Company may have been client of EGFSL or its affiliates during twelve months preceding the date of distribution of the research report and EGFSL or its affiliates may have co-managed public offering of securities for the subject company in the past twelve months.

NIRAV MAHENDRA SHETH

Digitally signed by NIRAV MAHENDRA SHETH
DN: c=IN, st=Maharashtra, 2.5.4.20=b021a3b7ba2f2566f915f35e82167026c49ca773cabb716b4826b7268cb00640, postalCode=400018, street=Mumbai, pseudonym=94c8e30b1cac7f7ac01065eac115af39, serialNumber=5cbdd61c805572e87e207081a5fbc8d95528e09b090e868e8fb628970b66eb2b, o=Personal, cn=NIRAV MAHENDRA SHETH
Date: 2023.10.15 19:52:00 +05'30'