used in the construction of chemical handling facilities – chemicals, pharmaceutical, bio-tech, oil & gas and other plants. The functionality spans UV-transparency, fire-resistance, weather resistance (e.g., hail, general weathering), resistance to harsh cleaning chemicals or sterilization, effective corrosion prevention to creating a metal ion free environment. PFAS-containing Polymer Processing Additives are used to help with the defect-free extrusion of high strength HDPE (https://multimedia.3m.com/mws/media/991385O/dynamar-ppas-in-applications-of-hdpe-pipes.pdf).

MEDICAL DEVICES:
In the use category "Medical devices":

- The use of cooling liquids is included, but the product 3M™ Novec™ 7500 Engineered Fluid (CAS # 297730-93-9) and the product 3M™ Fluorinert™ Electronic Liquid FC-40 (CAS # 1064698-37-8) should be added.

TULAC
In the use category "TULAC":

- It is important to note the use of 3M Polymer Melt Additive in the medical protective clothing & facemasks. 3M Polymer Melt Additive is a fluorochemical flake (PFBS (C4) based fluoro-polymeric material) for incorporation into polyolefin and other synthetic resins (e.g. polypropylene). 3M Polymer Melt Additive is heat and shear stable to a wide variety of extrusion conditions. 3M Polymer Melt Additive is designed to be compatible with synthetic resins at extrusion temperatures. Consequently, the additive can localize at the surface during quenching or within a few hours to provide an effective surface-active treatment, while not significantly influencing fiber properties.
- The report references personal protective equipment (PPE) several times, but a dedicated section or category would be appropriate to include the following products should be added: 3M™ Fall Protection harnesses, 3M™ PELTOR™ ComTac™ VII communications headset and system control unit, Protective Coveralls 4532+, high performance filtration applications, valves, washers, o-rings and electrical components with coated wires, used in multiple 3M Scott Fire & Safety products.

PFAS PRODUCTION (MANUFACTURING)
In the category PFAS production (manufacturing), the following substances should be added:

- Manufactured in EU/sold in EU+UK = 3M™ Fluorinert™ Electronic Liquid FC-40 (CAS #1064698-37-8), 3M™ Fluorinert™ Electronic Liquid FC770 (CAS #1093615-61-2), 3M™ Performance Fluid PF5056 (2187449-42-7), 3M™ Performance Fluid PF5058 (CAS# 2176446-38-9), 3M™ FA-188 Foam Blowing Additive (CAS #3709-71-5);
- Imported into EU/sold in EU+UK = 3M™ Novec™ 7000 Engineered Fluid (375-03-1), 3M™ Novec™ 7100 Engineered Fluid (CAS# 163702-08-7/163702-07-6) and 3M™ Novec™ 7200 Engineered Fluid (CAS# 63702-06-5/163702-05-4).

F-GASES

In the use category "F-gases":

- The use of foam blowing additives in the production of energy efficient building material should be added. It is important to note the use of 3M™ FA-188 Foam Blowing Additive (CAS #3709-71-5) in this application.
- The use of fluoroketone is missing as a clean agent fire suppression fluid, specifically 3M™ Novec™ 1230 Fire Protection Fluid (CAS # 756-13-8).
- The application of cover gas is detailed, however, the use of fluoroketone is missing as a cover gas, specifically 3M™ Novec™ 612 Magnesium Protection Fluid (CAS # 756-13-8).
- The following product listed in F-Gas Annex I is missing: 3M™ Fluorinert™ Electronic Liquid FC-72 (CAS# 1064697-81-9). This product is typically used as a heat transfer agent. Other products used as heat transfer agents are: 3M™ Fluorinert™ Electronic Liquid FC-3283 (CAS# 338-83-0), 3M™ Fluorinert™ Electronic Liquid FC-40 (CAS# 1064698-37-8), 3M™ Fluorinert™ Electronic Liquid FC-770 (CAS# 1093615-61-2).
- The electrical equipment application is mentioned but the use of alternatives to sulfur hexafluoride (SF_6) in electrical switchgear, gas insulated lines and other gas-insulated equipment is missing. It is important to note the use of fluorinated ketone 3M™ Novec™ 5110 Insulating Gas (CAS # 756-12-7) and fluorinated nitrile 3M™ Novec™ 4710 Insulating Gas (CAS # 42532-60-5) as low global warming potential alternatives to sulfur hexafluoride in this application.
- The preservation of documents application should be added. The products used in this application include 3M™ Novec™ 7100 Engineered Fluid (CAS# 163702-08-7/163702-07-6) and 3M™ Performance Fluid PF-5060 (CAS# 1064697-81-9).
- Specific F-gas (specific composition is confidential) is used as explosion tamer in polymerization processes during the production of fluoropolymers. CAS # can be shared confidentially.

ELECTRONICS & ENERGY

In the use category "Electronics & Energy":

- The use of alternatives to sulfur hexafluoride (SF_6) in Energy in electrical switchgear, gas insulated lines and other gas-insulated equipment is missing. In particular, the summary report and the questionnaire do not mention the use of fluorinated ketone 3M™ Novec™ 5110 Insulating Gas (CAS # 756-12-7) and fluorinated nitrile 3M™ Novec™ 4710 Insulating Gas (CAS # 42532-60-5) as low global warming potential alternatives to sulfur hexafluoride in this application.
- The following substances should be added under fire protection fluid: 3M™ Novec™ 1230 Fire Protection Fluid (CAS # 756-13-8).
- The following substances should be added under Coatings of electronic components: 3M™ Novec™ 1710 Electronics Coating (2-10% trade secret fluoroaliphatic polymer, balance 3M™ Novec™ 7100 Engineered Fluid (CAS# 163702-08-7/163702-07-6)).
- The following substances should be added under Heat transfer fluids: 3M™ Novec™ 7200 Engineered Fluid (CAS# 63702-06-5/163702-05-4), 3M™ Novec™ 7700 Engineered Fluid (CAS# 957209-18-6), 3M™ Fluorinert™ Electronic Liquid FC-

3283 (CAS # 338-83-0) and 3M™ Novec™ 649 Engineered Fluid (CAS# 756-13-8). Other heat transfer fluids included in the report are: 3M™ Novec™ 7500 Engineered Fluid (CAS# 297730-93-9), 3M™ Fluorinert™ Electronic Liquid FC-40 (CAS# 1064698-37-8) and 3M™ Fluorinert™ Electronic Liquid FC-72 (CAS# 1064697-81-9.

- The following substances should be added under Solvent/Solvent Cleaning of Electronics Components: 3M™ Novec™ 7100 Engineered Fluid (CAS# 163702-08-7/163702-07-6), 3M™ Novec™ 71IPA Engineered Fluid (azeotropic blend of Isopropanol with 3M™ Novec™ 7100 Engineered Fluid CAS# 163702-08-7/163702-07-6), 3M™ Novec™ 73DE Engineered Fluid (azeotropic blend of trans-1,2-dichloroethylene (t-DCE) with 3M™ Novec™ 7300 Engineered Fluid (CAS # 132182-92-4)).
- The following substances should be added under Lubricant deposition for use as solvents: 3M™ Novec™ 7100 Engineered Fluid (CAS# 163702-08-7/163702-07-6) and 3M™ Novec™ 7200 Engineered Fluid (CAS# 63702-06-5/163702-05-4).
- The following substances should be added under Thermal testing: 3M™ Fluorinert™ Electronic Liquid FC-770 (CAS# 1093615-61-2) and 3M™ Fluorinert™ Electronic Liquid FC-40 (CAS# 1064698-37-8).
- The following substances should be added under Data Centers – immersion cooling of semi devices/servers: 3M™ Fluorinert™ Electronic Liquid FC-3284 (CAS# 382-28-5), 3M™ Fluorinert™ Electronic Liquid FC-3283 (CAS# 338-83-0), 3M™ Fluorinert™ Electronic Liquid FC-40/43 (CAS #1064698-37-8), 3M™ Fluorinert™ Electronic Liquid FC-72 (CAS# 382-28-5), 3M™ Novec™ 7000 Engineered Fluid (CAS# 375-03-1), 3M™ Novec™ 7100 Engineered Fluid (CAS# 163702-08-7/163702-07-6) and 3M™ Novec™ 649 Engineered Fluid (CAS# 756-13-8).
- The following products for fluoropolymer tube lining, solar films, cable and wire insulation should be added: PFPE (CAS# 69991-67-9) lubricant is used on silicone cable accessories, Silicone rubber compound containing PTFE (CAS# 9002-84-0) is used in molding and extruding cable accessories; Solar Radiative Film uses PVDF (CAS# 24937-79-9); Heat shrink tubing with PVDF (CAS# 24937-79-9).
- The following sub-use category should be added: Ion exchange membrane in vanadium redox batteries. Ion exchange membrane in vanadium redox batteries, made out of fluoropolymers, are used as sealings for aggressive chemicals. Seals in high temperature stationary fuel cells use fluoropolymer seals due to corrosion and temperature resistance.
- The summary report does not mention a small but growing application of the use of Polymer Optical Fibers for data transmission where electromagnetic interference is a concern. The fluoropolymer serves as a low refractive index layer.
- In the use category "photovoltaic cells" it should be noted that not only PFAS-based films and coatings are being used, but also PFAS-based tapes are heavily used in the bonding of solar panels.

TRANSPORTATION

In the category "Transportation":

- The report says that no information is available on fire prevention and protection. The following substance should be added as a fire protection fluid: 3M™ Novec™ 1230

Fire Protection Fluid (CAS # 756-13-8). Specific application includes fire systems for marine vessels.

- 3M™ Novec engineered fluids and 3M™Fluorinert™ Electronic Liquids can be used as heat transfer fluids in immersion cooling applications in automotive electronics applications (e.g. inverters, Electronic Control Unit (ECUs), on-board chargers, traction motors). The following substances should be added as heat transfer fluids for power electronics cooling: 3M™ Novec™ 7100 Engineered Fluid (CAS# 163702-08-7/163702-07-6), 3M™ Novec™ 7300 Engineered Fluid (CAS# 132182-92-4), 3M™ Novec™ 7500 Engineered Fluid (CAS# 297730-93-9), 3M™ Novec™ 649 Engineered Fluid (CAS# 756-13-8), 3M™ Fluorinert™ Electronic Liquid FC-770 (CAS# 1093615-61-2), 3M™ Fluorinert™ Electronic Liquid FC-72 (CAS# 1064697-81-9).
- 3M™Novec™Electronic Grade Coatings and coatings with the Novec engineered fluids used as solvent are used in automotive electronics to coat the printed circuit boards and LED lighting for moisture and corrosion protection. Novec fluids can also be used as carrier solvents for anti-fingerprint or anti-smudge coating materials for automotive display surface coatings. The following substance should be added as a coating for corrosion protection: 3M™ Novec™ 1700 Electronic Coating (2-10% trade secret fluoroaliphatic polymer, balance 3M™ Novec™ Engineered Fluid 7100 (CAS # 756-13-8)).
- The following substances should be added as cleaning fluids: 3M™ Novec™ 7100 Engineered Fluid (CAS# 163702-08-7/163702-07-6) and Novec 71DE fluid (azeotropic blend of t-DCE with Novec 7100 fluid (CAS# 163702-08-7/163702-07-6), Novec 71IPA fluid (azeotropic blend of Isopropanol and Novec 7100 fluid (CAS# 163702-08-7/163702-07-6), Novec 72DE fluid (azeotropic blend of t-DCE with Novec 7100 fluid (CAS# 163702-08-7/163702-07-6) and Novec 7200 fluid (CAS# 63702-06-5/163702-05-4), and Novec 73DE fluid (an azeotropic blend of t-DCE and Novec 7300 fluid (CAS # 132182-92-4)).
- The following substances should be added as solvents for lubricants: 3M™ 3M™ Novec™ 7000 Engineered Fluid (375-03-1), Novec™ 7100 Engineered Fluid (CAS# 163702-08-7/163702-07-6), 3M™ Novec™ 7200 Engineered Fluid (CAS# 63702-06-5/163702-05-4).
- The following substances should be added as testing fluids: 3M™ Fluorinert™ Electronic Liquid FC-3284 (CAS# 382-28-5), 3M™ Fluorinert™ Electronic Liquid FC-40 (CAS# 382-28-5), 3M™ Fluorinert™ Electronic Liquid FC-72 (CAS# 382-28-5).
- Summary report mentions the use of PFAS-enabled adhesive tapes as paint replacement. To be added: adhesive tapes are also used for paint protection. Paint protection film products use PFAS as a stabilizing agent for the polymer that goes into making of the finished product. The finished product itself is affixed to key areas of a vehicle exterior to protect the painted surface from chips caused by impinging debris and rocks. Other adhesive film product, e.g. 3M™ SIT2010 Structural Isolation Tape, utilizes a fluoropolymer film layer that provides weatherability and reduces the potential of corrosion between two dissimilar materials that the SIT2010 is positioned between in the vehicle chassis.
- Summary report rightly mentions that Acrylic Foam Tape (AFT) products (PFAS are used as stabilizing agent in production of tape) are used to affix the weight to the wheel surface. To be added: The finished AFT product is also used to affix components such as molding, clips and emblems to the exterior surface of the vehicle,

as well as in the vehicle interior to affix sensors to the windshield for the rearview mirror assembly, as well as for affixing silicone seals in the doors and trunk lids. AFT products use PBSF as a manufacturing process aid, therefore the PBSF should be added as a PFAS substance used in manufacturing of transportation products and articles. Without its use the final product does not consistently meet quality and performance requirements as defined by the automotive sector.

- Summary report rightly mentions the use of adhesive tapes on aircraft exterior to provide a chemical resistant surface for the aircraft as well as to reduce the aircraft's surface energy. To be added, Polyurethane Protective tape is also used on the interior of an aircraft. The fluoropolymer is incorporated in the polyurethane, which helps the product to provide a moisture resistant barrier that helps to reduce the potential for corrosion on the aircraft interior surface where it is applied.
- Summary report mentions a group of fluoroelastomers as well as perfluoropolymeric ionomers as part of PFAS substances used in transportation products and articles, but does not mention other fluoropolymers, such as fluoroplastics and FKM and FFKM. Fluoroplastic wiring is used in high temperature wiring to the catalytic converter as well as used under the hood wiring applications for smaller and hotter engines. High temperature FKM and FFKM seals are used in aerospace, commercial vehicles and cars. Examples of applications that require high temperature performance combined with chemical resistance are the cylinder head gasket, air intake manifold and turbo charger hoses.
- Additionally, PTFE Micropowders are also used as additives in oil-based lubricants and in dry lubricants. The technical function is to reduce friction and to reduce the temperature dependence of the lubricant formulation. Two critical applications of PFAS containing lubricants include dry lubricants or PTFE bearings, which are frequently used in durability and safety-relevant parts, and these applications are nearly maintenance-free in accessibility-challenged environments. Also, 3M™Novec™Engineered Fluids can be used as carrier solvents for dry lubricants (e.g. PTFE powder) that are added to plastics used in automotive interiors.
- It should be noted that fluoropolymers are essential to meet Euro 6 requirements – for standard and ethanol-containing fuel grades.
- One missing subgroup within the Transportation summary report is wirings. Wiring for catalytic converter sensors are commonly made from PTFE, and under-the-hood wiring use Fluorothermoplastics where high temperature resistance is required (near the Internal Combustion Engine). Fluoropolymers are also required in aircraft wiring due to temperature and chemical resistance. Some aircraft wiring is inside of the Kerosene tanks (wings) and therefore constantly exposed to fuel. Fluoropolymer sleeves or jacketing provides the safety required.
- Window films are missing from the current report. PBSF-enabled coatings used in commercial/residential building window films are missing in the current report. The PBSF is used to aid in wetting out during the coating step. Window films are used in both automotive aftermarket as well as in public, commercial and residential buildings.

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FOOD CONTACT MATERIALS AND PACKAGING

In the category "Food Contact Materials and Packaging":

- The summary report characterizes Gen-X as a polymer processing aid (PPA). Gen-X is a fluorinated emulsifier which is different from a polymer processing additive. We believe there is a risk of confusion between this terminology, equating polymer processing aid and the polymer processing additive. Polymer Processing Additives are fluoropolymer-based additives to polyolefins, and engineering polymers to enable or improve film, tubing, fibers or pipe extrusion or blow molding processes.
- A missing sub-category under the consumer cookware applications are P Electrostatic Powder Coating grades. Powders designed for electrostatic powder spray-coating are used to produce non-stick coatings for industrial cook and backware as well as industrial and consumer use rice cookers.
- Under industrial applications, it should be noted that seals, O-rings, gaskets, tubing and pipes use Fluorothermoplastics and PTFE that are processed into pipes and tubing for commercial food and feed products or equipment for the private household. Fluorothermoplastics and PTFE are also processed into valves and fittings for commercial food and feed products. Fluoropolymer dispersions are formulated into coatings for belts for commercial food and feed products.
- Fluorelastomers designed for food contact applications such as seals that require high temperature and chemical stability (frequently aggressive cleaning chemicals) cannot be provided by other materials. Likewise, Fluorothermoplastics, PTFE and PTFE compounds used for seals, valves and tubing that require high temperature, stability against steam and chemicals (frequently aggressive cleaning chemicals) cannot be provided by other materials.
- The Polymer Processing Additives enable some of the recent reduction of packaging film needed. They are not intended to change the surface properties of the packaging material, but help to reduce or eliminate processing defects, improve processing efficiency, improve energy efficiency and reducte manufacturing waste. Typically, fluoroelastomers or fluorothermoplastics are used as Polymer Processing Additives (not low molecular weight additives). Polymer Processing Additives are frequently formulated with inorganics and non-fluorinated aliphatic polyethers or polyesters as synergists.
- Polymer Processing Additives are used in packaging. Fluoropolymers used in Polymer Processing Additives are fluoroelastomers and fluorothermoplastics, so high-molecular weight fluoropolymers. The summary report is incorrectly reporting their use, especially in the food packaging sub-category.
  Polymer Processing Additives promotes down gauging of films, layer stability in multilayer construction, less waste in manufacturing, and less energy needed for operations (enable overall lower cost in manufacturing). In exchange, they enable affordable food packaging, help enable usage of strong, thin, light-weights packaging articles, reduce overall consumption of plastic, enable preservation of food freshness, reduce food waste and help enable increased recycled contact into packaging.

OTHER: USES NOT COVERED BY THE STUDIES/QUESTIONAIRES

- 3M also uses PFAS in some of our Personal Protective Equipment that is not covered by the TULAC study and questionnaire, including: 3M™ Fall Protection harness, 3M™ PELTOR™ ComTac™ VII communications headset and system control unit, Protective Coveralls 4532+, high performance filtration applications, Valves, washers, o-rings and electrical components with coated wires, used in multiple 3M Scott Fire & Safety products.
- 3M supplies products using PFPE and other PFAS for Release Liners to the industrial converters and users in the general industrial and electronics industry. PFAS-enabled silicone adhesives are used in double coated tapes, adhesive transfer tapes and foam tapes. They are also used in bonding applications in mobile handheld devices and other electronic devices. PFPE is used to coat the liner and provide the proper surface to protect the adhesive prior to use. It provides excellent flexibility, high temperature resistance and consistent performance over wide temperature ranges.
- In the use category "Construction", one missing sub-group is home improvements products (i.e., foam mounting tapes and squares, and damage-free hanging solutions). A fluorosilicone chemistry is used in release liners for our silicone-based adhesives in some home improvement applications. Two silicone-based chemistries are used in products, one picture hanging and one for bath and outdoor products. The fluorosilicone release chemistry is used in the manufacture of the release liner which allows the silicone-based adhesives to be coated and converted in the form of an adhesive transfer tape to produce the final product.
- PBSF coating is used in whiteboard films to provide stain resistant properties. This helps prevent "ghosting" and marker staining on the whiteboard film. The whiteboard films can be applied to a variety of substrates and can be directly applied to a wall, table or as a replacement film over an existing whiteboard.

OTHER: WRONG STATEMENTS:

- It should be noted that there is an error in Appendix 1 in "Report summary F-gas uses". Entry 24 "methoxytridecafluoro-heptene isomers", **MPHE Sion TM is NOT a fluoroketone**.
- Inconsistencies in the terminology used in the summary report: "PFAS Processing Aid" and "fluorinated Processing Aid" are used in confusing and inconsistent ways in the FCM questionnaire and "polymer processing aids (PPAs)" in the summary reports. A clear definition of these terms is critically needed.
- There are limitations to apply ERC approaches to calculate the emissions due to the lack of volatility and water solubility of most of the higher molecular weight fluoropolymers. It will be appropriate to develop Specific Environmental Release Categories (SPERCs) for subsets of PFAS used in individual categories that better consider the applications and material characteristics for PFAS materials or subsets of PFAS (i.e. fluoropolymers, etc.). Therefore, the ERC analysis report should be adjusted taking into consideration the physical properties and use conditions of PFAS.
- In the use Category F-gas, the Section C solvent sub-use alternatives table lists several non-PFAS alternatives. These same non-PFAS solvent alternatives are also reported in Appendix 8 of the report "Report summary F gas uses july 2021." This report and the

listed alternatives are directly contradicted by the contents of the report "Application of Fluorinated Gases (F-Gases) in the European Economic Area," also provided by the authorities, questioning the viability of these options. Paragraph 4.3.2 of this report states, "The following solvents are identified as potential alternatives for metal cleaning: isopropyl alcohol (IPA), n-propyl bromide (nPB), dichloromethane (DCM,methylenechloride),trans-1,2-dichloroethylene,trichloroethylene (TCE), perchloroethylene (PER), volatile methyl siloxanes, hydrocarbons (hexane, heptane, benzene) and acetone. Many of these alternatives have health concerns and regulatory restrictions. Other alternatives such as IPA are considered highly flammable and therefore not suitable for some uses." In fact as referenced by (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP Regulation) the listed alternative solvents present significant flammability and human health concerns and may further include regulatory barriers preventing their use: Isopropyl alcohol (67-63-0) is a category 2 highly flammable liquid/vapor, N-propyl bromide (106-94-5) is a category 1B reproductive toxin and is further subject to Authorization in the EU under REACH Annex XIV, dichloromethane (75-09-2) is a category 2 carcinogen, trans-1,2-dichloroethylene (156-60-5) is a category 2 highly flammable liquid/vapor, trichloroethylene (79-01-6) is a category 1B carcinogen and category 2 mutagen and is further identified as an SVHC for its carcinogenic potential, perchloroethylene is a category 2 carcinogen, octamethylcyclotetrasiloxane (CASRN 556-67-2), a volatile methyl siloxane, is a category 2 reproductive toxin and is SVHC-listed on the basis of its PBT and vPvB characteristics, n-hexane (110-54-3) is a category 2 highlight flammable liquid and vapor and is a category 2 reproductive toxin, benzene (71-43-2) is a category 1A carcinogen and a category 1B mutagen and a category 2 highly flammable liquid/vapor, heptane (142-82-5) is a category 2 highly flammable liquid/vapor, and acetone (67-64-1) is a category 2 highly flammable liquid/vapor.

- In the case of immersion cooling of electronics in data centers, in the "Report summary Electronics and Energy", Section 5, "Manufacturing and Market" under the heading Immersion cooling, the text provided states: "Two-phase liquid immersion cooling showed promising results in the, important, energy saving of datacentres. It is more energy-efficient however, the potential for emissions is deemed higher (reference 18). In 2016 the cost of the fluids alone was found to be higher than the cost reduction because of a higher energy efficiency (reference 19)." Reference 18 does not provide a quantitative representation of emissions. There are installations with reported evaporative fluid losses of 1-2% per year as well as documented reports of ~1% fluid loss per year, as reference (https://146a55aca6f00848c565-a7635525d40ac1c70300198708936b4e.ssl.cf1.rackcdn.com/images/9f425f33160adcab98bfaca87c06c1ff0c71d9a3.pdf) 3M is aware of some system integrator tank suppliers providing warranties for 1% or lower loss of fluid per year. We believe that the industry can achieve evaporative losses on the order of 0.1% per year with ongoing improvements to both tank design and operational controls (i.e., methods to perform routine maintenance.) Also, while Reference 19 is a comprehensive report, it should be considered that the work was published in 2016 and describes fluid loss and energy consumed during a 10-month timeframe based on a single, hand-built, experimental tank. As 3M has firsthand knowledge of the installation and operation of the referenced system, we know that circumstances of the project forced the tank to

remain open in an unsealed state for an extended period of time (i.e., days) leading to losses far higher than is expected (and now demonstrated) in current documented installations. The equipment used is not well described, however, it is known that in 2015/2016 when this work was completed, there were no commercially available systems for two phase immersion cooling. In the past 5 years there have been significant learnings and advancements to operating two phase immersion cooling systems for use in datacenters as well as the availability of commercial systems from multiple suppliers. Improved system design combined with operational standards support greatly improved fluid losses resulting in losses of 1% or less over extended periods of time. A more holistic view of the true value and cost of immersion cooling should consider cost on the scale of an entire datacenter, including annual savings for water and energy. Datacenters built for immersion cooling can be built in less time, require a smaller footprint, use less water and less energy to provide equal or greater computing power compared to an air-cooled datacenter. To take from a published example, reference (www.opencompute.org/files/Open-Compute-Engineering-Workshop-3M-Immersion-Cooling-March-2018-FINAL.pdf)

3M appreciates the authorities' consideration of the above missing uses and applications, missing PFAS substances, or wrongly stated information in the reports when developing the PFAS restriction dossiers.

3M welcomes the opportunity to further discuss any previously provided or above input.

Miljøministeriet
Miljøstyrelsen

Den 12. juli 2024

Aktdetaljer

Akttitel: CALL FOR EVIDENCE PFAS
Aktnummer: 19
Sagsnummer: 2020 - 15422

Akt-ID:	3829658
Dato:	06-10-2021 14:31:54
Type:	Indgående
Dokumenter:	• [1] CALL FOR EVIDENCE PFAS.eml • [2] Fluorten.pdf

Til: restrictiePFAS (E7), DE (E1 (E1), ' P1 ' (E1), Toke Winther ([redacted]@mst.dk), P2 (E2), P3 (E3)
Cc: P4 - CAAST S.p.A. (E4), P5 - CAAST S.p.A. (E5)
Fra: P6 - CAAST S.p.A. (E6)
Titel: CALL FOR EVIDENCE PFAS
Sendt: 06-10-2021 14:31
Bilag: Fluorten.pdf;

Dear All,
please find document attached

Cordiali saluti,
Best regards

P6
Ti1

CAAST
SEALING SOLUTIONS

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Date: 24/08/2021

Kind attention:

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Dr.	P2 - Germany	ChemG@baua.bund.de
Mrs.	P3 - Sweden	E1
Mr. Toke Winther	- Denmark	towin@mst.dk
Mr.	P4 - Norway	E2
Mr.	P5 - ECHA	E3

Through: Fluorten s.r.l. - Via Cercone, 34 - 24060 Castelli Calepio (BG) - Italy

The members of Fluorten s.r.l. mainly focus on processing of Fluoropolymers, part manufacturing and its applications, the involvement of downstream users in PFAS process.

Subject: PFAS restriction proposal & request for exemption of FLUOROPOLYMERS

Reference: PFAS - Registry of restriction intentions until outcome (RoI) dated 15th July 2021

Dear Sir/Madam,

With regards to Registry of Intention (RoI) filed by 4 EU Member States (Germany, the Netherlands, Sweden, and Denmark) & Norway for the restriction of PFAS, we, a member of fluoropolymer downstream user industry, hereby, would like to share some salient facts related to the importance of fluoropolymers, critical functionalities, performance and benefits of its applications to society, while acknowledging concerns regarding PFAS emissions related to the use of fluoropolymers and their end of life.

Registry of Intention for PFAS restriction was announced by ECHA on 15th July 2021, to prepare a restriction proposal for PFAS. Fluoropolymers are also included in the scope. The restriction proposal is intended to be submitted to ECHA by 15th July 2022.

Fluoropolymers are a distinct subset of PFAS and are inherently safe, non-mobile, non-bio accumulative and non-toxic. Fluoropolymers are different from other PFAS as they **do not share the toxicological and environmental profiles** associated with PFAS of concern. Fluoropolymers have **unique set of physicochemical properties,** they meet OECD polymer of low concern criteria, and are considered to have **insignificant environmental and human health impact**.

Fluoropolymers ensure safety, reliability, durability and critical performance in numerous technologies, industrial processes and everyday applications that are important for human health, safety, and the environment. With a unique combination of functionalities, fluoropolymers are irreplaceable across many key sectors/applications. Alternatives to fluoropolymers, if exist, escalate safety risks, carbon footprint, technology regression, and do not match the advanced performance of fluoropolymers. Most importantly, restriction on fluoropolymers will make EU industry lose its technological superiority over other economies and could put Europe's climate and energy goals at risk. Overall, fluoropolymers contribute heavily to Europe's socio-economic status and are critical for the betterment of the society.

The fluoropolymer downstream user industry acknowledges the concerns regarding PFAS emissions due to the use of fluoropolymers and end of life processes. We wish to assure the authorities and EU Member States that,

we are implementing Best Available Technologies to ensure reduction in PFAS emissions in a systematic way and eventually eliminating them to achieve EU's sustainability goals. Parallelly, we are consciously working on recyclability and reusability to meet circular economy goal.

Fluoropolymers play an important role in achieving EU Green Deal objectives and UN Sustainable Development Goals (UN SDG) because of their vital use in Lithium-ion batteries, Green hydrogen, Fuel Cell, Solar and Wind energy. No new-age technologies are possible without the use of fluoropolymers. Restriction on the use of fluoropolymers would adversely impact implementation of these technologies crucial for planet's future as well as in all existing applications vital for the society.

Considering the benefits of fluoropolymer applications to environment and society, low PFAS emissions and initiatives being taken by the processing industry to further minimize emissions and closing the loop by implementing circular economy wherever possible, we request for a **complete exemption of fluoropolymers from the PFAS restriction proposal.**

Fluoropolymers processed by us:

PTFEs

.....

Service application industries:

Food, oil and gas, power generation, industrial, chemical

.....

Sincerely yours,

Name and signature

Pierluigi Fucito - CEO

.....

Company name and address

CAAST SPA Via Luigi Fumagalli, 91 22066 Mariano Comense - ITALY -

.....

Miljøministeriet
Miljøstyrelsen

Den 12. juli 2024

Aktdetaljer

Akttitel: Call for Evidence PFAS - ST116970
Aktnummer: 20
Sagsnummer: 2020 - 15422

Akt-ID:	3886364
Dato:	15-10-2021 08:52:29
Type:	Indgående
Dokumenter:	• [1] Call for Evidence PFAS - ST116970.eml • [2] PFAS_Letter_ P15 .pdf

Til: Toke Winther ([redacted]@mst.dk)
Cc: Technical Support - A/S Gunnar Haagensen ([redacted]@haagensenseals.com)
Fra: Technical Support - A/S Gunnar Haagensen ([redacted]@haagensenseals.com)
Titel: Call for Evidence PFAS - ST116970
Sendt: 15-10-2021 08:52
Bilag: PFAS_Letter_ P15 .pdf;

Dear Mr. Winther

On behalf of my company A/S Gunnar Haagensen, I am writing you with regard your involvement in the ongoing subject of PFAS restrictions.

As a member of the fluoropolymer downstream user industry, we are asking you to consider an exemption of fluoropolymer as per attached letter.

Should you have any questions, please feel free to contact me.

Med Venlig Hilsen / Kinds regards
P1
Ti1 MSc (Eng). Master of Science in Engineering
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