

India

Underweight (no change)

Highlighted Companies

Gujarat Fluorochemicals

REDUCE, TP Rs1946, Rs3509 close

HFC sales have evaporated and at the same time, PFAs (PTFE, PVDF etc.) sales are facing regulatory headwinds. Please remember that often a ban is not necessary to stop usage of the commodity – take a look at the paraben-free cosmetics as an example. Please note that paraben is not banned in cosmetic usage but being paraben-free is marketed as a virtue of the product. Similarly, the day is not far when being PFAS-free will be marketed as a virtue.

Summary Valuation Metrics

	Mar24-F	Mar25-F	Mar26-F
P/E (x)			
Gujarat Fluorochemicals	70.65	65.28	51.83
P/BV (x)			
Gujarat Fluorochemicals	6.35	5.79	5.21
Dividend Yield			
Gujarat Fluorochemicals	0%	0%	0%

Chemicals - Others

Are PFAS replaceable? The answer is Yes

- Many of the popular PFAS like PTFE, PVDF as well as fluoroelastomer co-polymer and terpolymer have equally capable alternatives.
- Although the progress by ECHA (European Chemicals Agency) is slow, it is moving decidedly against the usage of PFAS.
- Often, a ban is not needed to stop its usage – see paraben-free cosmetics as an example. Similarly, the day is near when PFAS-free will be sold as a virtue.

PFAS are forever chemicals; ECHA doing consultations to ban them

Per- and polyfluoroalkyl substances (PFAS) are a large, complex group of synthetic chemicals that have been used in consumer products around the world since about the 1950s. They are often referred to as ‘forever chemicals’ due to their long-term resistance to degradation. PFAS molecules have a chain of linked carbon and fluorine atoms. As the carbon-fluorine bond is one of the strongest, these chemicals do not degrade easily in the environment. There are various types of PFAS, both polymers and monomers, such as PTFE, PVDF, PFA, PVF, etc. The proposal to ban PFAS in the EU was framed by the authorities in Denmark, Germany, Netherlands, Norway and Sweden and was submitted to ECHA on 13 Jan 2023. ECHA has started the process of hearing the various parties.

PFAS are replaceable; 3M exit doesn't pave way for Indian companies

A bull market has strange ways and in this market often logic becomes convoluted. Prices are high means there has to be some logic in the bullish arguments & bearish arguments are best to be trashed. At least in case of fluoropolymer companies, the same is happening. While 3M is exiting the business as it paid heavy fines and most of the consumer products are going to shun PFAs but companies in India believe that as the old manufacturers are out, they will get that market share. Indirectly, it means that 3M is a fool to exit and leave the market to Indian companies as consumers have no choice but to use the product. We tend to disagree with this logic as there are multiple products to replace some quite popular PFAs like PTFE and PVDF. The terminal value of fluoropolymer makers is ZERO.

There are multiple alternatives to popular PFAS like PTFE, PVDF

Clariant claims to have developed PTFE alternatives that are environment-friendly ([Link](#)). Silicone-modified polyester (SMP) and polyester-modified silicone resin IOTA 6072-50D can replace PVDF. Fluoroelastomer co-polymer and fluoroelastomer terpolymer can be replaced by the following: 1) chlorinated polyethylene, 2) ethylene propylene diene monomer (EPDM) rubber, 3) chloroprene rubber (neoprene), and 4) butyl rubber.

Signs of PFAS usage slowdown are already visible

The first signs of usage slowdown of PFAS are already visible as 1) prices are falling, and 2) export volume is also declining. Please remember that often a ban is not necessary to stop the usage – take a look at paraben-free cosmetics. Please note that paraben is not banned in cosmetic usage but being paraben-free is marketed as a virtue of the product. Similarly, the day is not far when being PFAS-free will be marketed as a virtue.

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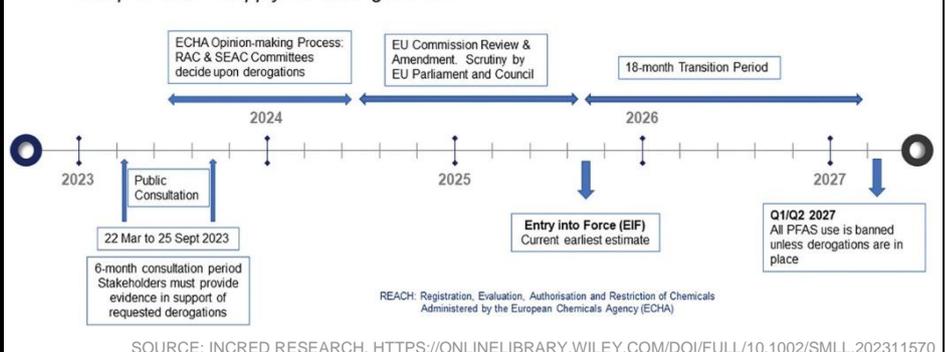
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Figure 1: The ECHA restriction timeline is listed below

PFAS – REACH Restriction Timeline

Disruption of API supply chains begins 2027



Are PFAS replaceable? The answer is Yes

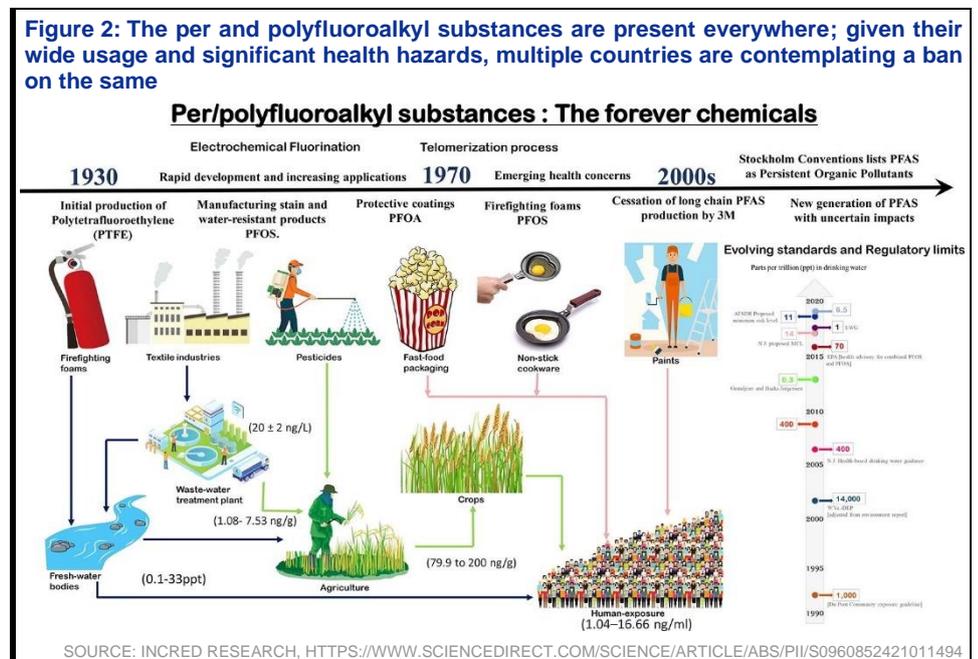
A bull market has strange ways and in this market often logic becomes oxymoronic and one tends to believe the prices. The prices are high means there has to be some logic in the bullish arguments and bear arguments are best to be trashed. At least in the case of fluoropolymer companies, the same is happening. While 3M is exiting the business because it paid heavy fines and most of the consumer products are going to shun PFAs but companies in India believe that as the old manufacturers are out, they will get that market share. Indirectly, it means that 3M is a fool to exit and leave the market to Indian companies as the consumers have no choice but to use the product. We tend to disagree with this logic as there are multiple products which can replace some quite popular PFAs like PTFE and PVDF. The end is near and the terminal value of fluoropolymer makers is ZERO.

Per- and polyfluoro alkyl substances(PFAS)

What are PFAS? ➤

1. Per- and polyfluoroalkyl substances (PFAS) are a large, complex group of synthetic chemicals that have been used in consumer products around the world since the 1950s.
2. They are often referred to as 'forever chemicals' due to their long-term resistance to degradation.
3. PFAS molecules have a chain of linked carbon and fluorine atoms. As the carbon-fluorine bond is one of the strongest, these chemicals do not degrade easily in the environment.
4. There are various types of PFAS, both polymers and monomers, such as PTFE, PVDF, PFA, PVF, etc.

There are close to 14,000 chemicals which come under this category. They are listed below.



Properties of PFAS ➤

1. Most PFAS are solids, often crystalline or powdery in form, at room temperature; however, shorter chained compounds (the acid forms of PFCA and PFSA, FTS and FTOH with a 4- to 6-carbon tail) take liquid form at room temperature.
2. They have varied melting and boiling points as there are a wide range of compounds in the PFAS category.

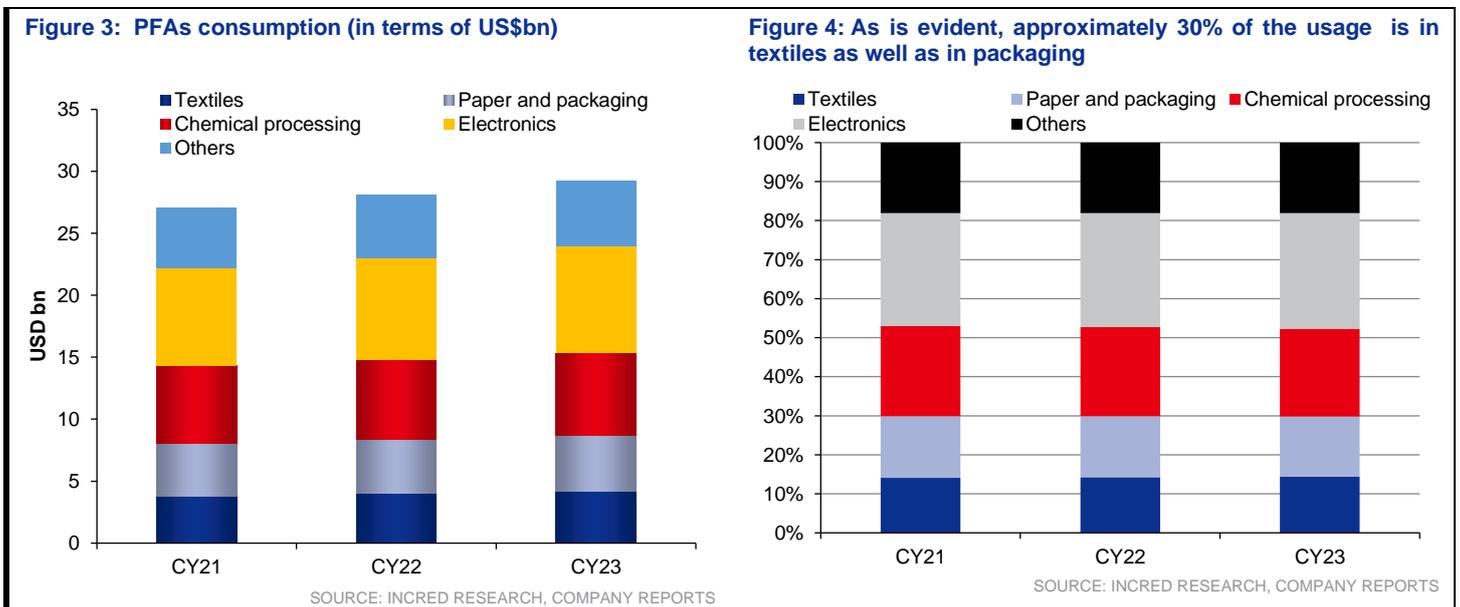
3. Thermal stability of most PFAS is very high due to the strength of C—F bond present in them.
4. Polar regions of some PFAS can be vulnerable to chemical reactions but the chemical stability of PFASs is high, i.e. most PFAS are chemically inert. Due to their thermal and chemical stability, they are not easily degradable.
5. Some of them can be anionic, cationic or zwitter-ionic in different environments.

Following are the uses of PFAS ➤

Fluoropolymer coatings can be in a variety of products like:

- a. Clothing – carpet, textile, waterproof clothing, and leather production
- b. Furniture
- c. Adhesives
- d. Food packaging
- e. Heat-resistant non-stick cooking surfaces
- f. Insulation of electrical wires
- g. Chromium plating
- h. Photography
- i. Photolithography
- j. Paper products
- k. Semi-conductor manufacturing
- l. Coating additives and cleaning products
- m. Cosmetics
- n. Fire-fighting foams.

The graph below shows the consumption of various PFAs (in US\$bn) for various purposes.



Environmental concerns and regulations

The carbon fluorine bond is a forever bond and it doesn't degrade in nature. If it enters the blood stream, it can cause various damages. Because of this reason ECHA is proposing a ban on the usage of PFAS. In the section, we will address various issues and questions regarding the same.

ECHA is the first agency to start investigation regarding the harmful impact of PFAS ➤

The proposal was prepared by the authorities in Denmark, Germany, Netherlands, Norway and Sweden and submitted to ECHA on 13 Jan 2023. It aims to reduce PFAS emission into the environment and make the products and

processes safer for the people. After the submission of the dossier, ECHA has started the process of hearing various parties on this issue.

As of now, ECHA is doing detailed consultations with various stakeholders to assess the requirement of a ban on PFAS in the European Union ➤

Following the screening of a large number of comments received during the consultations, ECHA is clarifying the next steps for the [proposal to restrict PFAS](#) under REACH, the EU's chemicals regulation.

The agency's scientific committees for Risk Assessment (RAC) and Socio-Economic Analysis (SEAC) will evaluate the proposed restriction together with the comments from the consultation in batches, focusing on the different sectors that may be affected.

In tandem, the five national authorities who prepared the proposal, are updating their initial report to address the consultation comments. This updated report will be assessed by the committees and will serve as the foundation for their opinions.

The sectors and elements that will be discussed in the next three committee meetings are:

Mar 2024 meetings:

1. Consumer mixtures, cosmetics and ski wax;
2. Hazards of PFAS (only by RAC); and
3. General approach (only by SEAC).

Jun 2024 meetings:

1. Metal plating and manufacture of metal products; and
2. Additional discussion on hazards (only by RAC).

Sep 2024 meetings:

1. Textiles, upholstery, leather, apparel, carpets (TULAC);
2. Food contact materials and packaging; and
3. Petroleum and mining.

More information about the committees' plans to evaluate the remaining sectors and about the next procedural steps will be announced as the work progresses. This information will be communicated in conjunction with the committee meetings.

ECHA is making efforts for progress in opinion making, following the updates made to the proposal by the five national authorities. The agency will deliver the final opinion to the European Commission in the shortest possible timeframe while ensuring transparency, independence and high quality.

While the EU is doing consultations, countries like New Zealand have gone ahead and banned the usage of PFAS >

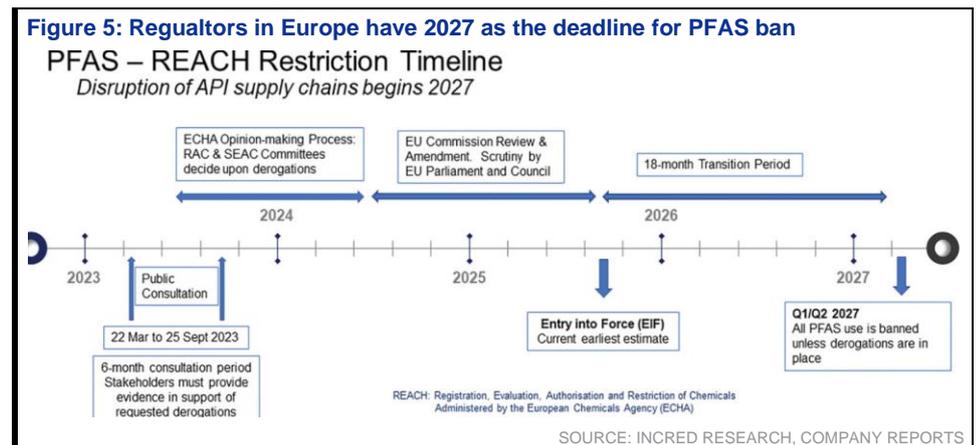
New Zealand is banning PFAS, aka forever chemicals, in cosmetics from 2026. It is the first country to do so.

As usual, companies are claiming that PFAS are irreplaceable >

1. Companies agree that some PFAS need to be replaced, but most of them are irreplaceable.
2. Chemours states that any ban would have a significant negative impact on downstream industries because in many applications, there are no suitable alternatives.

As a respite to companies, ECHA is delaying the inevitable ban on PFAS >

1. The future of most PFAS depends on the verdict of the ban in the EU as many countries could follow suit.
2. Despite promising to ban PFAS in 2023 via REACH legislation, the EU has not done it yet and it is for economic gains, according to environmentalists.
3. If adopted in full, REACH would mark the beginning of the end for membranes such as PVDF made from fluorinated polymers. Derogations may be granted for some PFAS chemicals in case where there is deemed to be no alternative, but these are likely to be time-limited over a few years.



There is huge evidence of the negative impact of PFAS on human health and environment >

1. Exposure to certain PFAS may be associated with increased risk of thyroid cancer.
2. PFAS are potentially associated with endocrine and immune dysfunction (including reduced vaccine antibody response).
3. A large-scale study on exposure to PFAS in humans and rodents showed consistent evidence of liver damage. PFAS are known to accumulate in body tissues such as in the liver.
4. Exposure to PFASs may have:
 - a. Reproductive effects such as decreased fertility or increased high blood pressure in pregnant women.
 - b. Developmental effects or delays in children, including low birth weight, accelerated puberty, bone variations, or behavioural changes.
 - c. Increased risk of some cancers, including prostate, kidney, and testicular cancers.
 - d. Reduced ability of the body's immune system to fight infections, including reduced vaccine response.
 - e. Interference with the body's natural hormones.

- f. Increased cholesterol levels and/or risk of obesity
5. PFAS do not break down in the environment, can move through soils and contaminate drinking water sources, build up (bioaccumulate) in fish and wildlife.
6. In Apr 2024, EPA issued the first-ever national, legally enforceable drinking water standard to protect communities from exposure to harmful PFAS. The final rule will reduce PFAS exposure for approximately 100m people, prevent thousands of deaths, and reduce tens of thousands of serious illnesses
7. Under the Stockholm Convention on Persistent Organic Pollutants, some PFAS (like perfluorohexanesulfonic acid (PFHxS), perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) have already been banned globally in 2023.

There are various alternatives to PFAS ➤

a) Bio-derived and biodegradable polymers:

- a. A range of biodegradable and bioderived polymers such as protein derivatives, polysaccharides, virus derivatives and polymers such as polylactic acid and cellulose show properties similar to fluoroplastics (piezoelectric properties)
- b. They also have potential for implantable electronics
- b) **Polyethylene (PE):** Certain grades of polyethylene can offer chemical resistance and good electrical properties, making them suitable alternatives for specific applications where PVDF is used.
- c) **Polypropylene (PP):** It shares some characteristics with PVDF, such as good chemical resistance and the ability to withstand high temperatures. PP is often used in applications where these properties are essential.
- d) **Polyamide (nylon):** Certain nylon grades can exhibit good chemical resistance, high strength, and excellent mechanical properties, making them suitable for replacing PVDF in certain applications.
- e) **Polycarbonate (PC):** It is known for high-impact resistance, clarity, and good electrical properties. While PC may not match PVDF in chemical resistance, it can serve in applications where other properties are more critical.
- f) **Polyoxymethylene (POM):** Also known as acetal, POM offers good mechanical properties, wear resistance, and dimensional stability. It may not match PVDF's chemical resistance entirely, but it serves well in certain engineering applications.
- g) **Polyether Ether Ketone (PEEK):** It is a high-performance thermoplastic with excellent mechanical properties, chemical resistance, and high-temperature stability. While not identical to PVDF, it can serve as an alternative in certain applications.

Clariant has developed an alternative to even PTFE ➤

Clariant claims to have developed PTFE alternatives that are environment-friendly. Clariant claims and we quote from its website:

“Clariant’s PFAS-free additives offer equal performance to their PTFE-containing predecessors, with lower dosage levels. All tests have demonstrated that our PTFE-alternatives are a viable and safe replacement in printing on packaging, found in metal coatings and more. With a differentiated biopolymer-based micronized wax, the same rub resistance performance is achievable with a dosage reduction of 30 % – 50 %, making our additives a highly cost-efficient PTFE-alternative. Other benefits are:

1. High mechanical and temperature resistance
2. Low Coefficient of Friction (CoF)
3. Compliant with current and actually foreseeable regulatory requirements
4. Improved sustainability profile
5. Improved cost-performance effectiveness.

Please click the link to the website here: <https://www.clariant.com/en/Business-Units/Additives-and-Adsorbents/Waxes/PTFE-Free-Solutions>

Multiple companies have developed the alternatives to PVDF and some of them are listed below ➤

1. Silicone modified polyester (SMP) can provide comparable performance to PVDF coatings without the drawbacks.
2. Polyester modified silicone resin IOTA 6072-50D can also replace PVDF.

Fluoroelastomer co-polymer and fluoroelastomer terpolymer have also multiple non-fluorinated alternatives ➤

Creating a direct non-fluorinated alternative to a fluoroelastomer co-polymer can be challenging due to the unique properties that fluorinated compounds offer. However, certain non-fluorinated elastomers may provide some similarities or partial substitutes in specific applications. Here are a few alternatives to consider:

1. **Chlorinated Polyethylene (CPE):** It is a thermoplastic material that exhibits good resistance to heat, weathering, and chemicals. While it may not replicate all the properties of fluoroelastomer co-polymers, it can be used in certain applications requiring weather resistance and flexibility.
2. **Ethylene Propylene Diene Monomer (EPDM) Rubber:** It offers good weather resistance, ozone resistance, and electrical insulation properties. It's commonly used in outdoor applications and automotive seals.
3. **Chloroprene Rubber (Neoprene):** It provides good resistance to oils, chemicals, and weathering. It's often utilized in applications requiring moderate chemical resistance and flexibility.
4. **Butyl Rubber:** It offers excellent resistance to gases, weathering, and ozone. It's used in applications where airtight seals or resistance to gases is crucial.

We acknowledge the contribution of Shakthi Sharvani Karanam (Intern) in the writing of this note

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