

□□ **PFAS** □□□□□□□□□□

Application for exemption from the draft PFAS

□□□□□**ETFE** □□

ETFE film

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Suzhou Hondol New Material Co., Ltd.

□□:2023 □ 8 □ 23 □

Date: August 23,2023

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ETFE, CAS NO.:65324-12-1

ETFE 氟乙烯-氟乙烯共聚物，是一种氟素聚合物。ETFE 膜具有优异的机械性能、化学稳定性、耐候性、透光率高等特点。ETFE 膜可以直接从材料制成薄膜。ETFE 膜具有良好的耐久性、易于清洁和稳定性，是一种典型的非织物膜材料，是目前最先进的膜材料。因为具有其高透光率、阻燃、耐久性、易于清洁和稳定性，它被广泛用作玻璃的替代品，通常被称为“软玻璃”。建筑物使用 ETFE 膜包括 Amhiem 动物园在荷兰，Hampshire 网球和健身俱乐部在英国，Eden 在英国，Moby Dlck 游泳池在德国，Masoala 雨林在瑞士，等等。

ETFE chemical name ethylene tetrafluoroethylene copolymer, is a fluorine-containing polymer thermoplastic material, is an artificial high strength fluoropolymer, ETFE film directly from the material into a film. ETFE film has good durability, easy cleaning and stability, is a typical non-fabric film material, is the most advanced film material in the world. Because of its high light transmission, flame resistance, durability, easy cleaning and stability, it is widely used as a substitute for glass, commonly known as "soft glass". Buildings built with ETFE membranes include Amhiem Zoo in the Netherlands, Hampshire Tennis and Fitness Club in the United Kingdom, Eden in the United Kingdom, Moby Dlck swimming pool in Germany, Masoala Rainforest in Zurich, Switzerland, and so on.

在光伏领域，双面组件的需求和市场份额近年来一直在增加，高效和大尺寸、轻量化也是未来发展趋势。作为双面组件的两大封装方法，双面玻璃封装组件具有更好的耐候性，但由于重量大、尺寸受限、生产线匹配和其他原因，导致在生产能力、施工等方面存在一定局限性，所以透明背板是一个更好的选择。

In the photovoltaic field, the demand and market share of double-sided modules have been increasing in recent years, and efficient and large-size and lightweight are also future development trends. As one of the two main packaging methods of double-sided components, double-sided glass packaging components have better weather resistance, but due to large weight, limited size, production line matching and other reasons, resulting in certain limitations in production capacity, construction, etc., so transparent backplane is a better choice.

PVDF 和 PVF 膜具有优异的机械性能、化学稳定性、耐候性、透光率高等特点。ETFE 膜具有优异的机械性能、化学稳定性、耐候性、透光率高等特点。ETFE 膜可以直接从材料制成薄膜。ETFE 膜具有良好的耐久性、易于清洁和稳定性，是一种典型的非织物膜材料，是目前最先进的膜材料。因为具有其高透光率、阻燃、耐久性、易于清洁和稳定性，它被广泛用作玻璃的替代品，通常被称为“软玻璃”。建筑物使用 ETFE 膜包括 Amhiem 动物园在荷兰，Hampshire 网球和健身俱乐部在英国，Eden 在英国，Moby Dlck 游泳池在德国，Masoala 雨林在瑞士，等等。

Compared with the traditional PV backplane with PVDF, PVF and fluorine coating as the outer protective material, ETFE has better weather resistance, heat resistance, scratch resistance and hydrophobicity, and is a more ideal material as the outer material facing ultraviolet light. And portable photovoltaic energy storage is on the rise, ETFE has a unique advantage, it can be used as a packaging material for flexible photovoltaic modules, to achieve flexibility and portability. In the future, photovoltaic power generation will be rapidly applied in many scenarios with high requirements for lightweight, portability and application, such as RV, outdoor activities and disaster emergency, and ETFE materials are expected to open up more application scenarios.

Request an exemption:

We apply for the exclusion of the substances mentioned from the PFAS ban.
ETFE is not PFAS

Grounds for exemption:

1

[1] Photovoltaic power generation is an important way to achieve carbon neutrality

1

Traditional fossil energy consumption will emit a lot of greenhouse gases, in order to achieve the goal of carbon neutrality, countries vigorously promote the development of new energy (see Table 1), the market application continues to expand. With the acceleration of the global response to climate change, the development of the photovoltaic industry has received policy support, and the market demand continues to increase, and China's photovoltaic products exports exceeded 28.4 billion US dollars in 2021.

1

Table 1 Carbon neutrality timelines and emission reduction targets for major countries or organizations

nation	Carbon neutral time	Emission reduction target
Germany	2045	2030 greenhouse gas emissions will be 65% lower than 1990

		in 1990
美国 America	2050 年	2030 年温室气体排放量 2005 年 50%~52% By 2030, US greenhouse gas emissions will be reduced by 50 to 52 percent from 2005 levels
日本 Japan	2050 年	2030 年温室气体排放量 2013 年 40% Greenhouse gas emissions by 2030 will be 40% lower than in 2013
欧洲 Union	2050 年	2030 年温室气体排放量 1990 年 55% By 2030, greenhouse gas emissions will be at least 55% lower than in 1990
法国 France	2050 年	将减排速率提高三倍 It is proposed to triple the rate of emission reduction
英国 Britain	2050 年	2030 年温室气体排放量 1990 年 68% By 2030, greenhouse gas emissions will be at least 68% lower than in 1990
中国 China	2060 年	2030 年单位 GDP 温室气体排放量 2005 年 60%~65% By 2030, emissions per unit of GDP will be 60% to 65% lower than that of 2005. Carbon emissions peak in 2030
俄罗斯 Russia	未指定	1990 年至 2030 年温室气体排放量减少 25%~30% Reduce greenhouse gas emissions by 25% to 30% between 1990 and 2030

中国提出 2030 年碳达峰、2060 年碳中和目标，对全球气候治理产生深远影响。中国作为全球最大的发展中国家，其减排承诺体现了负责任大国的担当，也为全球应对气候变化贡献了中国智慧和中国方案。

The double carbon target promotes the rapid growth of global photovoltaic installed capacity year by year, the price of raw materials is low, and the cost of photovoltaic modules is falling, which will also promote photovoltaic to become an energy alternative in a wider range of application scenarios, bringing a significant increase in demand.

2. ETFE 在光伏中的应用

[2] ETFE film is irreplaceable in photovoltaic power generation

在光伏背板材料中，PVF 和 PVDF 材料具有明显的衰减，而 ETFE 材料具有优异的耐候性、耐热性、抗划伤性和疏水性，是光伏背板材料的理想选择。

In the existing transparent backplane production technology, the outermost layer is mainly polyvinyl fluoride film (PVF) and polyvinylidene fluoride film (PVDF), which has obvious attenuation in various climatic conditions and lack of weather resistance. ETFE film material is used for transparent backplane products, with better weather resistance, heat resistance, scratch resistance and hydrophobicity, as the outer

material facing ultraviolet light, is a more ideal material, effectively make up for the prior art PVDF plastic film due to low melting point and easy thermal shrinkage defects.

[3] Ethylene and tetrafluoroethylene copolymer films (ETFE) have not been

shown to be harmful

3.1 Toxicity data, human clinical data and physicochemical properties

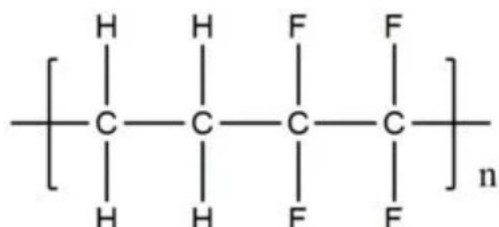
Based on fluoropolymer toxicity data, human clinical data, and physical and chemical properties, fluoropolymers meet widely accepted regulatory assessment criteria and should be considered a polymer PLC of low concern. Fluoropolymers have high molecular weight, narrow molecular weight distribution, negligible oligomer content and organic and inorganic extractives. The data show that fluoropolymer has thermal stability, chemical stability, photochemical stability, hydrolytic stability and biological stability. ETFE has been extensively tested to comply with U.S. and European Union food contact and global medical device regulations (e.g., U.S. Food and Drug Administration, CFDA, Korean MFDS, Japanese PMDA), including ISO 10993 biocompatibility testing and preclinical animal testing. Toxicological studies of ETFE have shown no acute or subchronic systemic toxicity, irritation, sensitization, implantation local toxicity, in vitro and in vivo genotoxicity, hemolysis, complement activation, or thrombosis. The data presented indicate that PFAS in the fluoropolymer category are well defined, comply with PLC standards and should be considered significantly different from PFAS in other categories. Scientific data does not support grouping all PFAS together.

3.2

3.2 There is no relevant evidence to prove the harmfulness in the production process

ETFE 氟乙烯-氟乙烯共聚物，是一种含氟聚合物热塑性材料，是由乙烯、四氟乙烯共聚聚合而成的人工高强度氟聚合物，ETFE 膜直接从共聚聚合材料挤出或吹塑成型。在共聚聚合和成型过程中，没有产生有害物质，没有相关证据能证明其有害性。

ETFE chemical name ethylene tetrafluoroethylene copolymer, is a fluorine-containing polymer thermoplastic material, is made of ethylene, tetrafluoroethylene copolymerization of artificial high strength fluoropolymer, ETFE film directly from the copolymerization material cast or blow molding film. No harmful substances are produced in the copolymerization and forming process, and there is no relevant evidence to prove the harmfulness.



3.3 氟乙烯-氟乙烯共聚物

3.3 There is no relevant evidence to prove the harmfulness in the use process

氟碳键键能 $485\text{kJ}\cdot\text{mol}^{-1}$ ，氟碳键键能大，不易断裂，所以它具有优良的耐酸、耐碱、耐老化、耐气候、耐辐射、耐污染等性能。ETFE 膜在使用过程中，不会产生有害物质，没有相关证据能证明其有害性。

The bond energy of fluorocarbon bond is $485\text{kJ}\cdot\text{mol}^{-1}$, the bond energy is large, and it is not easy to break, so that it has good acid resistance, alkali resistance and weather resistance. Therefore, the performance of ETFE film is stable during use, and it is not easy to decompose and oxidize. The product is only used in photovoltaic power generation components, does not produce direct contact with the human body, and as a building membrane structural material has been widely used, there is no relevant evidence to prove its harmful.

4 产品特性

[4] Excellent product features:

本公司 ETFE 膜产品采用 ETFE 树脂通过流延和吹膜工艺
9600 万平方米。膜产品具有良好的一致性和优异的性能，并
克服 ETFE 不能阻隔紫外线的技术难题。配方稳定，
生产工艺成熟，厚度、宽度、颜色、粗糙度可根据客户需求
定制。

Our company uses ETFE resin to make ETFE film products by casting and blowing film processes, and has achieved large-scale mass production with an annual capacity of 96 million square meters. The membrane products have good consistency and excellent performance, and overcome the technical problem that ETFE cannot block ultraviolet light. The formula is stable, the production process is mature, and the thickness, width, color and roughness can be customized according to customer needs. Technology iteration to achieve cost reduction and efficiency, improve power generation efficiency, reduce the weight of photovoltaic modules, and help the diversification of photovoltaic power generation applications, has a non-negligible role in promoting the development of photovoltaic power generation industry.