

Sector: Technical textile

<Hight performance membrane: Filters for waste facilities >

Element	Information
a	Type of PFAS : PTFE
b	In addition to the water repellency and oil repellency listed in the Table A.15, the following functions are required: - Waste Incineration Equipment: Heat resistant to withstand high temperature filtration for dioxin decomposition - Industrial waste treatment facilities: Chemical resistance to various toxic gases generated
c	1,700 waste incineration plants (worldwide) and companies involved in filter manufacturing (number unknown) will be affected.
d	No functionally equivalent replacement currently exists. There is a description in Annex XV that there was a report in the 2nd CfE that a polyurethane film was used as a alternative , but polyurethane cannot be a alternative because of its lack of heat resistance and chemical resistance.
e	It is necessary to start researching new materials, but as mentioned above there is no functionally equivalent substitute, and it is highly unlikely that research will find a substitute that has all of the above multiple functions.
f	-
g	If incinerators cannot operate at high temperatures, toxic substances such as dioxins will be generated, so if materials with sufficient heat resistance cannot be used, incinerators will not be able to operate. In this case, a vast area of land is required for landfill disposal of waste, and installation and operation costs for equipment such as rainwater leakage prevention equipment and rainwater treatment equipment to prevent environmental pollution caused by rainwater, etc., are enormous. Is required. In addition, if it is operated with materials that lack heat resistance and chemical resistance, not only will the outflow of dust and harmful substances increase due to the deterioration of filter performance, but it will also lead to increased maintenance costs and reduced equipment availability.

<Hight performance membrane: Diaphragm for electrolysis >

Element	Information
a	Type of PFAS : PTFE
b	In addition to the water repellency and oil repellency listed in the Table A.15, the following functions are required: - Chemical resistance: During electrolysis, chemical resistance is required due to high alkaline conditions. Chemical resistance is also required to maintain the physical membrane structure of the diaphragm. - High insulation; high insulation is required to prevent short circuits due to current flow during electrolysis.
c	-
d	No functionally equivalent replacement currently exists.
e	It is necessary to start researching new materials, but as mentioned above there is no functionally equivalent substitute, and it is highly unlikely that research will find a substitute that has all of the above multiple functions.
f	-
g	Without the PTFE diaphragm, electrolysis by the diaphragm equipment is harmful to health, and there is only asbestos that has been used in the past.

Sector: lubricants, (Sub-)use: Use of articles as lubricants

<Automotive anti-vibration products >

This application is probably related to the transport sector and mentioned as 'Lubricants based on polymeric PFASs' in Table A.41 of Annex A.

For details, see the comments no. 4525,4526.

Element	Information
a	Type of PFAS : PTFE
b	PFAS textiles are used as anti-vibration products for automobiles not only in the engine bay, but also in the undercarriage, because they exhibit stable and low friction performance over wide temperature range .
c	-
d	No functionally equivalent replacement currently exists. In the past, silicon-based materials were examined, but they were not an alternative.
e	It is necessary to start researching new materials, but as mentioned above there is no functionally equivalent substitute, and it is highly unlikely that research will find a substitute that has all of the above multiple functions.
f	-
g	If there is no perfect alternative and we have to use materials with an inferior coefficient of friction, there is concern that the alternatives will frequently break. This leads to deterioration of the environment due to increased noise, and deterioration of vehicle performance and quality, such as vehicle failure and deterioration of driving stability due to abnormal vibrations.

< Packings for industrial equipment >

This application is also mentioned in 'Case study: Use of Fluoroplastic Sealing elements in Chemical production and transport' in the comments by European Sealing Association (comment No. 4472).

Element	Information
a	Type of PFAS: PTFE
b	Compression packing is used in hydraulic equipment, compressors, pumps, boilers, etc. for the following purposes: - prevent leaks from the mating surfaces of containers containing liquids or gases; - facilitates opening motion; - buffer between parts. PTFE packing is a material with properties such as heat resistance, low temperature resistance, chemical resistance, low coefficient of friction, and self-lubricating properties , and it is used in high-temperature and corrosive environments and helps reduce pollution, energy loss and maintenance costs.
c	-
d	Materials other than PTFE are also used for compression packing, but there is currently no substitute that has all the equivalent functions.
e	It is necessary to start researching new materials, but as mentioned above there is no functionally equivalent substitute, and it is highly unlikely that research will find a substitute that has all of the above multiple functions.
f	-
g	When packing made of other materials is used, power consumption during machine operation increases due to increased friction, and deterioration of the packing due to lack of heat and chemical resistance increases maintenance costs. Accidents, disasters, and environmental pollution are expected to increase due to leaks.

< Bearings and various sliding materials >

Element	Information
a	Type of PFAS: PTFE
b	As a material with low friction, self-lubricating properties, and excellent durability, PTFE fibers are used as various maintenance-free bearings and sliding parts such as seismic isolation materials, underwater bearings, aircraft, heavy construction machinery, agricultural machinery, manufacturing equipment, and electrical appliances. It is used as various maintenance-free bearings and sliding materials in composites with thermoplastic resins, thermosetting resins and etc. For example, in the case of sliding materials for vibration isolation devices ³⁾, stable low coefficient of friction during repeated sliding, wear resistance performance, slidability under high load capacity, and creep resistance performance against constant long-term load are required.
c	-
d	There are no functionally equivalent alternatives to PTFE bearings. Rolling bearings and sliding bearings made of non-PTFE materials can be considered as bearings that do not use PTFE. Not suitable for difficult applications. In addition, rolling bearings require ancillary equipment such as grease and an oil supply system with a filter function, which leads to an increase in the size and weight of the equipment. The use of PTFE bearings eliminates the need for repeated petroleum greases and additives which would have to be repeatedly reapplied for the proper function of the part. Decreasing the need for hydrocarbon also reduces the generation of greenhouse gases during the manufacturing of petroleum products. Solids such as molybdenum disulfide and lubricating oils can also be used as lubricants, but repeated sliding depletes the lubricants and reduces durability and wear resistance, so they cannot be substitutes for all applications.
e	It is necessary to start researching new materials, but as mentioned above there is no functionally equivalent substitute, and it is highly unlikely that research will find a substitute that has all of the above multiple functions.
f	-
g	They will be replaced with rolling bearings or plain bearings using materials with high friction coefficients. In the case of rolling bearings, not only is the performance lowered, but additional equipment is required to maintain performance, which increases the size and weight of the equipment, increasing equipment costs and environmental impact. In addition, sliding bearings are inferior to PTFE bearings in function, so maintenance costs such as frequent replacement work increase, energy loss, and industrial waste increases due to the increase in used bearings, resulting in bloated costs.