1: Sectors and (sub-)uses

Sector: Metal plating and manufacture of metal products

Sub-use: Hard chrome plating

7: Potential derogations marked for reconsideration

The use of PFAS as fume suppressant is marked for reconsideration after the consultation. With this comment we would like to strengthen the justification for the derogation as we consider that there is not a technically and economically feasible alternative to the use of PFAS as fume suppressant in hard chrome plating.

It is crucial to note that PFAS are used in very limited quantity, nonetheless they are essential for the protection of both workers' health and the environment. The following data provide further support for our argument:

a) Annual Tonnage and Emissions of PFAS

In consideration of the PFAS draft regulation for its use as a fume suppressant in hard chrome plating, we offer the following estimates based on available data:

1. **Annual Tonnage of PFAS use**: The annual usage in Europe of PFASs substance is estimated between 6 and 9 metric tons. This figure represents the total quantity of PFAS utilized across all European companies engaged in hard chrome plating. This estimation is calculated as following:
    a. The specific usage of PFAS substance on unit of chromium trioxide consumed (used tons of PFAS on used tons of chromium trioxide), has been derived from the real world usage data from hard chrome facilities. The specific usage of PFAS ranges between 0,0010 and 0,0015 tons/tons of used chromium trioxide.
    b. The European annual usage of PFAS has been calculated multiplying the specific usage of PFAS by the estimated annual usage of chromium trioxide as estimated for Europe by the CTACSub authorization documents of hard chrome use (6.000 tons per year). Even though this data originates from a 2015 document, due to the market remaining relatively unchanged, the estimated annual usage of chromium trioxide, which is about 6.000 tons per year, is still considered valid as of 2023.
2. **Emissions of PFAS** are categorized as follows:
    a. Water Emissions: The quantity of water emissions varies depending on whether the company employs a closed-loop water system or not.
    For companies not using a closed-loop water system, PFAS emissions typically occur as a byproduct of the plating process, where the drag-out from the plating tank flows into the rinsing tank, and then through the company's wastewater physio-chemical treatment plant. Here, if activated carbon is used, some of the PFAS will be adsorbed by the carbon and will eventually be treated externally as waste. If no activated carbon is used, PFAS will be discharged into the sewage system.
    Usually, due to the specifics of the process, most of hard chromium plating shops adopts a closed-loop water system with no waste water emissions.
    b. Waste Emissions: Waste emissions also differ based on the water system employed by the company. Here are the main types of waste emissions:
        i. Exhausted Concentrated Rinsing Water: Following the plating process, parts that have been coated with a chrome plating electrolyte containing PFAS are rinsed in a non-

renewing water bath. Once this rinsing bath reaches its capacity and becomes exhausted, it is handled as waste and sent to external waste treatment facilities. This solution is usually concentrated before disposing to reduce its volume and minimize waste.

ii. Eluate from Deionized Water Resins regeneration: In companies using a closed-loop water system, the rinsing water containing PFAS is treated by DI resin, typically preceded by an activated carbon treatment. This is because the presence of organic pollutants can compromise the efficiency and regenerability of ion exchange resins, hence the use of activated carbon. If activated carbon is not used, PFAS is captured by the DI resin. The spent DI resin may be treated within the plant or externally. However, the eluate containing the PFAS will become waste and treated externally.

iii. Carbon used for Absorption: When activated carbon is used (in either type of water system), it will absorb PFAS. **This spent carbon is usually disposed of as waste and generally incinerated, a process that destroys the PFAS, thereby helping to reduce the environmental impact.**

iv. Spent Bath: These wastes, which contain PFAS, result from the disposal of spent hard chrome plating baths. The frequency of the disposal, that may be total or partial, of the bath is very low, usually ranging from 3 to 10 years. The disposal depends on the accumulation of pollutants of the plating bath during the plating operation. The spent baths are disposed to authorized waste treatment facilities.

b) Key Functionalities Provided by PFAS:

PFAS plays an essential role as a fume suppressant in hard chrome plating primarily due to its ability to reduce surface tension. This characteristic significantly curtails aerosol emissions during the plating process, enhancing both worker safety and environmental protection.

PFAS based fume suppressants have been used in hard chromium plating for more than twenty years and the management of this kind of suppressants is easy and well established.

A critical aspect to highlight is that PFAS surfactants are the only known surfactants capable of withstanding oxidation by chromic acid, a common constituent in hard chrome plating solutions. This unique resistance allows PFAS to maintain its effectiveness over time, unlike other surfactants which would degrade in such conditions.

The use of other surfactants that degrade under such conditions could pose unacceptable risks to workers as they could fail to adequately suppress fumes, leading to potential health hazards due to increased aerosol exposure. Therefore, PFAS surfactants provide a reliable, long-lasting solution for aerosol suppression in hard chrome plating processes. This unique characteristic, is the primary reason for its widespread use within the industry.

c) Number of Companies Affected:

Current data indicates that at least 650 European companies involved in hard chrome plating, which utilize chromium trioxide and likely PFAS-based fume suppressants, could face potential operational disruptions due to any future limitations on PFAS use. This data is primarily derived from companies that have either notified their use of chromium trioxide for hard chrome plating or obtained their own authorization for the same.

d) Availability, Technical and Economic Feasibility, Hazards, and Risks of Alternatives:

Currently, alternatives to PFAS as a fume suppressant in hard chrome plating are extremely limited in the market. There is only one known supplier who has developed a potential alternative using non-fluorinated surfactants.

However, while this alternative does exist and is utilized to some extent, it has not been extensively tested and it’s still in the early stages of adoption.

This potential alternative also presents technical challenges and potential risks. Accurate and constant monitoring is required for effective use, which may not be feasible for all companies given their resources, expertise, or the scale of their operations. Moreover, it has been reported that maintaining adequate worker protection is challenging due to the complicated operation of control and replenishment necessary for this alternative.

Given the current state of development and the challenges presented by the sole potential alternative, it's anticipated that there could be significant shortages in the supply of effective alternatives if a restriction on PFAS use were to be implemented in the short term. Further research and development are needed before a technically and economically feasible alternative with comparable efficacy to PFAS could be widely available and adopted.

e) Status of R&D Processes for Finding Suitable Alternatives:

Most of the companies operating within the European hard chrome plating industry are SME enterprises, meaning their resources to explore and develop alternative substances to PFAS are significantly limited.

Currently, our understanding regarding the progress of R&D activities in the sector to identify viable alternatives to PFAS in hard chrome plating is quite restricted. The scale of these R&D initiatives, in terms of duration and financial commitments, remains unclear. Similarly, projected timelines for introducing substitutes, inclusive of acquiring any requisite certifications or regulatory approvals, have yet to be defined.

In conclusion, it's evident that a substantial amount of work is still required in the exploration and incorporation of PFAS alternatives within the hard chrome plating industry.

f and g) Substitution technically and economically feasible

The following sections, namely (f) and (g), are designed to address two distinct scenarios relating to the potential substitution of PFAS in hard chrome plating. Scenario (f) explores cases where substitution is technically and economically feasible, but more time is needed for the transition. In contrast, scenario (g) considers cases where substitution is not technically or economically feasible.

It is important to note, however, that at present, while there is an existing alternative to PFAS, it is not extensively adopted and its feasibility is not yet conclusively proven, as stated before. Furthermore, it remains uncertain whether other alternatives will emerge in the near future. The complex nature of this situation necessitates a comprehensive approach to addressing the matter, which is why both scenarios are detailed below.

f) For cases in which substitution is technically and economically feasible but more time is required to substitute:

f1) Type and Magnitude of Costs Associated with Substitution:

Providing an accurate estimation of the costs associated with replacing PFAS with the currently available alternatives is complex at the moment, especially considering that there is only one known supplier of this alternative. This monopolistic scenario could create potential price and supply chain risks. It's only after the alternative has been completely developed, commercialized, and competition introduced in the market, that we'll be able to make a more precise assessment of the initial implementation costs, ongoing operating costs, and market dynamics.

f2) Time Required for Completing the Substitution Process:

Our best estimate for the total time required to replace PFAS, which includes all necessary testing, implementation, validation, and obtaining necessary regulatory approvals, ranges from 4 to 10 years. It is important to note, however, that this is an estimate and the actual timeline could vary significantly depending on various factors including market conditions, the progress of research and development efforts, and regulatory processes. Moreover, it is crucial to acknowledge the inherent uncertainty in this process, as there is always a possibility that a technically and economically viable alternative may not be found.

f3) Possible Differences in Functionality and Consequences for Downstream Users and Consumers:

A paramount concern regarding the potential replacement of PFAS is its impact on worker safety and environmental protection. PFAS plays a crucial role in suppressing aerosols of chromic acid, which significantly reduces exposure risks for workers and also limits emissions into the environment. Any alternative that is less effective at suppressing aerosols could potentially increase workplace health hazards and environmental risks. Therefore, the presence of PFAS not only serves as a safety measure for the workers but also acts as a critical control to minimize environmental contamination.

This highlights the importance of comprehensive testing and validation of any proposed alternatives to ensure they can provide the same level of worker protection and environmental safety. Furthermore, it's crucial to note that if an alternative doesn't offer an equivalent level of safety, or introduces different exposure scenarios, it will invalidate the current authorization for the use of chromium trioxide under the REACH regulation. Such a development could necessitate the suspension of plating production, leading to significant implications for the sector.

Moreover, implementing a closed system with Local Exhaust Ventilation (LEV) using no fume suppressant is not a viable alternative either. Although this approach might seem to address worker safety concerns, it will lead to increased emissions to environment, posing higher risks to the air and the overall environment. Hence, any substitution must consider both human safety and environmental impact to ensure sustainable operations.

f4) Benefits for Alternative Providers:

At this point, the potential benefits for providers of PFAS alternatives are uncertain and may depend on various factors such as market demand, pricing, and regulatory developments. Furthermore, the fact that there is only one known alternative supplier creates a challenge to the alternative providers market, since the existence of a monopoly offers no competitive advantage. More study and market analysis are required to gain a comprehensive understanding of this aspect.

g) For cases in which substitution is not technically or economically feasible, information on what the socio-economic impacts would be for companies, consumers, and other affected actors:

g1) Impact on Companies:

If substitution of PFAS is not technically or economically feasible, the potential socio-economic impacts on companies within the hard chrome plating sector would be considerable. The use of chromium trioxide, a key element in this sector, is subject to authorization under the REACH regulation. This authorization depends on an assessment of the chemical risks associated with its use, which is significantly minimized by PFAS fume suppressants. The inability to find a viable alternative to PFAS will increase the risk to workers, will invalidating the authorization. In such a scenario, companies may be forced to cease operations, leading to severe socio-economic implications, including job losses and impacts on related industries.

g2) Impact on Consumers and Other Affected Actors:

The ramifications would be equally significant for consumers and other stakeholders. Hard chrome plating is a crucial surface treatment for a wide range of applications, which currently lack viable alternatives. If operations were to cease due to a lack of a feasible PFAS substitute, it could considerably impact European industry and consumers, potentially leading to a decrease in product availability and an increase in costs.

g3) Annual Value of EU Sales, Profits of the Relevant Sector, and Employment Numbers:
The inability to find a viable alternative to PFAS as a fume suppressant, leading to the invalidation of the authorization for the use of chromium trioxide for hard chrome plating, can have extensive social and economic impacts. These impacts are multi-tiered, affecting suppliers of chromium trioxide, hard chrome platers, various industries that rely on hard chrome plating, and ultimately the customers.

Economic Impact: The following data are taken from the Socio-economic Analysis carried out by the Chromium Trioxide Authorization Consortium (CTAC) , and annexed to the Application for Authorisation for Use 2, functional chrome plating, submitted by the CTACSub .

Economic impact on suppliers of chromium trioxide. If hard chrome plating were to be discontinued, the expenses for raw materials, including chromium trioxide, and energy would plummet, leading to an estimated loss of €648.72 million, considering the NPV of future expenses over 12 years.

Economic Impact on Hard Chrome Platers: The direct impact on hard chrome platers would be severe. With at least 23,205 employees potentially losing their jobs, the sector could face a severe downturn. The estimated loss, considering the NPV of future payments of wages over 12 years, is a staggering €7,939 million.

Economic Impact on Industrial Companies Using Chrome Plating: The hard chrome plating sector underpins many other industries, including automotive, aerospace, defense, and heavy machinery. If hard chrome plating were to cease, these industries could face significant disruption, potentially causing job losses, production delays, and cost increases.

Economic Impact on Customers: Customers may face the repercussions of these changes in the form of decreased product availability and increased costs. These impacts could affect product affordability and availability, leading to reduced consumer choice and potentially higher prices.

Wider Economic Impacts: Beyond these direct impacts, there would also be broader economic implications, including a reduction in taxes paid by affected sectors, adverse impacts on economic development as the European supply chain for surfaces treated with chromium trioxide relocates to non-EEA countries, and potential quality and security concerns associated with increased dependency on imported parts and components treated with chromium trioxide.