Submission to the Public Consultation on the Proposed PFAS Restriction

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Contents

1. Introduction

This document has been prepared by Elval Colour (EC), a subsidiary of Viohalco S.A, for the 2023 public consultation on the proposed restriction of PFAS chemicals (published in February 2023). As fluoropolymers and especially, polyvinylidene fluoride (PVDF) and fluoroethylene vinyl ether resin (FEVE) play an essential role for coating process, we as EC want to give a strong statement regarding “Regulation (EC) No. 1907/2006 (REACH) Proposal for a restriction of Per - and polyfluoroalkyl substances (PFASs)”.

EC is a leading European coil coater and aluminium composite panel producer with green products that contribute to sustainable buildings. The Company manufactures and sells a full range of superior quality, state-of-the-art building envelope products.

2. Sectors and (sub-) uses covered in the present document.

The comments in this document apply to **the coil coating sub-sector of the construction sector** as defined in **Table 9** of the Restriction Proposal.

Coil coating is also defined as a sub-use sector of the metal industry sector in **Table A.57** with section **A.3.14** (Construction Products of **Annex A**).

Coil coating is discussed in section **E.2.13 (Construction Products) of Annex E** in the section titled “coil coating” on **page 405**.

The comments apply specifically to the following coil coated products for the construction market:

(a) PVDF-coated steel or aluminium.

(b) FEVE-coated steel or aluminium.

Where PVDF = polyvinylidene fluoride (coating polymer composition = 70% PVDF, 30% acrylic) and FEVE = fluoroethylene vinyl ether resin (coating polymer composition = 100%).

The EC's position on why PVDF and FEVE should be exempted from the suggested restriction is presented below, along with supporting data and reasoning. Additionally, the EC agrees with European Coil Association (ECCA) and Fluoropolymer Product Group (FPG) of Plastics Europe's and endorses their proposals to exempt all fluoropolymers from the proposed PFAS ban.

3. Fluoropolymers: properties and applications

“Fluoropolymers (FPs) are high molecular weight (MW) polymers with fluorine atoms directly attached to their carbon-only backbone”.[1] Fluoropolymers exhibit excellent chemical, biological, and thermal stability, heat and chemical resistance, remarkable dielectric characteristics, and superior durability due to the carbon-fluorine (C-F) bond, which is the strongest bond between a carbon and another atom.[2]

Fluoropolymers also possess anti-stick, anti-wetting, fire and weather resistance features. It becomes clear that fluoropolymers are considered indispensable because of their special combination of characteristics that are necessary to ensure optimal performance in many applications and which cannot be obtained or maintained with substitute materials.[3,4]

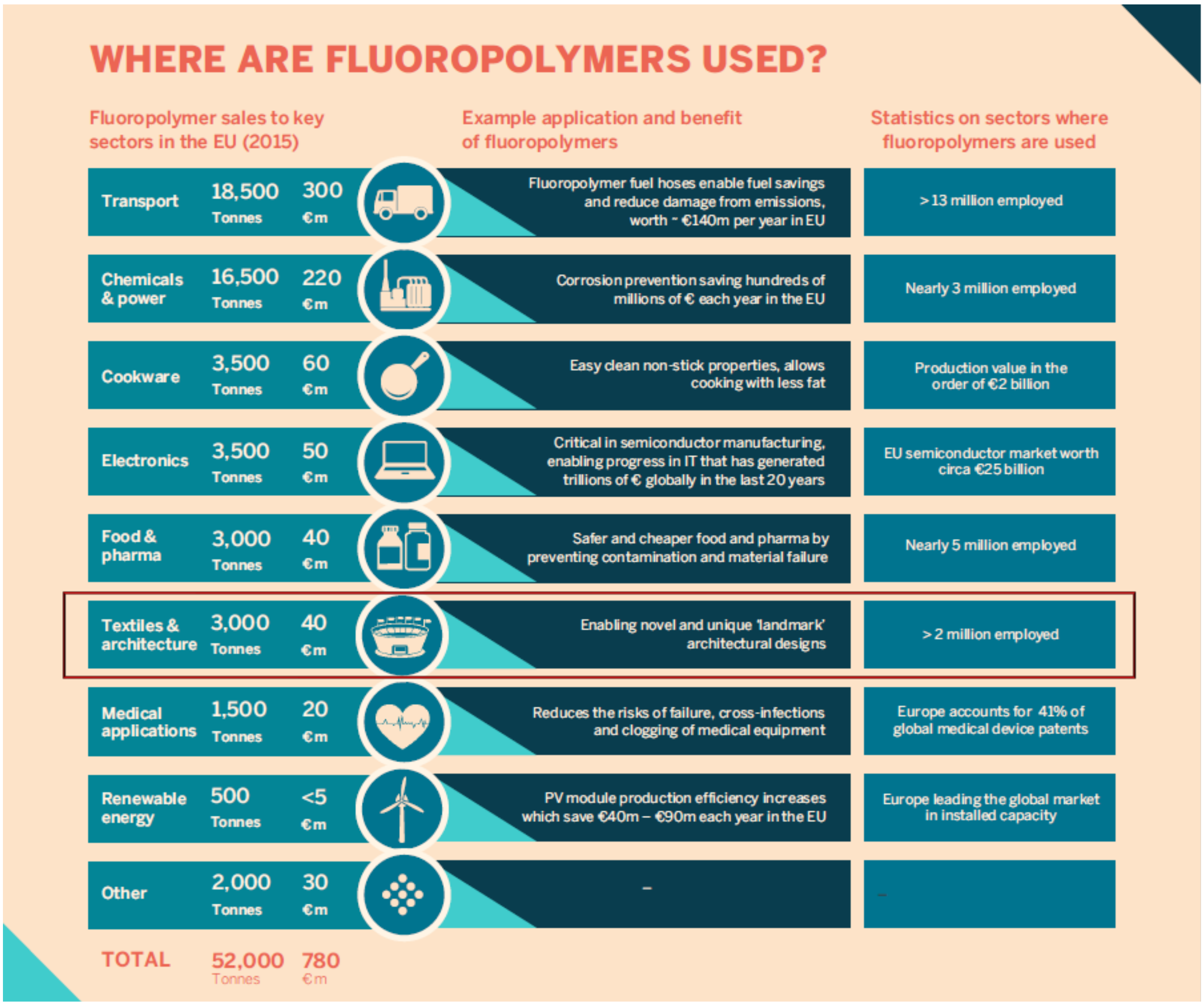

Figure 1: A schematic illustration of sales, statistics industrial processes and everyday applications of Fluoropolymer-based techniques (adopted from reference[5]).

PFAS according to the article 68(1) of REACH restriction have the following structural formula: “$X-(-CF_2-)_n-X'$ with n equal to or larger than 1 and X, X′ not being H (thus including $X-CF_3$), meaning fluorinated substances that contain at least one aliphatic carbon atom that is both saturated and fully fluorinated”. In other words, any chemical with at least one perfluorinated methyl group ($-CF_3$) or at least one perfluorinated methylene group ($(-CF_2-)_n-$), including branched fluoroalkyl groups and substances containing ether linkages, fluoropolymers and side-chain fluorinated polymers. Based on this proposal, ***Elval Colour strongly supports that the current approach of the PFAS restriction as defined in article***

68(1) REACH is extremely general and vague as it only indicates that the compounds it refers to, share the structural property of having a fully fluorinated methyl or methylene carbon moiety and does not specify whether a compound presents a risk or not.

4. PVDF/FEVE exception requested by Elval Colour

The current document contains no derogations and a transition period of 18 months for coil coating applications of PVDF and FEVE fluoropolymers. Moreover, EC's request is in line with the UK Government's recently released comprehensive RMOA on the restriction of PFAS chemicals, which was developed after extensive consultation with all relevant parties.[6] EC requests that these fluoropolymers are excluded from the proposed PFAS restriction on the basis that:

1. Polyvinylidene fluoride (PVDF) resin-based architectural coatings have a proven track record dating back more than 30 years and they have established themselves as the go-to materials for passing strict architectural criteria throughout time.[7]

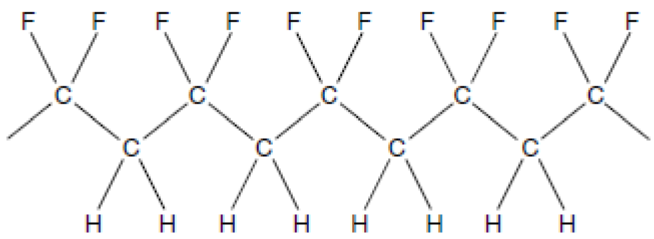

Figure 2: Chemical structure of PVDF.

Carbon/fluorine and carbon/hydrogen linkages are found in alternate positions throughout the PVDF structure (Figure 2). As a result of this structure and the strong bond between carbon and fluorine atoms (116 kcal/mol), coatings that are resistant to environmental deterioration (such as oxidation, photochemical deterioration, fading, chalking, cracking, and airborne pollutants) can be produced. However, PVDF's chemical inertness poses difficulties for those who formulate paint because it inhibits substrate adherence and makes dispersing pigments challenging. To face this problem PVDF resins are typically modified with an acrylic resin. To increase coating adhesion and facilitate pigment dispersion, an acrylic modifier is usually physically combined with PVDF resin through physical blending and the most common ratio used is 70:30 wt% (PVDF:Acrylic).[8]

2. Another research in Florida outdoor exposure infrastructure has shown that PVDF resin has outstanding exterior durability, exceptional resistance to heat, UV, chemicals and weather, good adhesion, good moisture and fungus resistance.[9,10]

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3. Similar to other fluoropolymers, fluoroethylene vinyl ether resins (FEVE) have outstanding chemical properties and UV resistance, which is high dependable to the number of fluorine atoms present in the repeat unit.

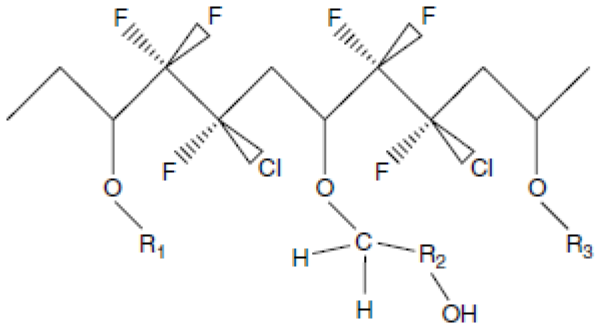

Figure 3: Chemical structure of FEVE.

Architectural coatings are the primary use for FEVE resins. Excellent gloss and color retention are provided by the integration of these resins. Additionally, FEVE resins have been credited for enhancing corrosion and weathering resistance, particularly in marine environments where coatings are subjected to both high UV radiation and significant concentrations of corrosives.[8]

4. PVDF and FEVE polymers are generally considered safe for many applications. They have high molecular weight (MW), negligible oligomer content and few organic and inorganic leachables. In terms of human health, it should be noted that PVDF is generally regarded as non-toxic and biocompatible. Hence, it has been used in medical applications such as implants, prosthetics, and drug delivery systems.

5. In challenging market applications, such as strong UV or corrosive (marine/industrial) conditions, there are no substitute products that can match the performance of these fluoropolymers.

In the event that ECHA decides to keep fluoropolymers under the proposed restriction, Elval Colour is requesting a 12-year (plus 18 months) derogation to coil coating fluoropolymer application. In addition, every five years, this derogation should be reviewed to determine if the market has been able to generate new polymer systems that are comparable to the technical properties of the fluoropolymer products currently available on the market.

5. Polymers of Low Concern criteria: the case of PVDF and FEVE

FPs are regarded as persistent compounds, as was previously noted, but this does not automatically suggest that they pose a risk now or in the future. Due to their lack of toxicity (being biologically inert) and mobility (not being soluble in water), FPs do not pose a threat to the ecosystem, while being persistent. In addition, some FPs (such as PTFE, PVDF, FEVE), which account for the majority of volume in terms of production and use, meet the requirements specified by the OECD to be classified as PLC (Polymers of Low Concern). These FPs do not cause systemic toxicity and are not responsible for local toxicity effects.

Elval Colour acknowledges the concerns behind the REACH restriction. It is well known that the use of some specific PFAS as polymerization catalysts is directly related to the production of some FP products. During the production, polymerization, usage, and end-of-life handling of FP products, residuals of these polymerization catalysts and solvents, as well as certain monomers, oligomers, and other by-products created during the polymerization process, may be released. Residuals from the polymerization reaction process are a concern for human health because they are not bound to the FP products (i.e., they can be leached from these FP products), and depending on their structure, they can become bioavailable (i.e., they can cross cell membranes). The PLC requirements are, however, easily met by the market's top-selling FP products (PTFE, ETFE, FEP, PFA, PVDF, FEVE and VDF-co-HFP).

The PLC criteria[11,12] among other things, place restrictions on the quantity of oligomers with MW 1,000 Da and low MW leachables. These FPs, according to scientific studies,[3,4,13] meet both of these requirements. In the majority of cases, the presence of oligomers is not significant, and in the case of PTFE, the concentration of low MW leachables is less than 1 ppm and in PVDF/FEVE cases, it is below quantification limits. This is because some FP manufacturers utilize post-polymerization procedures (washing, heating, etc.) that enable the removal of residues from the final commercial FP products. Workers engaged in post-manufacturing procedures are therefore not anticipated to have any relevant exposure.

Recent thorough studies [4,13] established the application of PLC regulatory criteria to FPs. In these studies, a large number of fluoropolymers, including fluoroplastics and fluoroelastomers, were examined along with their composition, applications, performance characteristics, and functionalities. A series of data were presented to show that these materials meet the generally accepted criteria for polymer hazard assessments, making them polymers of low concern. The PLC criteria and their application on PVDF and FEVE polymers are presented in Table 1.

Table 1: PLC criteria in PVDF and FEVE polymers.

PLC assessment criterion	PVDF	FEVE
Polymer composition (must have C, H, Si, S, F, Cl, Br, or I covalently bound to carbon)	YES	YES

Molecular weight (Mn) (Mn >1000 Da and oligomer content <1%)	70000-300000	7000-46000
Molecular weight distribution Mw ÷ number average Mn	2-3	2-4
Wt% oligomer (<5% for <1000 Da oligomers, <2% for <500 Da oligomers)	Negligible	Mn <1000 range of <3.5% and Mn <500 is <0.7%
Ionic character	Neutral	Neutral
Reactive functional groups (RFGs) and functional group equivalent weight (FGEW)	None and N/A	None and N/A
Low molecular weight leachables	No active leachables by USP class VI (121 °C)	Negligible; crosslinked as final product
Residual monomers	<50 ppb	0.12% – 1.43% nonfluorinated
Ratio of residual monomers to molecular weight (typical value)	$\sim 10^{-12} - \sim 10^{-13}$	$10^{-7} - 10^{-8}$
Structural similarities to RFG of concern	None	None
Physical–chemical properties		
Water solubility and octanol/ water partition coefficient, K_{ow}	Insoluble/practically insoluble and N/A	Insoluble/practically insoluble and N/A
Particle size (median mass aerodynamic diameter, MMAD, should be >5 µm)	Powders: 5–300 µm pellets: 2–4mm	Solution or flake 150 nm for emulsion
Stability		
Hydrolysis, light (hv), Oxidation, biodegradation (aerobic and anaerobic)	Stable	Stable
Thermal stability at normal foreseeable use maximum continuous temp. (°C)	150 °C	220 °C
Meets PLC criteria (Yes or No)	YES	YES
Fluorinated polymerization aid (PA) used? (Yes or No)	NO	NO
Recommended processing/ application (use) temperature (T°C)	Processing: 200 °C – 250 °C Use max temp: 150 °C	180 °C – 200 °C

These findings were further supported by seven businesses (AGC Chemicals Americas, Arkema, The Chemours Company, Daikin Industries, Gujarat Fluorochemicals Limited, Solvay Specialty Polymers, and 3M Company), which account for almost 96% of the global commercial fluoropolymer market and agreed to participate in the study. It should be noted that these companies are members of the US-based Performance Fluoropolymer Partnership (PFP) and/or EU-based Fluoropolymer Product Group (FPG).

6. The European Coil Coating Market

Due to factors such as rising urbanization, improved infrastructure, and increased demand for coated metals in the construction and automotive industries, the market for coil coatings has been increasing steadily over the past years. The demand for durable, weatherproof, and aesthetically appealing coil coatings is another factor driving the market. Coil coatings provide increased durability and protection to metal surfaces utilized in the construction sector. They offer a barrier that protects metal roofing, wall cladding, composite panels, and other architectural elements from harsh weather, corrosion, and ultraviolet rays. Coil coatings enable these materials to last longer. As a result, maintenance and replacement costs decrease significantly.

European Coil Coating market is estimated to grow to US$2.357 billion in 2023 from US$1.63 billion in 2017, growing at a compound annual growth rate (CAGR) of 6.27% over the forecast period. [14]

Another important factor that the building industry is placing more and more emphasis on, is sustainable development and energy-saving solutions. These goals are enhanced by coil coatings, which increase a building's capacity for efficient energy consumption. For instance, reflecting and cool roof coatings decrease heat absorption, use less energy to cool a structure, and increase its overall energy efficiency.

Towards these goals and due to PVDF and FEVE extraordinary characteristics, annually 3.500 tons of PVDF and FEVE paints are consumed by European Coil Coating Industry. Although this amount account for only ~5% of the total coil coating market, in some applications (as will be discussed in the following section), there are no suitable alternative candidates to be used.

7. The Performance of PVDF, FEVE and their Alternatives in Architectural paints

The most stringent UV (R_{UV5}) and corrosion resistance (RC5) requirements are met by prepainted metals coated with either PVDF or FEVE, according to EN 10169 and EN 1396, the European standards that specify product performance for the coil coating industry.

There are no other prepainted products that have been demonstrated to be technically equal to PVDF and FEVE coil coated metals in challenging building applications, such as high UV and/or corrosive (marine/industrial) conditions, wind, precipitation, dirt and chemicals. This coating technology also provides long-term gloss and color retention for 30 years or more. Because of their long life, PVDF and FEVE-based coating systems reduce lifecycle coating costs, improve asset utilization and eliminate the need for multiple painting cycles.[15,16]

Alternative resins in paints that are under investigation to confer the durability and other required performance characteristics include acrylic, a popular choice which is a water-based latex paint, Polystyrene (PS) - based formulations, Polyurethane (PU), alkyds, phenolic or silicone alkyds, phenolic, vinyl and polyester/high durable polyester and epoxy coatings.[17]

FP paints are UV resistant, which means that little UV radiation degrades them, and they can withstand extreme UV conditions, such as those seen in settings with intense sunlight. This deterioration is frequently associated with "chalking," in which the paint develops a chalky surface, necessitating repainting. Degradation can also be considered as a matter of gloss retention, where the paint's capacity to maintain a glossy appearance is evaluated. Additionally, FP coatings are reported to be corrosion-resistant, making them capable of withstanding extreme weather conditions, such as those found on bridges near oceans.[18]

A variety of weatherability tests can be conducted using i.e. a QUV test which reproduces sunlight, heat and moisture through fluorescent UV lamps and using condensing humidity and/or water spray. The two QUV tests, QUV-A and QUV-B, use UV-A lamps or UV-B lamps, respectively. A similar approach is used in Xenon arc testing, which uses xenon arc light sources, humidifiers, and heaters to simulate the effects of weathering. Since results from a single exposure in a place cannot be used to estimate the material's overall durability, it is well known that the weatherability of materials might vary depending on the location and weather conditions. However, if performed repeatedly in numerous locations with various climatic conditions or when combined with other tests, it can offer a base for durability. Finally, the EMMAQUA accelerated weathering test uses reflective mirrors and daylight to function. Ten reflective mirrors are used in this test to direct sunlight onto the target specimen, which is calculated to provide an intensity equivalent to eight suns. Because of its ability to mimic sunlight's spectrum, it has been reported to accurately simulate UV deterioration in subtropical and harsh desert regions.[18]

In the following diagrams a comparative performance of different coating systems is presented. A variety of weatherability tests have been conducted on FEVE paints (i.e. Lumiflon). In these tests FEVE was compared to non-fluorinated alternatives and with other PFAS coatings.

At first point a QUV-A test was conducted. The gloss retention in percentage was measured against the hours of QUV-A exposure for FEVE urethane (a Lumiflon material), polysiloxane and acrylic urethane. FEVE urethane performed the best, retaining ~ 80 % gloss after 13000 hours. Polysiloxane performed the second best, retaining around 55 % after around 8500 hours, whereas acrylic urethane was at around 20 % gloss retention after 6000 hours (Figure 4-up).

An EMMAQUA weathering test was also conducted. Here the gloss retention in percentage was measured against radiant energy (MJ/m^2) for FEVE urethane, PVDF and polyurethane. In this test the gloss retention of PU seemed to decline rapidly after 800 MJ/m^2 from 80 % to 22 %. Whereas both FPs at this point still had around 90-100 % gloss retention. At 2800 MJ/m^2 both FPs were around 80 % gloss retention whereas polyurethane at this point had declined below 20 %. This weathering test therefore points to a much higher degradation of non-PFAS paints by UV light (Figure 4-down).

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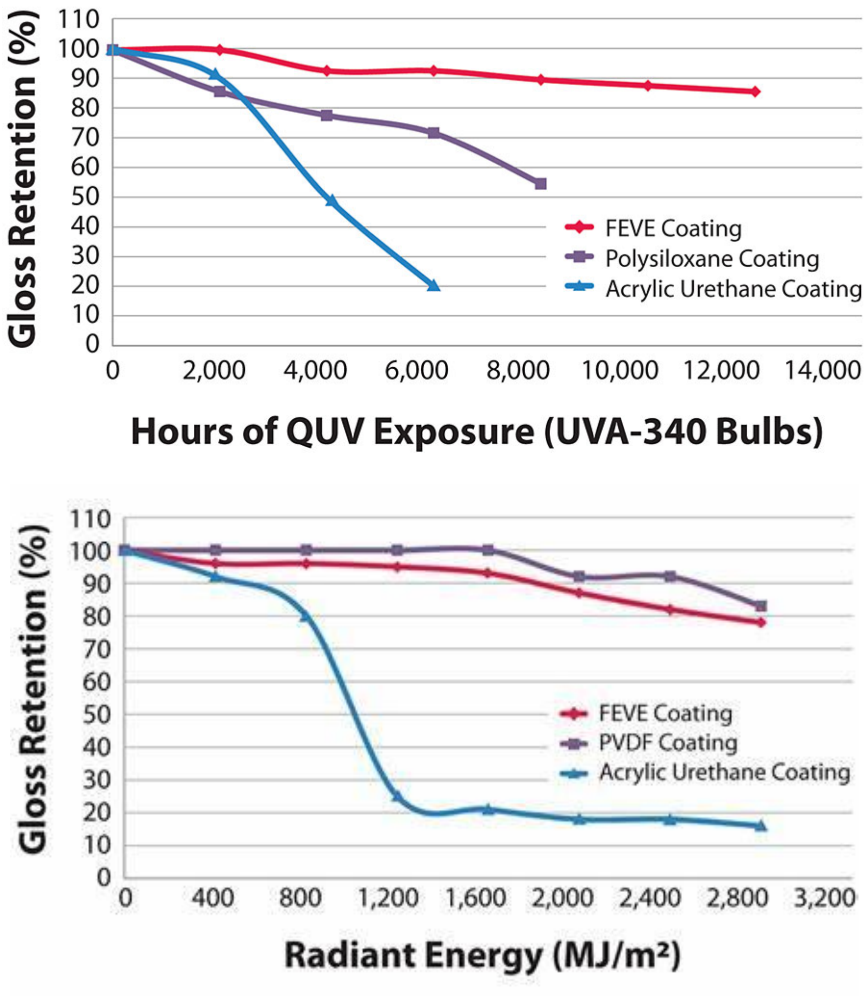


Figure 4: QUV-A weathering-up and EMMAQUA testing-down (adopted from reference[19]).

In another case study, a QUV-B test was carried out. The absorbance was measured against the wavelength (nm) of QUV-B exposure for PVDF, epoxy, polyester, polyurethane and acrylic coatings. Figure 5 shows the extent to which UV energy breaks down common coating binders, reducing their mechanical protection properties. Note that PVDF resin has very minimal absorption of UV energy, making it ideal for coating applications needing strong UV resistance.

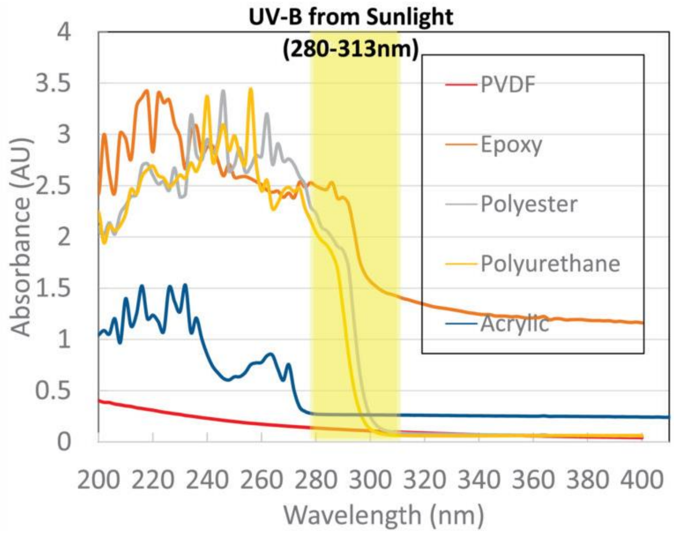
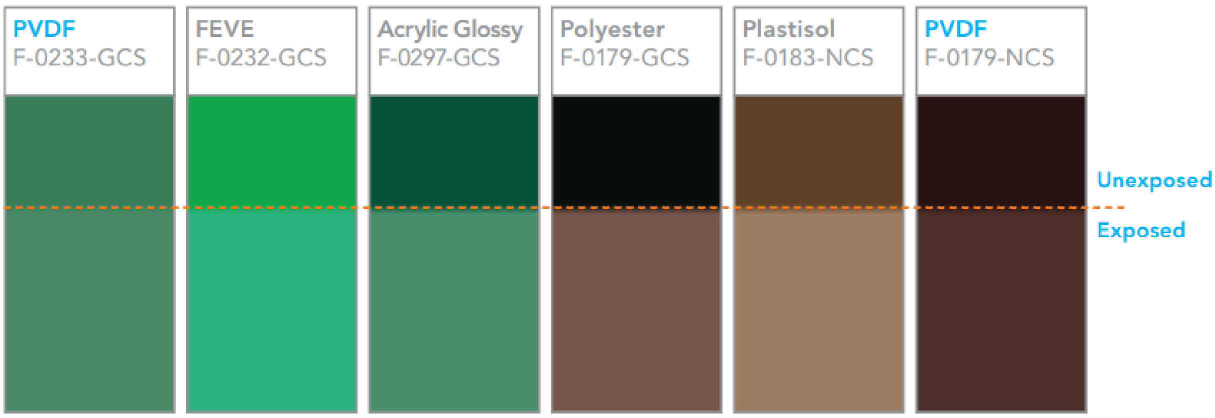


Figure 5: QUV-B weathering (adopted from reference[20]).

Another strong case study was done by Solvay, where a series of different coatings were compared concerning their colour change performance and gloss retention in 10 years exposure time in South Florida at 45° at an independent test-fence facility. By comparing the difference in the upper, covered portion of each panel to the exposed section beneath, it is easy to see the superior weatherability of PVDF-based coatings over other resin systems. Moreover, the results presented in Figure 6 further support this statement.



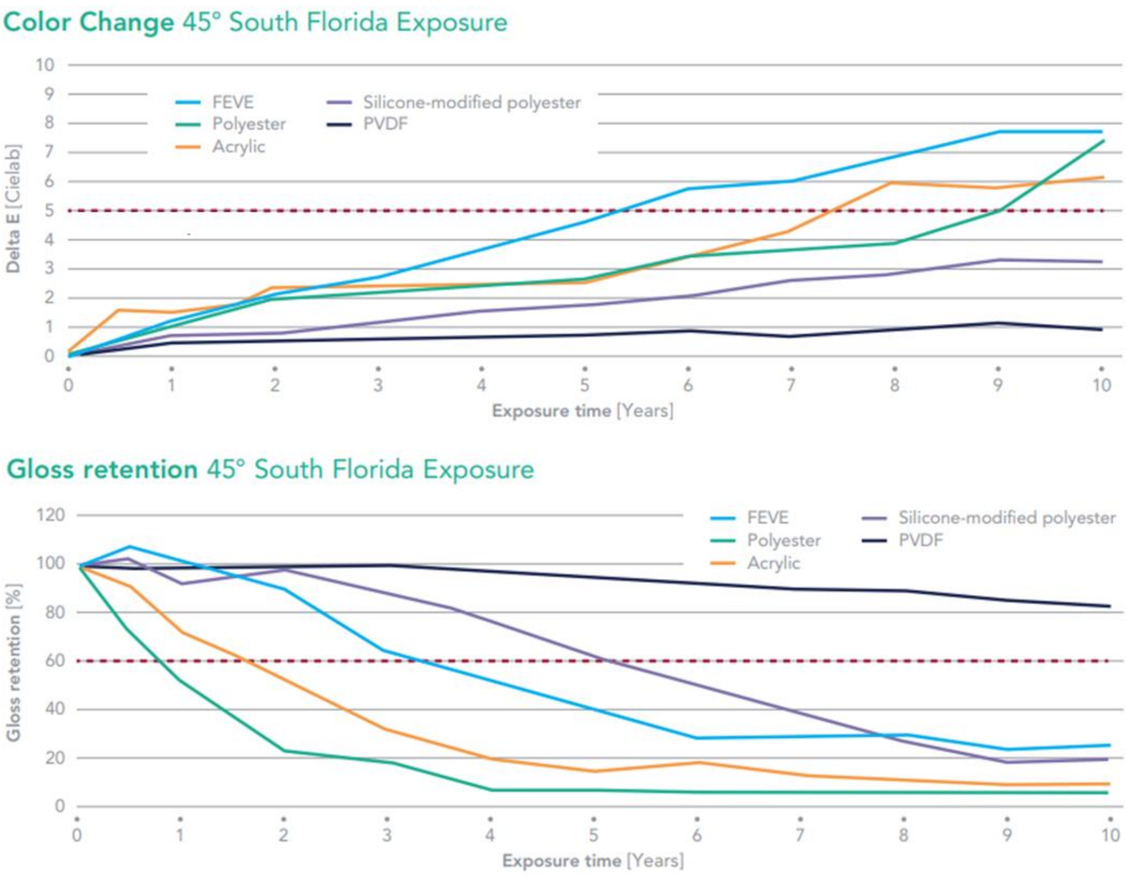


Figure 6: Colour change performance and gloss retention of different painting systems in 10 years exposure time in South Florida (adopted from reference[21]).

Last but not least, a comparative evaluation of the UV and Corrosion resistance of coated aluminium sheets with PVDF 2, 3 & 4 layers versus VHDPE 2 layers. The evaluation was performed by CCFAT (Commission chargée de formuler des Avis Techniques et Documents Techniques d'Application) on behalf of Elval Colour in 2018 and the results are presented in Table 2. The obtained results, based on the available number of tested samples indicated that although PVDF and VHDPE appear to be similar in terms of corrosion resistance, PVDF outperforms VHDPE in terms of UV resistance.

Table 2: Choice of coatings according to the different conditions.

Type of coating	Index of corrosion resistance (According to EN 1396)	Index of UV resistance (According to EN 1396)	Rural/Not polluted	City and Industrial Conditions		Marine Conditions					Special Conditions	
			'	Normal	Severe	20 - 10 km	10 - 3 km	Near sea ≤ 3 km	Sea Front ≤ 1 km	Mixed	High UV rays	Extreme
PVDF-2	3	R_{UV4}	•	•	•	•	•	•	○	○	•	○
PVDF-3	3	R_{UV4}	•	•	•	•	•	•	○	○	•	○
PVDF-4	3	R_{UV4}	•	•	•	•	•	•	○	○	○	○
VHDPE	3	R_{UV3}	•	•	•	•	•	•	○	○	•	○

- • Suitable coating
- ○ Coating whose final choice as well as the characteristics must be decided after consultation with the manufacturer's agreement.

From the above it is clearly evident that the weatherability and durability of PVDF and FEVE-based resins is better than their alternatives, meaning they are likely to perform better in these respects for example in external architectural applications.

8. Comparison of the Costs of Alternatives

Performance requirements have traditionally been the basis for choosing extended-life coatings for each specific project. A fluoropolymer-based topcoat might be required for a colossal building in a big city, like a skyscraper, in order to guarantee decades-long gloss and color retention. Sameway, for long-term barrier corrosion prevention, a major steel bridge might need a fluoropolymer coating.[15,16,21]

Naturally, high performance coating materials like FP-based coatings are usually more expensive compared to non-PFAS alternatives like PE. However, there are other costs that must be taken into account when planning large-scale projects. In the long run, premium coatings often cost much less. Since FP-based coatings function better in the weather than non-PFAS alternatives, using these alternatives necessitates more regular recoating, which adds to labor costs. They also aid the environment because durable coatings that last for many years are by nature sustainable. The case examples that follow demonstrate this.

Figure 7: Al Dar headquarters, Abu Dhabi, UAE. The Al Dar headquarters building in Abu Dhabi is a 23-story structure designed by MZ Architects. It features aluminum panels coil-coated with an FEVE-based liquid coating. The steel curtain wall is also protected with an FEVE-based powder coating. The project was completed in 2010.

Figure 8: The Pavilion basketball arena at Ole Miss, Mississippi. The facility was designed by AECOM Technology. Chosen from an extensive list of colors, Sherwin-Williams' Fluropon 70 percent PVDF coating in Terra Cotta is a premium, high performance product that offers some of the most advanced durability and aesthetic features. The project was completed in 2016.

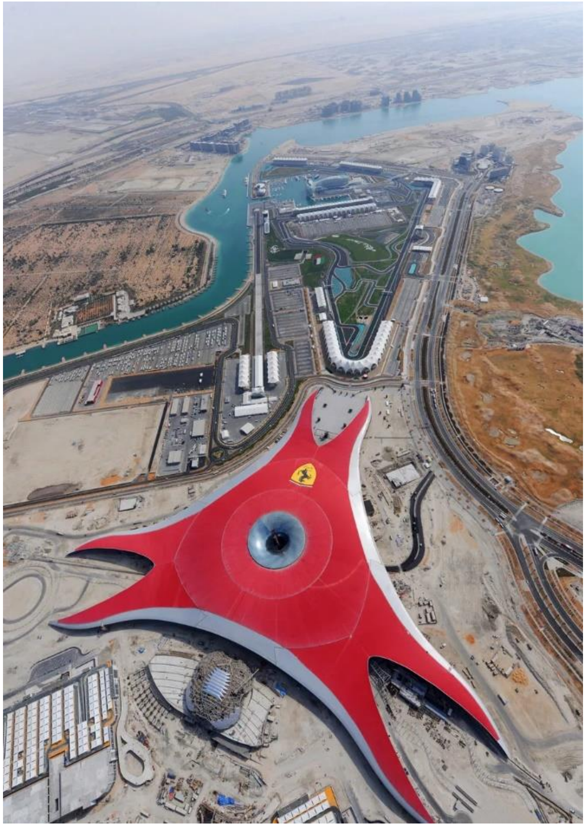


Figure 9: Ferrari World, Abu Dhabi. Developed by Aldar Properties and constructed by BESIX Group. For this extremely harsh environment (very high UV rays, located on Yas Island in Abu Dhabi) a PVDF and FEVE coating system was chosen to construct the Al roof. The project was completed in 2008.

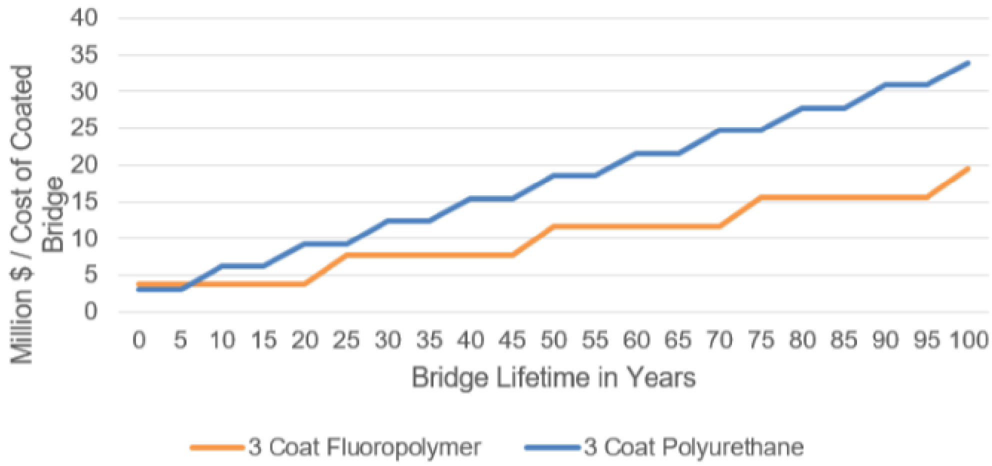


Figure 10: The cost of painting a bridge over time with PFAS and Non-PFAS paints. The study was conducted by University of Wisconsin- Milwaukee, 2013. The data was based on an estimate of a bridge span of 2000 ft and a total of 650000 square feet to be painted. The conclusion was that per coating it would cost aprox. 26% more with the FP-based coating compared to polyurethane. However, after 30 years it was concluded that the total cost for the polyurethane coating would cost 16% more than the FP-based coating, owing to the faster degradation of the non-PFAS coating and therefore a need for more frequent recoating, with associated labour and material costs. [18]

While addressing changing customer expectations is the coil coating industry's top priority, all parties in the value chain has a role to play in promoting a future that is more sustainable. To support customer objectives for green building, the paint and coatings sector should always look for strategies to use resources more effectively and create value-added sustainable solutions. Customers, suppliers, and communities may all benefit from the coil coatings industry's vital contribution to a more sustainable future.

9. Life Cycle Analysis (LCA) of painted coils

In order to increase awareness of aluminium's exceptional recycling capabilities and the size of its scrap potential in the building industry, European Aluminium assigned the Delft University of Technology to undertake research on the removal of aluminium from buildings in Europe in 2004. The study found exceptionally high aluminium collection rates, which infers implicitly high recycling rates as well. The average collection rate of the nine buildings under study was greater than 95%, highlighting the importance of aluminium in a circular built environment.[22]

Recently, a new series of case studies have been released by European Aluminium to look into the current collection rate for building items made of aluminium in Europe. The first two case studies, which were conducted in Germany (98.3%) and The Netherlands (99.3%), support the high collection rates first noted in the 2004 study. To determine the current average collection rate for end-of-life aluminium building products, additional case studies will be done.[23]

Aluminium can be melted down and reformed endlessly without losing any of its quality. The life cycle of aluminium includes a number of steps, from the extraction of bauxite (the ore from which aluminum metal is obtained) to the initial fabrication of rolled or cast products through the usage phase to recycling and re-melting.

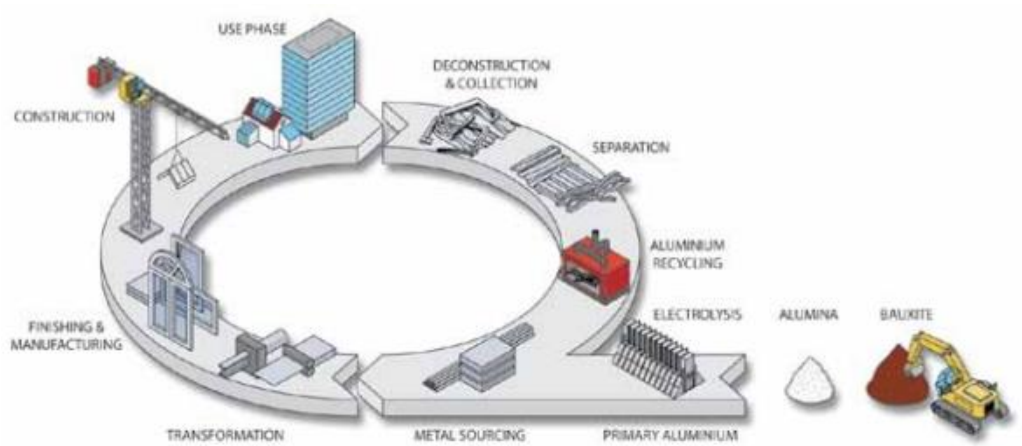


Figure 10: The infinite Aluminium cycle (adopted from reference[24]).

Aluminium recycling conserves raw materials, lowers energy use, minimizes environmental pollution, and prevents the need for landfills to store waste. Because of its success, 75% of the aluminium that was produced to date is still in use. The material is gathered from its end-use applications, such as building and transportation, and processed through recycling facilities. Pre-painted aluminium is a significant component of this recycling business. With little or minimal preparation operations, an increasing number of remelters may now process coated and polymer-containing scrap. They use a two-chamber furnace. Aluminum coatings and other finishes are burned off in the first chamber at 1000 ^oC, while gas emissions are captured by effective fume capturing machinery. Under these conditions, the FPs are mineralized into fluoride ion and carbon. Then the fluoride ions are trapped within other solid waste products, i.e. slag in the process and not released directly to the environment.

The question of whether FP are totally burned without producing short-chain or long-chain PFAS was examined as part of a project by the Karlsruhe Institute of Technology (KIT) and the Société Générale de Surveillance (SGS). The study results presented below have been submitted to ECHA and according to the preliminary report that was released in June 2023:

A. Inorganic fluorides and carbon dioxide are produced during the conversion of fluoropolymers. Hydrogen fluoride was among the inorganic fluorides found. The vast majority of samples showed that long-chain PFAS were below limits of 1 ng/m^3. Following incineration, there were no short chain PFAS found. With a reporting limit of 14 g/m^3, TFA was not traceable in any of the samples. The findings demonstrate that fluoropolymers do not emit any detectable levels of PFAS during end-of-life incineration in representative European municipal incinerators, and as a result, pose no threat to human health or the environment.
B. The study offers compelling evidence that burning a mixture of fluoropolymers under typical municipal waste combustion conditions results in full mineralization of the C-F bonds, negligible emissions of long-chain PFAS, negligible emissions of TFA, and negligible emissions of light fluorocarbons like CF_4 or C_2F_6.
C. Fluoropolymers were included in the EU PFAS restriction proposal primarily due of their persistence (i.e., resistance to environmental degradation). The complete mineralization of fluoropolymers is confirmed by the absence of organic fluorides and, more specifically, PFAS, in tests that mimic municipal waste incineration. This important piece of evidence supports the case for exempting fluoropolymers from the EU REACH PFAS restriction proposal.

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Last but not least, in 2019 ECCA produced an in-depth life cycle assessment of the various coating systems that are used in the coil coating industry. The results indicated that PVDF-coating has the lowest environmental impact of all the coatings studied according to the following diagram:

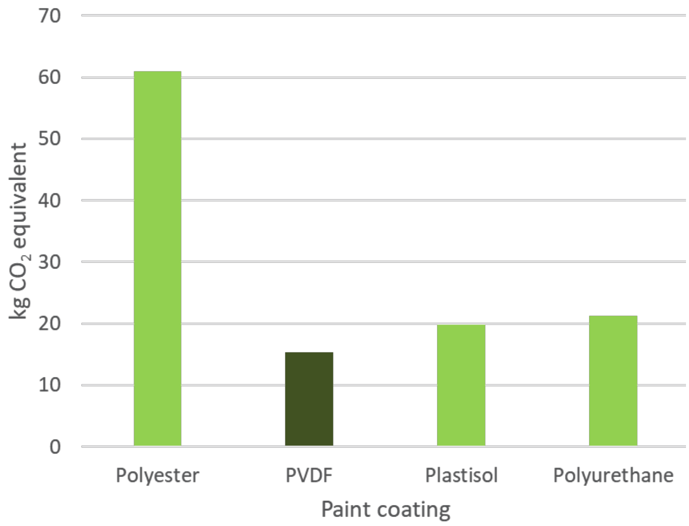

Figure 11: Climate change impact of cladding panel applied to a building that lasts for 50 years (adopted from reference[25]).

The product's coating's longevity, which eliminates the need for re-painting, is the primary factor in this decreased environmental impact. By not having to repaint, the environmental problems based on using wet paint on-site are eliminated. Moreover, to match market expectations, if a polyester coated metal was used, two sets of it would be required, each with a service life of 15 years, in contrast to PVDF, which has a minimum of 30-year lifespan.

10. Conclusions

It is expected that a significant amount of PFAS-containing waste would be produced from what used to be sales stock in all businesses if all PFAS-containing items were to be forbidden from the market after 18 months of the restriction taking effect. The production of substitute components, however, necessitates the development of new resources and industrial capabilities. It is unclear that banning all PFAS-containing items would be in line with policy in the EU, which is attempting to improve resource efficiency under the Green Deal initiative.

The restriction should, at the very least, be applied to only highly dangerous PFAS and items where high exposure is anticipated. Aside from being incompatible with the goal of the eco-design legislation, disposing of all the accumulated sales stock would put a tremendous financial strain on many sectors and have a considerable negative impact on society.

In light of the above, Elval Colour request that fluoropolymers should be excluded from the proposed risk management option because they are not bio accumulative, not mobile, not toxic, and, therefore, do not pose a risk to the environment or human health. PVDF and FEVE coating systems have the least negative impact on the environment compared to all the systems currently used by the sector. Additionally, restricting from the market innovative items that may be applied to a variety of building designs in harsh conditions, will lead to materials like concrete which are less recyclable.

Elval Colour offers the following options for the suggested restriction:

- ✓ If ECHA decides to leave fluoropolymers in the proposed restriction, a 12-year derogation is needed for these fluoropolymer applications. This derogation should be reviewed every five years from inception to determine if industry has been able to develop new PFAS-free systems that meet the technical performance of current fluoropolymer products.
- ✓ Only hazardous subgroups of PFAS and high-risk uses must be eliminated, rather than restricting all PFAS as a single group.

We as Elval Color strongly encourage the adoption of appropriate chemical restrictions in order to achieve the EU's goal of protecting human health and the environment in the EU region through its Green Deal strategy.

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