POREX® Microporous PTFE (Polytetrafluoroethylene) Fact Sheet

Porex Corporation is a global market leader in porous materials development, manufacturing, and innovation.

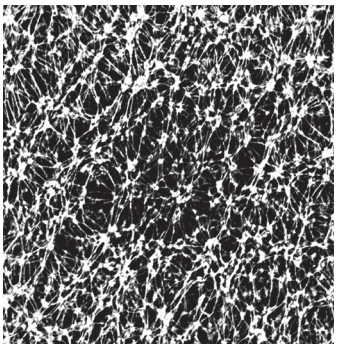
Discovered in the 1930's, PTFE is a well-known material that has excellent temperature, environmental and chemical resistance, and is used in many electrical, industrial, medical and consumer applications. PTFE also has very low surface energy making it very slippery and naturally hydrophobic. In the late 1960's, a process was developed to stretch PTFE film (known as expanded PTFE or ePTFE) to the point it becomes porous thus allowing passage of small molecules such as air and water vapor yet still repelling polar liquids such as water. Expanded PTFE, often fabric supported as part of a layered composite, found applications in areas such as in rain resistant breathable clothing and many industrial venting applications.

In the 1990's, Porex developed a proprietary PTFE sintering process to manufacture an engineered breathable microporous material that offered an alternative to expanded PTFE. Microporous PTFEs' manufacturing process results in an intricate network of open-celled, omni-directional pores that offer a different level of performance compared to ePTFE.

The POREX Microporous PTFE process begins as a powder with a tight particle size distribution. The powder then goes through a forming and sintering process to create a bulk microporous structure. This process fuses the particles of powder together but also creates a void between them. The size of the voids can be predetermined by varying the morphology of the starting powders. The resulting structure is then cut to a precisely controlled thickness.

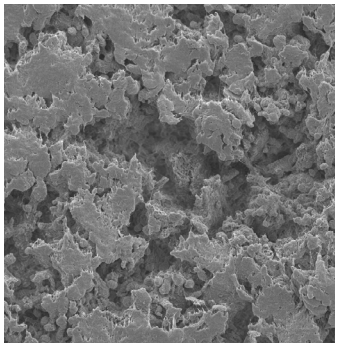
The process results in a robust, durable, design-flexible omni-directional material with long-term value advantages that does not require a supporting layer. It can be easily handled manually or by high-speed equipment with minimal damage concern and can be applied using various techniques such as adhesive backing, vibrational or heat welding, or insert molding.

To better illustrate the differences between ePTFE and POREX Microporous PTFE, below is a microscopic image of a typical unsupported ePTFE membrane. The membrane forms a network of interconnected nodes and fribules which provides the structure for gases to pass. One of the limitations of this network is the tensile pull of the fribules to the nodes which can change with temperature and pressure, thus the ePTFE membrane is often part of a multi-layered structure that supports and protects it.

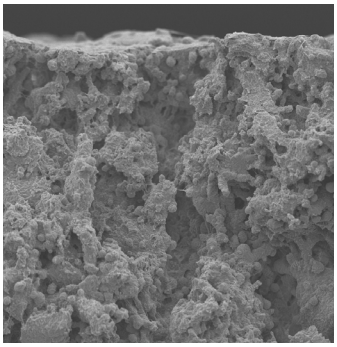


Below are typical microscopic images of POREX Microporous PTFE. Structure differences are apparent as absent are the nodes and fribules and visible is a network of well-controlled particles all bonded to their neighbors.

This structure provides a very robust 3 dimensional membrane that experiences very little change with temperature or pressure, and requires no supporting layers.



Top View



Cross Section View

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With the differing structures come different features and benefits....

Features	POREX Microporous PTFE	Expanded PTFE with no support*	Expanded PTFE with support*
Naturally Hydrophobic (IP rated)	Yes	Yes	Yes
Sintered Porous Structure	Yes	ID	ID
High Temperature (>250 C)	Yes	Yes	No
High tensile strength in all directions	Yes	No	ID
Precise porosity and thickness control	Yes	U	U
High UV and outdoor weather resistance (UL 746C)	Yes	Yes	No
Meets UL 94 flammability (V0)	Yes	ID	No
High open area (>80%)	No	Yes	U
Secondary oleophobic treatment meets AATCC grade 8	Yes	U	U
Water naturally runs off surface	Yes	ID	ID
Benefits			
Low flex fatigue	Yes	No	Yes
Omni-directional (can be installed any direction)	Yes	Yes	No
Heat welding	Yes	Yes	ID
Vibrational Welding	Yes	No	ID
Can apply physical pressure to membrane	Yes	ID	ID
Can plate metallic or other secondary layers	Yes	ID	ID
Low sound blocking	ID	Yes	ID
Mounting inside or outside of enclosure	Yes	Yes	ID

* There are numerous suppliers and variations within these classes of materials and some exceptions may occur

U – Unknown
ID – Insufficient Data

POREX
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