**General comments and answers to specific information requests**

**Specific information requests:**

1. **Sectors and (sub-)uses**: Please specify the sectors and (sub-)uses to which your comment applies according to the sectors and (sub-)uses identified in the Annex XV restriction report (Table 9). If your comment applies to several sectors and (sub-)uses, please make sure to specify all of them.
2. **Emissions in the end-of-life phase**: The environmental impact assessment does not cover emissions resulting from the end-of-life phase. To get a better understanding of the extent of the resulting underestimation, (sub-)use-specific information is requested on emissions across the different stages of the lifecycle of products, i.e. the manufacture phase, the use phase and the end-of-life phase. Please provide justifications for the representativeness of the provided information. In particular:
3. Please provide, at the (sub-)use level, an indication of the share of emissions (as percentages) attributable to these three different stages. An indication of annual emission volumes in the end-of-life phase at sector or sub-sector level would also be appreciated.
4. If possible, please provide for each (sub-)use what share of the waste (as percentages) is treated through incineration, landfilling and recycling. Please provide information to justify the estimates as well as information on the form of recycling referred to.
5. **Emissions in the end-of-life phase**: With respect to waste management options, additional information is requested on the effectiveness of incineration under normal operational conditions (for different waste types, e.g. hazardous, municipal) with respect to the destruction of PFAS and the prevention of PFAS emissions.
6. **Impacts on the recycling industry**: To get an understanding of the impacts of the proposed restriction on the recycling industry, information is requested on:
7. The impacts that the concentration limits proposed in paragraph 2 of the proposed restriction entry text (see table starting on page 4 of the summary of the Annex XV restriction report) have on the technical and economic feasibility of recycling processes (together with a clear indication on the waste streams to which the described impacts relate).
8. The measures that recyclers would need to take to achieve the proposed concentration limits.
9. The costs associated with these measures.
10. **Proposed derogations – Tonnage and emissions**: Paragraphs 5 and 6 of the proposed restriction entry text (see table starting on page 4 of the summary of the Annex XV restriction report) include several proposed derogations. For these proposed derogations, information is requested on the tonnage of PFAS used per year and the resulting emissions to the environment for the relevant use. Please provide justifications for the representativeness of the provided information.
11. **Missing uses – Analysis of alternatives and socio-economic analysis**: Several PFAS uses have not been covered in detail in the Annex XV restriction report (see uses highlighted in blue and orange in Table A.1 of Annex A of the Annex XV restriction report). In addition, some relevant uses may not have been identified yet. For such uses, specific information is requested on alternatives and socio-economic impacts, covering the following elements:
12. The annual tonnage and emissions (at sub-sector level) and type of PFAS associated with the relevant use.
13. The key functionalities provided by PFAS for the relevant use.
14. The number of companies in the sector estimated to be affected by the restriction.
15. The availability, technical and economic feasibility, hazards and risks of alternatives for the relevant use, including information on the extent (in terms of market shares) to which alternative-based products are already offered on the EU market and whether any shortages in the supply of relevant alternatives are expected.
16. For cases in which **alternatives are not yet available**, information on the status of R&D processes for finding suitable alternatives, including the extent of R&D initiatives in terms of time and/or financial investments, the likelihood of successful completion, the time expected to be required for substitution (including any relevant certification or regulatory approvals) and the major challenges encountered with alternatives which were considered but subsequently disregarded.
17. For cases in which **substitution is technically and economically feasible** but more time is required to substitute:
    1. the type and magnitude of costs (at company level and, if available, at sector level) associated with substitution (e.g. costs for new equipment or changes in operating costs);
    2. the time required for completing the substitution process (including any relevant certification or regulatory approvals);
    3. information on possible differences in functionality and the consequences for downstream users and consumers (e.g. estimations of expected early replacement needs or expected additional energy consumption);
    4. information on the benefits for alternative providers.
18. 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. If available, please provide the annual value of EU sales and profits of the relevant sector, and employment numbers for the sector.
19. **Potential derogations marked for reconsideration – Analysis of alternatives and socio-economic analysis**: Paragraphs 5 and 6 of the proposed restriction entry text (see table starting on page 4 of the summary of the Annex XV restriction report) include several potential derogations for reconsideration after the consultation (in [square brackets]). These are uses of PFAS where the evidence underlying the assessment of the substitution potential was weak. The substitution potential is determined on the basis of i) whether technically and economically feasible alternatives have already been identified or alternative-based products are available on the market at the assumed entry into force of the proposed restriction, ii) whether known alternatives can be implemented before the transition period ends (taking into account time requirements for substitution and certification or regulatory approval), and iii) whether known alternatives are available in sufficient quantities on the market at the assumed entry into force to allow affected companies to substitute.

A summary of the available evidence as well as the key aspects based on which a derogation is potentially warranted are presented in Table 8 in the Annex XV restriction report, with further details being provided in the respective sections in Annex E.

To strengthen the justifications for a derogation for these uses, additional specific information is requested on alternatives and socio-economic impacts covering the elements described in points a) to g) in question 6 above.

1. **Other identified uses – Analysis of alternatives and socio-economic analysis**: Table 8 in the Annex XV restriction report provides a summary of the identified sectors and (sub-)uses of PFAS, their alternatives and the costs expected from a ban of PFAS. More details on the available evidence are provided in the respective sections in Annex E.

For many of the (sub-)uses, the information on alternatives and socio-economic impacts was generic and mainly qualitative. In particular, evidence on alternatives was inconclusive for some applications falling under the following (sub-)uses: technical textiles, electronics, the energy sector, PTFE thread sealing tape, non-polymeric PFAS processing aids for production of acrylic foam tape, window film manufacturing, and lubricants not used under harsh conditions.

More information is needed on alternatives and socio-economic impacts to conclude on substitution potential, proportionality, and the need for specific time-limited derogations. Therefore, specific information (if not already included in the Annex XV restriction report or covered in the questions above) is requested on alternatives and socio-economic impacts covering the elements listed in points a) to g) in question 6 above.

1. **Degradation potential of specific PFAS sub-groups**: A few specific PFAS sub-groups are excluded from the scope of the restriction proposal because of a combination of key structural elements for which it can be expected that they will ultimately mineralize in the environment. RAC would appreciate to receive any further information that may be available regarding the potential degradation pathways, kinetics or produced metabolites in relevant environmental conditions and compartments for trifluoromethoxy, trifluoromethylamino- and difluoromethanedioxy-derivatives.
2. **Analytical methods**: Annex E of the Annex XV restriction report contains an assessment of the availability of analytical methods for PFAS. Analytical methods are rapidly evolving. Please provide any new or additional information on new developments in analytics not yet considered in the Annex XV restriction report.

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| 8371 | Date:  2023/09/21 22:12  Content:  Scope or restriction option analysis  Hazard or exposure  Environmental emissions  Baseline  Description of analytical methods  Information on alternatives  Information on benefits  Other socio economic analysis (SEA) issues  Transitional period  Request for exemption  Type:  BehalfOfAnOrganisation  Org. type:  Company  Org. name:  Halocarbon  Org. country:  United States of America  Attachment:  <redacted>  Privacy statement:  Contains Confidential Information – Protected Against Disclosure Under Article 4 of Regulation (EC) No 1049/2001. Our customer is submitting similar information as confidential, and we have a CBI agreement with them. | General Comments:  Halocarbon is requesting a new derogation to include critical applications for “Military/Defense/Aerospace”.  Halocarbon welcomes this opportunity to respond to the ECHA Annex XV proposal for the restriction of Per- and polyfluoroalkyl substances (PFASs). Throughout our 70+ year history, we have always believed in the responsible use of fluorochemistry. We believe that the products we manufacture, and sell can ensure the safety of people and the environment when used properly. In many cases, no suitable alternatives exist wherein the benefit of the alternative outweighs its own environmental and human safety risks when compared to a fluorinated material. Some critical facts pertaining to Halocarbon’s position on PFAS: • For 73 years, Halocarbon has been committed to the key industrial applications (business-to-business sales into hazardous operations) where low-volume specialty fluorochemistry is critical due to its unmatched safety, performance, non-reactive properties, and that there are no other suitable non-fluorinated equivalent materials. • Halocarbon is the only US-based supplier of many critical fluorochemicals currently used in defense, aeronautical, space, and naval applications focused on national and regional security. • Halocarbon products are manufactured in low volumes that are still commercially relevant and sold into business-to-business applications for use by trained professionals. In many of these applications no suitable non-fluorinated products exist or can provide the safety, nonreactivity, and containment of extremely hazardous and/or toxic chemicals (e.g. chlorine, nitric acid, liquid oxygen, etc.). • Halocarbon seeks to engage in open dialogue with regulators, subject matter experts, and public officials to help create meaningful fluorochemical regulation, grounded in the best available science and will abide by and protect all established regulations. • Halocarbon is and will continue to work with customers to develop cradle-to-grave product strategies and lifecycle solutions. We seek to establish a circular economy around our fluorinated products, to establish and drive more risk based responsible use and disposal consumption of fluorinated materials. • Throughout our history, Halocarbon has never manufactured, used, or sold products containing fluorinated surfactants like perfluorooctanoic acid (PFOA) or perfluorooctanesulfonic acid (PFOS). • Throughout our history, Halocarbon has never manufactured or sold fluorinated materials into non-essential applications such as food-packaging materials or cosmetic products. Halocarbon believes that the PFAS definition currently proposed by ECHA is too broad to have regulatory utility. Instead, we believe that regulators should be specific in defining chemicals by structure (e.g., PFOA and PFOS) or in groups of closely related structures (e.g., perfluoroalkyl acids). Regulators should also focus on specific applications that pose the greatest environmental or consumer risk (e.g. AFFF, food packaging, cosmetics products, etc.), and exclude lower risk chemicals that are used in highly controlled industrial applications and chemicals that are already highly regulated. We also encourage regulators to evaluate risk by excluding chemicals that are not environmentally mobile, not water soluble, and those that are designed for use in contained (immobilized) applications. |
| Answer to specific info request 1:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 2:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 3:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 4:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 5:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 6:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 7:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 8:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 9:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 10:  Please see Section V, Confidential Attachments. |

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| 8372 | Date:  2023/09/21 22:14  Content:  Scope or restriction option analysis  Hazard or exposure  Description of analytical methods  Information on alternatives  Information on benefits  Transitional period  Type:  BehalfOfAnOrganisation  Org. type:  Company  Org. name:  PCB Piezotronics, Inc. and its Subsidiaries  Org. country:  United States of America  Attachment: | General Comments:  Details are included in the attachment. |
| Answer to specific info request 1:  Electronics, Semi-conductors, Energy, Automotive Safety |
| Answer to specific info request 5:  Our products are designed to be returned at end of life and do not create any emissions. They do not create, degrade, emit, nor mature into any additional PFAS substances. |
| Answer to specific info request 6:  See attachment. |
| Answer to specific info request 7:  See attachment. |
| Answer to specific info request 8:  See attachment. |
| Answer to specific info request 9:  See attachments on electronic devices and devices used in the energy sector. |

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| 8373 | Date:  2023/09/21 22:18  Content:  Information on alternatives  Information on benefits  Other socio economic analysis (SEA) issues  Transitional period  Request for exemption  Type:  BehalfOfAnOrganisation  Org. type:  Company  Org. name:  <redacted>  Org. country:  United States of America  Company name confidential:  Yes  Attachment:    <redacted>  Privacy statement:  Attachment includes blueprints on tape libraries used by IBM and shows detailed drawings of components within tape libraries; this information is not public. | General Comments:  Please refer to attachments for derogation request and response regarding the public consultation on the proposed restriction on per and polyfluoroalkyl compounds (PFAS). |
| Answer to specific info request 1:  Electronics, Lubricants, Tape Libraries |
| Answer to specific info request 6:  Please refer to attachments regarding analysis of alternatives and socioeconomic analysis covering elements a-g. |

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| 8374 | Date:  2023/09/21 22:19  Content:  Scope or restriction option analysis  Hazard or exposure  Environmental emissions  Baseline  Description of analytical methods  Information on alternatives  Information on benefits  Other socio economic analysis (SEA) issues  Transitional period  Request for exemption  Type:  BehalfOfAnOrganisation  Org. type:  Company  Org. name:  Halocarbon  Org. country:  United States of America  Attachment:  <redacted>  Privacy statement:  Contains Confidential Information – Protected Against Disclosure Under Article 4 of Regulation (EC) No 1049/2001. Our customer is submitting similar information as confidential, and we have a CBI agreement with them. | General Comments:  Halocarbon wants to ensure that all our activities will be either supported in this existing derogation or in the proposed derogation by the SEMI groups titled, “The semiconductor manufacturing process”. Both SEMI US and EU have made submissions proposing this new derogation.  Halocarbon welcomes this opportunity to respond to the ECHA Annex XV proposal for the restriction of Per- and polyfluoroalkyl substances (PFASs). Throughout our 70+ year history, we have always believed in the responsible use of fluorochemistry. We believe that the products we manufacture, and sell can ensure the safety of people and the environment when used properly. In many cases, no suitable alternatives exist wherein the benefit of the alternative outweighs its own environmental and human safety risks when compared to a fluorinated material. Some critical facts pertaining to Halocarbon’s position on PFAS: • For 73 years, Halocarbon has been committed to the key industrial applications (business-to-business sales into hazardous operations) where low-volume specialty fluorochemistry is critical due to its unmatched safety, performance, non-reactive properties, and that there are no other suitable non-fluorinated equivalent materials. • Halocarbon is the only US-based supplier of many critical fluorochemicals currently used in defense, aeronautical, space, and naval applications focused on national and regional security. • Halocarbon products are manufactured in low volumes that are still commercially relevant and sold into business-to-business applications for use by trained professionals. In many of these applications no suitable non-fluorinated products exist or can provide the safety, nonreactivity, and containment of extremely hazardous and/or toxic chemicals (e.g. chlorine, nitric acid, liquid oxygen, etc.). • Halocarbon seeks to engage in open dialogue with regulators, subject matter experts, and public officials to help create meaningful fluorochemical regulation, grounded in the best available science and will abide by and protect all established regulations. • Halocarbon is and will continue to work with customers to develop cradle-to-grave product strategies and lifecycle solutions. We seek to establish a circular economy around our fluorinated products, to establish and drive more risk based responsible use and disposal consumption of fluorinated materials. • Throughout our history, Halocarbon has never manufactured, used, or sold products containing fluorinated surfactants like perfluorooctanoic acid (PFOA) or perfluorooctanesulfonic acid (PFOS). • Throughout our history, Halocarbon has never manufactured or sold fluorinated materials into non-essential applications such as food-packaging materials or cosmetic products. Halocarbon believes that the PFAS definition currently proposed by ECHA is too broad to have regulatory utility. Instead, we believe that regulators should be specific in defining chemicals by structure (e.g., PFOA and PFOS) or in groups of closely related structures (e.g., perfluoroalkyl acids). Regulators should also focus on specific applications that pose the greatest environmental or consumer risk (e.g. AFFF, food packaging, cosmetics products, etc.), and exclude lower risk chemicals that are used in highly controlled industrial applications and chemicals that are already highly regulated. We also encourage regulators to evaluate risk by excluding chemicals that are not environmentally mobile, not water soluble, and those that are designed for use in contained (immobilized) applications. |
| Answer to specific info request 1:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 2:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 3:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 4:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 5:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 6:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 7:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 8:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 9:  Please see Section V, Confidential Attachments. |
| Answer to specific info request 10:  Please see Section V, Confidential Attachments. |

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| 8375 | Date:  2023/09/21 22:25  Content:  Scope or restriction option analysis  Environmental emissions  Information on alternatives  Other socio economic analysis (SEA) issues  Transitional period  Request for exemption  Type:  BehalfOfAnOrganisation  Org. type:  Company  Org. name:  Emerson Electric  Org. country:  United States of America  Attachment: | General Comments:  Per the Information Note, some relevant uses may not have been identified yet. One such missing use is the Industrial Automation Monitoring & Control sector. The attached paper provides justification to add Industrial Automation Monitoring & Control as a new use sector. Subsequently, a request is made for a 12-year derogation of fluoropolymers for use in this new sector. |
| Answer to specific info request 1:  See attached paper. Emerson, a global technology and engineering company with significant operations in Europe, has closely reviewed the Annex XV Per-and Polyfluoroalkyl Substances (PFAS) restriction proposal and has identified a missing use that is critical to the EU and the world. The attached paper provides justification to add Industrial Automation Monitoring & Control as a new use sector. Subsequently, a request is made for a 12-year derogation of fluoropolymers for use in this new sector. Additionally, Industrial Automation Monitoring and Control Equipment is necessary to support most of the 15 existing use sectors (listed below). 1. Manufacturing of PFAS Processing Aids 2. Textiles, Upholstery, Leather, Apparel and Carpets (TULAC) 3. Food Contact Materials & Packaging 4. Metal Plating & Manufacture of Metal Products 5. Consumer Mixtures 6. Cosmetics 7. Ski Waxes 8. Applications of Fluorinated Gases 9. Medical Devices 10. Transport 11. Electronics & Semiconductor 12. Energy Sector 13. Construction Products 14. Lubricants 15. Petroleum & Mining |
| Answer to specific info request 2:  See attached paper. Manufacture of fluoropolymers: IAMC equipment manufacturers do not directly produce fluoropolymers. All components made of fluoropolymers or containing fluoropolymers are pre-manufactured by upstream suppliers and provided as final components (i.e., O-rings). Service Life (Use): The useful life of Industrial Automation Monitoring and Control equipment is very long, often greater than 15 years. The risk of environmental or human exposure to fluoropolymers is very limited throughout the service life of IAMC products due to the closed loop and sealed structures of the products. End-of-Life: Once the equipment containing fluoropolymers reaches the end of the service life phase there are effectively three waste management options. This covers the potential for recovery and recycling, disposal in landfill, and destruction through incineration at Energy from Waste (EfW) plant. IAMC equipment is designed so that it can be disassembled and separated at the end-of-life for processing or re-use in a circularity methodology. |
| Answer to specific info request 3:  See attached paper. During waste handling 55% of all end-of-life fluoropolymer is recovered and recycled, with the next biggest disposal option being landfill (32% by volume). The remainder (13%) is sent for thermal destruction via incineration. |
| Answer to specific info request 4:  See attached paper. Fluoropolymers can be both chemically and mechanically recycled. For chemical recycling, fluoropolymers can be returned back to their building blocks for reconstruction without damage to their properties. Melt-processable fluoropolymers can be recycled through traditional mechanical methodologies. The fate of fluoropolymers at the end-of-life in Industrial Monitoring and Control equipment is controllable. |
| Answer to specific info request 6:  See attached paper. Emerson, a global technology and engineering company with significant operations in Europe, has closely reviewed the Annex XV Per-and Polyfluoroalkyl Substances (PFAS) restriction proposal and has identified a missing use that is critical to the EU and the world. The attached paper provides justification to add Industrial Automation Monitoring & Control as a new use sector. Subsequently, a request is made for a 12-year derogation of fluoropolymers for use in this new sector. Alternatives Industrial Automation Monitoring and Control equipment commonly operates in harsh environments where only fluoropolymers can deliver the performance needed for safe and efficient operations. Socio-economic analysis The potentially significant negative implications for the IAMC sector and especially the many downstream user sectors could lead to wider impacts for the European economy and society. For example: Emerson is concerned that the EU could fall behind other countries on technology competitiveness, especially in the area of chemical processing. Potential outcomes include reduction in manufacturing operations resulting in higher imports for everything from food to pharmaceuticals. |
| Answer to specific info request 7:  See attached paper. Industrial Automation Monitoring and Control is necessary for the manufacturing of products essential within the other eleven potential derogations for reconsideration: Alternatives Downstream user sectors relying on industrial automation and the products and services it enables account for economic activities and benefits that are likely orders of magnitude larger than the IAMC sector itself. If a significant part of IAMC applications were lost due to the proposed restriction, this could severely affect industrial automation, increase the costs of industrial processes, and put the benefits provided by applications in downstream user sectors at risk. 1. Textiles for the use in engine bays for noise and vibration insulation used in the automotive industry. 2. Hard chrome plating 3. Foam blowing agents in expanded foam sprayed on site for building insulation 4. Industrial and professional use of solvent-based debinding systems in 3D printing 5. Industrial and professional use of smoothing agents for polymer 3D printing applications 6. Propellants for technical aerosols for applications where non-flammability and high technical performance of spray quality are required 7. Preservation of cultural paper-based materials 8. Cleaning and heat transfer: engineering fluids for medical devices 9. Membranes used for venting of medical devices. 10. Refrigerants and for mobile air conditioning in military applications 11. Semiconductor manufacturing process |
| Answer to specific info request 8:  See attached paper. Alternatives The high performance of fluoropolymers across a multitude of properties is what sets fluoropolymers apart from other materials and makes them a requirement for most applications. It also makes the list of viable alternatives very short. Socio-economic analysis Exclusion of Industrial Automation Monitoring and Control equipment could result in distress for the EU due to the inability to manufacture the essential products that make the other identified uses viable. |