

ETN'S CONTRIBUTION TO THE ECHA PUBLIC CONSULTATION ON THE PFHXA RESTRICTION PROPOSAL

September 2020

The European Turbine Network (ETN) values the opportunity to submit comments to the public consultation on the REACH restriction proposal for PFHxA, its salts and related substances.

ETN is a non-profit membership association (currently has 108 members), bringing together the entire value chain of turbomachinery technology worldwide. ETN addresses the main challenges and concerns of gas turbine (GT) users in committees and individual projects, composed of experts across the entire value chain: power generation and oil & gas companies, OEMs, R&D institutes, suppliers and service providers and technology consultancies.

ETN would like to express its support to the derogation request submitted by a coalition of filtration and separation media manufacturers (submission number 3014), for *filtration and separation media used in high performance air and liquid applications that require a combination of water- and oil-repellency*.

C6-treated filters are used to purify the air before entering turbines for energy generation purposes. C6-treated filters play a key role in the good functioning and protection of gas turbines, which in turns implies increased energy efficiency and reduced GHG emissions from gas turbines. On the other hand, very limited releases are expected to result from the use of C6 filters in gas turbines.

The criticality of C6-treated filters for gas turbines is further detailed below:

1. C6 is critical to ensure optimal operations in challenging and variable environments

Due to its **unique low surface tension**, C6-treated filters help preventing fouling and ingress of water, salts, and oil droplets in the turbine, ensuring the good functioning of the turbines even in challenging environments.

On top of that, C6-treated filters demonstrated unique performances in case of fog and icing conditions, which cannot be achieved without C6-based hydrophobic treatment.

2. C6 contributes to protect the gas turbine

The **high levels of hydrophobicity** provided by C6 fluorotelomer chemistry also help protecting gas turbines from corrosion and damages. This is particularly necessary in offshore applications since it prevents corrosion in the compressor and turbine.



Additionally, C6 filter media ensure a **high level of particulate removal efficiency**, which protects the turbine against fine dust, soot, and salts.

3. C6 is critical for energy efficiency and GHG emissions reduction

Only C6-treated filters ensure **reduced pressure drop**. Pressure drop means loss of pressure across a filter device in an air (or liquid) flow, due to resistance to flow, which can be caused by filter media, humidity, or contamination. The higher the pressure drop, the more energy is needed to run the air filtering systems. Therefore, **C6-treated filters contribute to reduce energy consumption and GHG emissions**.

Gas-fired power generation is expected to continue to play a strategic role in a decarbonised energy system. There is also a constant effort from the sector to further reduce GHG emissions. Yet, current levels of specifications for gas turbines can only be achieved with C6-treated filters.

New standards are also in development, with even stricter requirements, such as:

- ISO/PWI 29461-4 — Part 4: Test methods for static filter systems in marine and offshore environments (in development)
- ISO/AWI 29461-7, AWI, Filter element endurance test in Fog and Mist environments (in development)

Energy consumption and related GHG emissions are expected to increase in the absence of C6-treated filtration media. This is not in line with the objective of decarbonisation of the energy sector. Furthermore, this increase of GHG emissions needs to be compared with the fact that the releases of C6 that can be associated with gas turbines applications are negligible.

4. Very limited C6 releases

The main concern about C6 chemistry is related to emissions and potential implications of an increasing concentration in the long term.

On this, ETN would like to stress the **very limited releases that can be attributed to the use of C6-treated air filters**. Once applied on filtration media, C6 is not expected to be released at the stage of filter manufacturing or during use of the finished equipment. At end of life, it should be highlighted that gas turbines are being handled at end of life by established schemes. Filter products are disposed according to applicable waste codes.

C6-treated filters are typically used for 1-3 years. The time to renew filters often depends on the pressure drop -level. Without C6, the pressure drop level requiring filter renewal would be more quickly reached, triggering more frequent replacement of filters.

5. Importance of glue repellency for filter manufacturing

Glue repellency is linked to oil repellency. Filters used in gas turbines require the use of hot melt glue to assemble the filter media itself, to fix the pleats of the filters and to give them high mechanical resistance.

Without glue repellent properties, the glue would penetrate inside the media with the risk of clogging the pore, leading to an increase of pressure drop properties as well as a reduced lifetime. Glue-repellence is therefore a crucial feature for filter manufacturers used in gas turbines.

6. Re-qualification process in case of C6 substitution

A change in the composition of filters used in gas turbines would trigger an **extended requalification process**. This process would not be limited to water and oil repellency but would cover a large spectrum of requirements. A non-exhaustive list of these standards is provided in Table 2 below.

Standards for filtration media and filters for gas turbines

Filtration and separation media – Performance in terms of repellency	Performance Standards
Water repellency	EN20811 (Hydrostatic pressure)
	ISO811 (Hydrostatic pressure)
	EDANA NWSP 080.6 (Hydrostatic pressure)
	Mil Std 282 (Q-101) (Hydrostatic pressure)
	NWSP 080.11.R0 (15) (Mason Jar)
	WSP 80.11 (09) (Mason Jar)
	ASME-AG-1-2017; FC-I-3241 (prior to gamma irradiation)
	ASME-AG1-2017; FC-I-3242 (after gamma irradiation)
Glue/oil repellency and PU wicking	ISO 14419
	Tappi T559
	Dupont Kit test
	3M Kit test
Wet strength	ASME-AG-1-2017; FC-I-3233 (Wet tensile strength)
	Tappi T494 (Wet tensile strength)
	ISO 2758 (Wet burst strength)
	DIN53438

Fire behaviour relevant to media	DIN4102
	ISO11925
	EN13501
	NP P92-503, -504, -505
Filters	Performance Standards
Gas turbines	ISO/PWI 29461-4 — Part 4: Test methods for static filter systems in marine and offshore environments (in development)
	ISO/AWI 29461-7, AWI, Filter element endurance test in Fog and Mist environments (in development)
HVAC	EN779:2012
	ISO16890
	ASHRAE52.2
	ISO846
	VDI6022
EPA/HEPA/ULP	EN1822
	ISO29463
Fire behaviour relevant to final products for a wide range of applications	UL900

The requalification process would take several years and imply significant costs. As a reference, the transition from C8 to C6, which has been recently completed, took several years with high related costs.

It must be noted that the re-qualification process can only start once a good candidate has been identified. However, as discussed in the response from the coalition of filtration and separation media manufacturers, there are no candidates to replace C6 chemistry in high performance filtration applications.

Further, transitioning to non-fluorinated chemistry will take more time, and the duration of the requalification by customers is therefore expected to be longer.

ETN thanks ECHA and relevant authorities for considering these comments and remains available to discuss any part of this contribution that would require clarifications.