India

Underweight *(no change)*

Highlighted Companies

Gujarat Fluorochemicals Ltd

REDUCE, TP Rs1946, Rs2777 close

Extraordinary earnings kicker of HFC-125 may not last for long. Even PVDF will face cyclical headwinds in the near term. LiPF6 is still some time away, but the collapse of its spreads has reduced the option. Earnings disappointment is on the cards. Retain our high-conviction REDUCE rating on the stock.

SRF Limited

REDUCE, TP Rs1540, Rs2182 close

SRF trades at 20x P/E, the bluest of bluesky EPS. In the medium term, cyclical headwinds in films and HFC businesses will lead to earnings disappointment. The company will be lucky if it achieves even 70% of the consensus earnings forecast for FY24F and FY25F.

Summary Valuation Metrics

P/E (x)	Mar22-A	Mar23-F	Mar24-F
Gujarat Fluorochemicals Ltd	51.12	49.56	39.18
SRF Limited	34.25	35.84	40.62

P/BV (x)	Mar22-A	Mar23-F	Mar24-F
Gujarat Fluorochemicals Ltd	7.05	6.17	5.33
SRF Limited	7.55	6.33	5.55

Dividend Yield	Mar22-A	Mar23-F	Mar24-F
Gujarat Fluorochemicals Ltd	0%	0%	0%
SRF Limited	0.26%	0.25%	0.25%

Chemicals - Others

PFAS - end of the road likely, capex is futile

- 3M's exit from the PFAS business is perceived as an opportunity for Indian companies, but it should ring big alarm bells for investors vis-à-vis the future course of regulatory action.
- Five European countries have urged the European Commission (EC) to completely ban PFAS on 13 Jan 2023, and the EC is now examining all PFAs for a potential ban (this includes PTFE, PVDF, FKM and per fluoro alkoxy alkane or PFA).
- PFAS are regarded as 'forever chemicals' because the carbon fluorine bond doesn't break even after centuries. However, the good news is that alternate materials have been developed for multiple PFAS. Negative for SRF and GFL.

3M's exit from PFAS is not an opportunity but rather rings alarm bells

3M is planning to exit the PFAS business over the next three years. Please see the press release from 3M: (3M to exit PFAS manufacturing by the end of 2025 – 20 Dec 2022). In our view, because of this exit section of street believes that it has created an opportunity for Indian fluoropolymer players to expand their capacity and grab the market vacated by 3M's exit. At the outset, this assumes that 1) while 3M will exit because of perceived regulatory issue, regulators will keep allowing its widespread usage, and 2) there will be no alternative material development for the replacement of PFAS. The first assumption is totally incorrect and five European countries have urged the EC (European Commission) to completely ban PFAS on 13 Jan 2023 (please click the link here). At the same time, multiple US states are, either through regulatory or court orders, are in process of banning PFAs (please click the link here). Hence, we disagree with the bull thesis, and this report shows the scale of health problems from PFAS (already identified in the western world) and the development of alternate materials for PFAS. The master list of all PFAS material can be accessed here: https://comptox.epa.gov/dashboard/chemical-lists/pfasmaster. Please note that PTFE (even normal PTFE through the R-22 route and not through PFAO; PFOA is banned since Jun 2019 by the United Nations or UN and 180 countries endorse it), PVDF, PKM and per fluoro alkoxy alkane all come under the PFAS umbrella.

A ban, if any, will lead to a crash in PFAs prices; P/E multiple to derate

While the ban on PFAs may happen or may not happen soon, the overhang will lead to earnings uncertainty. Please note that India may not ban PFAS, but as most PFAS are exported, the ban in the western world would be catastrophic for Indian companies. Also, like in case of Coal India during 2015-16, a regulatory and environmental overhang can lead to widespread derating of fluoro polymer manufacturers. Headwinds are multiple for Indian companies like SRF and Gujarat Fluorochemicals or GFL. Please see our earlier note where we had highlighted the risk on earnings because of reduced usage of HFCs in USA (IN: Chemicals - Overall - SRF and GFL- the day of reckoning is here).

Figure 1: PFAS are non-essential and, in many cases, can be easily substituted

SOURCE: INCRED RESEARCH, COMPANY REPORTS

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PFAS - end of the road likely, capex is futile

3M is planning to exit the PFAS business over the next three years. Please see the press release from 3M: (3M to exit PFAS manufacturing by the end of 2025 – 20 Dec 2022). From the company as well as investors' viewpoint, this exit has created an opportunity for Indian fluoropolymer players to expand their capacity and grab the market vacated by 3M's exit. At the outset, this assumes that 1) while 3M will exit because of perceived regulatory problems, the regulators will keep allowing its widespread usage, and 2) there will be no alternative material development to replace PFAS. We tend to disagree, and this report shows the scale of health problems from PFAS (already identified in the western world) and the development alternate materials for PFAS. The master list of all PFAS material can be accessed here: https://comptox.epa.gov/dashboard/chemical-lists/pfasmaster

PFAS- 101

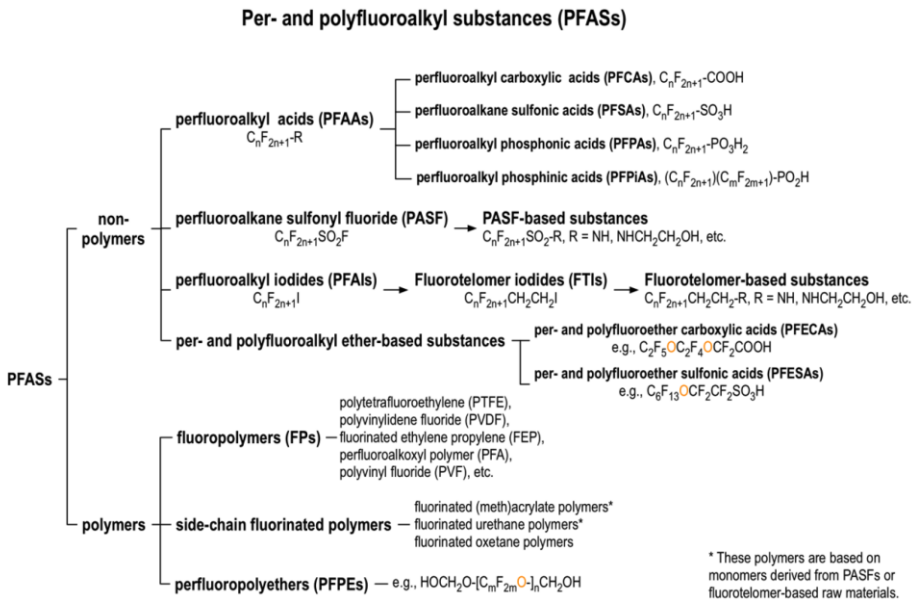
What are PFAS? ➤

PFAS are a large, complex group of manufactured chemicals that are ingredients in various everyday products. To cite an example, they are used to keep food from sticking to packaging or cookware, make clothes and carpets resistant to stains, and create firefighting foam that is more effective. PFAS are used in industries such as aerospace, automotive, construction, and electronics.

PFAS molecules have a chain of linked carbon and fluorine atoms. Because the carbon-fluorine bond is one of the strongest, these chemicals do not degrade easily in the environment.

Figure 2: The general classification of PFAs

Figure 1: General classification of per- and polyfluoroalkyl substances (PFASs) based on the a commonly agreed terminology for nomenclature of PFASs (Buck et al. 2011); this figure is reproduced from OECD (2013) and updated with new information available (in particular, regarding per- and polyfluoroalkyl ether-based substances).



SOURCE: INCRED RESEARCH, FIGURE1-CLASSIFICATION-OF-PER-AND-POLYFLUOROALKYL-SUBSTANCES -PFASS.PDF (OECD.ORG)

Among polymeric PFAS, different groups of substances can be differentiated as follows:

Fluoropolymers: These consist of carbon-only backbones with fluorine atoms directly attached to this backbone (e.g., polytetrafluoroethylene or PTFE, polyvinylidene fluoride or PVDF; fluorinated ethylene propylene or FEP; perfluoro alkoxyl polymer or PFA). They are not made from non-polymeric PFAS raw materials (except that perfluorobutylethlyene or PFBE can be used as a co-monomer in some cases); however, the long-chain PFCAs such as PFOA and PFNA have been used extensively as processing aids in the polymerization process of certain types of fluoropolymers.

Side-chain fluorinated polymers: They are fluorinated polymers consisting of variable compositions of non-fluorinated carbon backbones with polyfluoroalkyl (and possibly perfluoroalkyl) side-chains, which often originate from PASF or FT-based substances.

Perfluoropolyethers (PFPE): They are fluorinated polymers comprising backbones containing carbon and oxygen with fluorine directly attached to the carbon. PFPE are not made from PFAA and PASF- and FT-based substances; nor are these non-polymeric PFAS involved in the manufacturing of PFPE. However, in some cases, PFPE are longer-chain homologues of non-polymeric per- and polyfluoroalkyl ether-based substances. The terminology 'long-chain' and 'short-chain' is used to distinguish different types of PFCAs, PFSA and their precursors. The term 'long-chain PFAS' refers only to the following PFAS:

What are the examples of PFAS? ➤

The most widely used example of PFAS is PTFE or teflon. In 1946, DuPont introduced non-stick cookware coated with teflon. Today, the family of fluorinated chemicals that sprang from teflon includes thousands of non-stick, stain-repellent and waterproof compounds called PFAS, short for per- and poly-fluoroalkyl substances.

PFAS are used in a staggering array of consumer products and commercial applications. Decades of heavy use have resulted in contamination of water, soil and the blood of people and animals in the farthest corners of the world. PFAS are incredibly persistent, never breaking down in the environment and remaining in our bodies for years.

DuPont invented the PFAS chemical patented as teflon, but 3M became its main manufacturer. In 2001, a scandal erupted in Parkersburg, W.Va., after the discovery of teflon chemical in the drinking water of tens of thousands of people near a DuPont plant. (The story is documented in the film 'The Devil We Know.')

A class-action lawsuit uncovered evidence that DuPont knew PFAS was hazardous and had contaminated tap water but didn't tell its workers, local communities or environmental officials. The lawsuit also triggered studies linking the teflon chemical to cancer and other diseases.

Why PFAS are called 'forever chemicals'? ➤

PFAS (per- and polyfluorinated alkyl substances), also known as ***forever chemicals***, are a large chemical family of over 4,700 highly persistent chemicals that don't occur in nature. PFAS are the most persistent synthetic chemicals to date, they hardly degrade in the natural environment and have been found in the blood and breastmilk of people and wildlife all round the world.

Figure 3: PFAS are widely-used chemicals - from anti-stick cookware 'teflon' to multiple things of modern usage

SOURCE: INCRED RESEARCH, COMPANY REPORTS

What actions are being taken against PFAS? ➤

There are multiple pressure groups working on this issue who are forcing the government and companies to act. It is said that almost 99% of the Americans have PFAS in their bodies and it is getting passed on the new-born children as well. The voluntary action by 3M to stop production of PFAS by 2025F is under the pressure of these groups only. We are listing some of the pressure groups and organizations below:

- Manifesto (banpfasmanifesto.org)
- PFAS – the 'Forever Chemicals' (chemtrust.org)
- https://ec.europa.eu/environment/chemicals/pfas/index_en.htm
- https://news.bloomberglaw.com/environment-and-energy/pfas-bans-restrictions-go-into-effect-in-states-as-year-begins
- https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/countryinformation/european-union.htm

Europe is at the forefront of taking action against PFAS - in fact, five countries have officially submitted proposals for the same ➤

On 13 Jan 2023, the Netherlands, Germany, Denmark, Sweden, and Norway took the first formal step towards a European ban on per- and polyfluoroalkyl substances (PFAS) by jointly submitting a restriction proposal to the European Chemicals Agency (ECHA).

- https://www.cosmeticsdesign-europe.com/Article/2023/01/26/PFAs-ban-in-European-Union-proposed-by-five-national-authorities-to-be-evaluated-by-ECHA
- EC publishes recommendation and implementing regulation on PFAS Testing | PackagingLaw.com
- EU sets limits for PFAS in certain foods | Food Safety (food-safety.com)
- European Union proposal would restrict PFAS as a group (acs.org)
- Proposed European PFAS ban officially submitted | RIVM

United States of America (USA) is also working on banning PFAS ➤

Multiple states in USA are taking action against PFAS.

- https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2022/09/22/states-take-on-pfas-forever-chemicals-with-bans-lawsuits
- Per- and polyfluoroalkyl substances (PFAS) | US EPA

- https://www.siliconexpert.com/blog/pfas-usa/
- Forget forever chemicals: US Senate Committee passes amendment to ban PFAS in food packaging (packaginginsights.com)
- https://www.mondaq.com/unitedstates/product-liability--safety/1261530/state-pfas-food-packaging-bans-start-taking-effect-december-31-2022

There are plenty of alternatives for PFAS

While market celebrated the exit of 3M in the fluoropolymer space and assumed that all incremental market share will come to Indian fluoropolymer makers, but most critical will be the likely ban by Europe and USA. If these materials are banned in Europe and USA, then their prices will collapse. In this section, we will analyse some commonly manufactured PFAS by Indian companies and their alternatives present.

PTFE is the principal PFAS manufactured by Indian companies which is under risk ➤

Polytetrafluoroethylene (PTFE) has been widely used in coatings for reducing friction and increasing abrasion resistance. While PTFE manufactured by perfluorooctanoic acid (PFOA) is already banned by the UN convention since 2019 (What is PFOA and Why it is Banned in EU REACH | APA Engineering) Europe is now actively looking to impose a general ban on PTFE. Please see page 23 on the linked report: (64a60df2-9805-98e1-4ea9-bd1a6e3f58c5 (europa.eu))

There are multiple materials developed to replace PTFE ➤

Mipelon by Mitsui: Mitsui Chemicals' Mipelon ultra-high molecular weight polyethylene (UHMW-PE) is a very fine polyethylene powder. The spherical particles of Mipelon enhance the abrasion resistance and lubricity when used as an additive in coatings. Additionally, Mipelon is safe and environment friendly. The Mipelon range of UHMW-PEs presents high-performance alternatives to the usage of PTFE in coatings. Mipelon UHMW-PE has spherical particles with a narrow particle size distribution. CASE STUDY: A superior and safer alternative to PTFE for use as a friction-reducing additive in coatings 2 Mipelon XM220 has an average diameter of 30um while Mipelon PM200 has an average particle diameter of 10um. More about the molecule can be found here: (Case_study:_mipelon_a_safer_alternative.pdf (mitsuichemicals.com)).There are other alternatives to PTFE which can do better in other applications. However, please note that perfluoro alkoxy alkane is a PFAS material, as per the definition of ECHA (Please see page 23 of this report: 64a60df2-9805-98e1-4ea9-bd1a6e3f58c5 (europa.eu))

Deuteron SF Products: Alternatives to PTFE products - Deuteron: This is the alternative to the PTFE material which has been developed by Deuteron. Based on poly methyl urea (PMU) chemistry, Deuteron offers two high-performance surface additives with PTFE-like properties: Deuteron SF 505 and Deuteron SF 707.

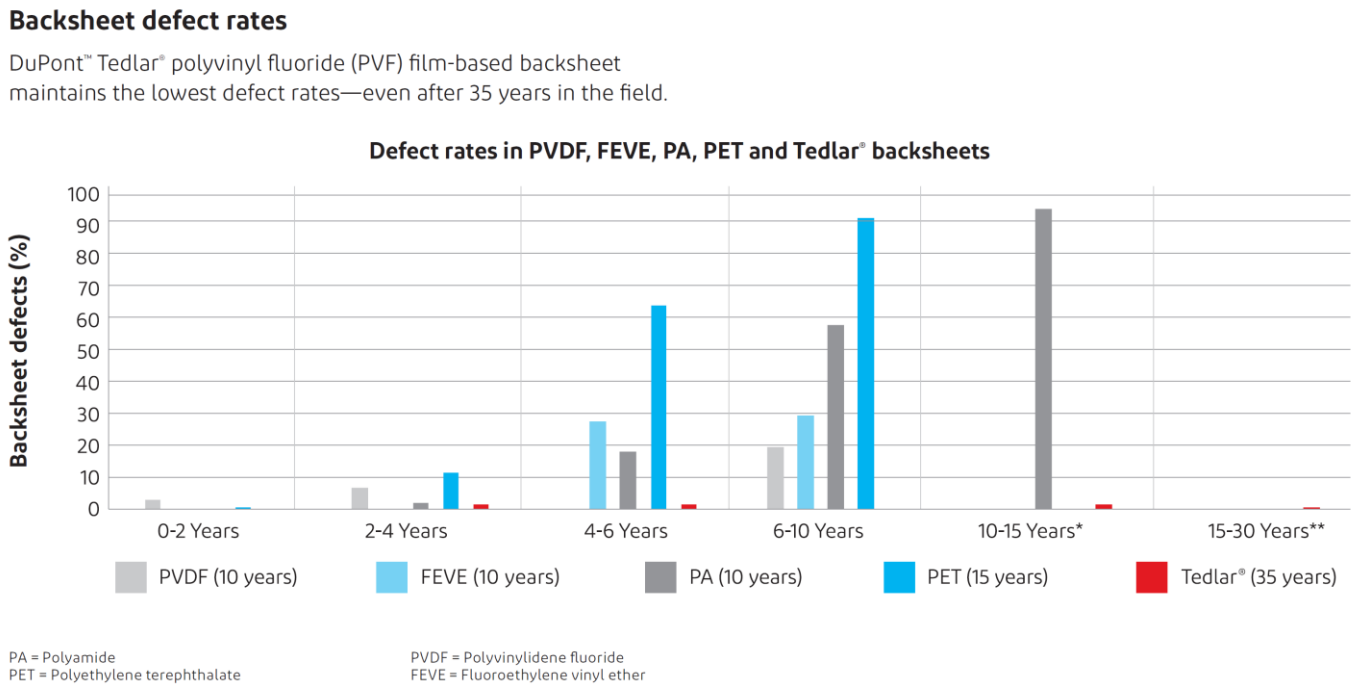
PFA (per fluoro alkoxy alkane) is also being evaluated for a ban by the EC and USA ➤

While five European nations have moved to ban the all PFAs and it is being evaluated by the European Commission for the general ban which includes PFA. (States Take on PFAS 'Forever Chemicals' With Bans, Lawsuits | The Pew Charitable Trusts (pewtrusts.org)).

PVDF is another material which is at risk ➤

PVDF is widely used in solar panels. Attached is an excerpt from the Dupont field study of passenger vehicles.

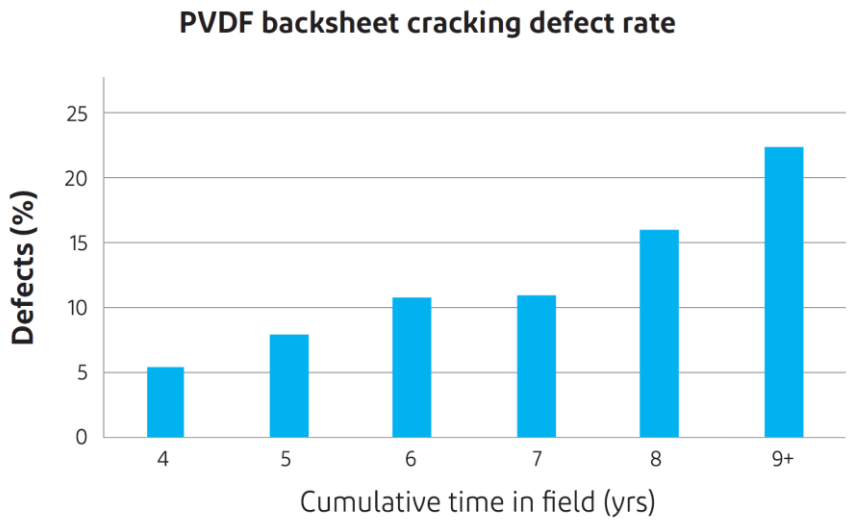
Figure 4: The defects in PVDF-based sheets are lesser but a much higher price (25x compared to polyethylene terephthalate) compensates for them; users can easily shift to PET films



SOURCE: INCRED RESEARCH, DUPONT FIELD PV REPORTS

PVDF outer-layer cracking defect rates have increased more than 3x in the past one year. There is no clear correlation between cracking and climate because cracking has been observed in hot-arid, cold-arid, temperate, and Mediterranean regions. There have been nearly a four-fold cumulative increase in PVDF outer-layer cracking defect rates, from 5% to 23%, between year-4 and year-9 after installation.

Figure 5: PVDF alone won't have any material advantage over PET in the field



SOURCES: INCRED RESEARCH, DUPONT FIELD PV REPORTS

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