

Application for exemption from EU REACHPFAS control of polytetrafluoroethylene hollow fibre membrane

Subject: Application for permanent exemption for polytetrafluoroethylene hollow fibre membranes

Basis: First, polytetrafluoroethylene hollow fiber membrane has high strength, high porosity, acid and alkali resistance, high and low temperature resistance.

Second, polytetrafluoroethylene hollow fiber membrane products are extremely widely used, in gas absorption, membrane distillation, membrane bioreactor, ozone dissolution filtration, acid and alkaline wastewater treatment and other special filtration applications have great potential, and the most widely used is the membrane water treatment industry (water resources), the mainstream technology application for MBR.

Third, with the development of recent years, the demand for PTFE hollow fiber membrane in various industries continues to increase, playing an irreplaceable role.

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Polytetrafluoroethylene (PTFE) since its invention, because of its excellent chemical stability, wear resistance, corrosion resistance, non-flammability, sealing, high lubrication non-viscosity, electrical insulation and good aging resistance and other excellent properties, has been widely used in chemical, aviation, transportation, electrical and other high-end fields. In the field of environmental protection water treatment, after the mass production of PTFE materials and the significant reduction in the cost of use, it will fully become the third generation of MBR membrane materials to replace PVDF. At present, GE of the United States and Sumitomo of Japan have taken the lead in using PTFE MBR membrane materials in sewage treatment. PTFE MBR film advantages:

- 1, strong chemical resistance: PTFE material is commonly known as "plastic king", and has the most stable chemical properties in plastic materials. Resistant to high concentrations of acid, alkali and strong oxidant cleaning, PH tolerance range between 0-14.

- 2, oil and organic solvent impact: based on the material's resistance to high concentrations of acid, alkali, strong oxidant and organic solvent performance, the film can withstand the impact of oil and high load of organic solvents. In the face of this operating condition, the performance of the membrane system can be restored by high-strength detergent cleaning, and once the PVDF product is affected by the pollution in this respect, the membrane system will be damaged, and it is seriously necessary to replace the new membrane.

3. Good anti-pollution performance: composite PTFE hollow film using PTFE as its filter layer, its unique non-adhesive and self-lubricating, so that the vast majority of polluting substances are not easy to adhere to the surface of the film, with strong anti-

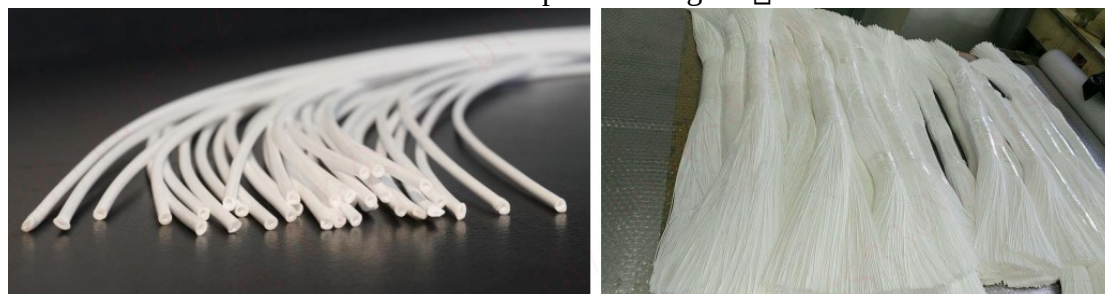
pollution performance, and easy to clean, drug consumption, energy consumption.

4. Long service life: PTFE film has strong acid and alkali resistance, chemical corrosion resistance, and unique support layer technology, with strong anti-shaking and anti-erosion ability, normal service life of 8-10 years, is 2-4 times the service life of general PVDF material film.

5. Super large water production flux: PTFE film has higher porosity than PVDF, coupled with unique hydrophilic modification and renewable process, so that it can maintain a large water flux and minimum flux attenuation during the application life. The membrane application process can withstand higher pressure and aeration shock, thereby improving process efficiency and effectiveness.

6. The membrane elements can be stored in a dry state: it can be stored in a dry environment, and the film material and performance are not affected, especially for projects with unstable water flow in the early stage of operation.

PTFE hollow fiber membrane filament product diagram□



PTFE hollow fiber membrane module product diagram□



From the perspective of different applications, PTFE hollow fiber membrane is mainly used in municipal sewage treatment, industrial wastewater treatment, food and beverage industry, medical industry, oil industry, etc., because of its excellent performance plays an irreplaceable role.

Comparison table of mainstream hollow fiber membrane

Comparison item	PTFE	PVDF	PVC	PAN	PP
Chemical resistance	superexcellence	optimal	good	good	normal
Filter life	□□ 7 □□□	1-3 □	1-3 □	6 □□-1 □	6 □□-1 □
overprecision	0.01μm	0.01μm	0.01μm	0.01μm	0.01μm
Product	Easy: the filter	Difficult:	Difficult: the	Difficult: the	Difficult: the

maintenance	element can be cleaned and restored with high intensity	very need to break the wire when cleaning	filter element needs to be replaced when it is contaminated	filter element needs to be replaced when it is contaminated	filter element needs to be replaced when it is contaminated
Safety performance	Safe (to handle any chemical environment)	Safe (except strong acid and strong breaking environment)	There is a risk of harmful substances precipitation	Easy to produce secondary pollution	Easy to produce secondary pollution
Total water production using JF-W-1 as an example)	More than 200 tons	50tons	30tons	30tons	2tons
Advantage	Excellent chemical stability, strong pollution resistance, good water permeability, high strength, high temperature resistance	Strong resistance to pollution, chemical cleaning and high concentration of residual chlorine solution	Strength and elongation is not as good as PAN, easy to break wire	The material is easy to obtain, the film production cost is low, the hydrophilic material is easy to form the film	Low material price, low consumption, low cost, resistance to organic solvents

The global PTFE hollow fiber membrane market grew from \$61.82 million in 2017 to \$93.35 million in 2021, representing a CAGR of 11.0%. The global PTFE hollow fiber membrane market is expected to grow to \$186.88 million in 2028, with a CAGR of 10.2% from 2022 to 2028.

In terms of products, curtain membrane components still dominate the global market in 2021 PTFE hollow fiber membrane for curtain membrane components accounted for 75.97% of the total market size, and the market share of column membrane components is expected to decline to 11.46% by 2028. From the perspective of product market application, municipal sewage treatment accounted for 60.91% of the market size, followed by industrial wastewater treatment, accounting for 13.06%, and the medical industry market accounted for 6.72%. In the future, with the increase of global medical investment, we expect that the medical industry will increase to 10.77% of the market in 2028.

At present, the production capacity of PTFE hollow fiber membrane of global enterprises has reached 2660 thousand square meters, and the main enterprises include Sumitomo Electric, Gore, Theway, Jingyuan Technology and Eastern Great Environment. By 2021, the share of the top ten enterprises will reach 92%, among which the local enterprises Jingyuan Technology and NEda Environment are in a leading position in the Chinese market and have developed rapidly in recent years. In the long run, the development prospects of the PTFE hollow fiber film market are great, and with the continuous strengthening of policy support for precision PTFE hollow fiber film projects, the future PTFE hollow fiber film market will maintain a growth rate of 10%.