

Introduction to the working principle of hollow fiber



Summary of Content

Hollow fiber membranes operate by selectively allowing small molecules to pass through their porous walls while retaining larger particles, using pressure or concentration gradients.

Structure and Composition

A hollow fiber is a thin, tubular membrane with a hollow center called the lumen. The fibers are typically made from synthetic polymers such as polysulfone, polyethersulfone, or cellulose acetate, chosen for their chemical stability and mechanical strength. The outer diameter of these fibers is usually less than 1 millimeter, while the inner diameter is often greater than 25 micrometers. The fiber wall itself is porous and asymmetric, with a dense layer controlling separation and a more porous substructure providing support. Thousands of these fibers are bundled into a module or cartridge, creating a high surface area-to-volume ratio for efficient filtration.

Separation Mechanism

Hollow fiber membranes rely on selective permeability. A pressure differential (transmembrane pressure) or a concentration gradient drives the fluid through the fiber wall. Molecules smaller than the pore size pass through as permeate, while larger molecules or particles are retained in the feed stream. The pore size determines the type of filtration:

- Microfiltration (MF): Larger pores remove suspended solids, bacteria, and large particulates.

Article Content

Hollow Fiber Membranes

Hollow fiber can find uses in all types of filtration, ranging from microfiltration to reverse osmosis. Hollow fiber filtration works on the

State-of-the-Art Organic

Herein, this review systematically outlines the fundamentals of hollow fiber membranes,

Hollow Core Fiber: Fundamentals, Advantages, and the

Hollow Core Fiber: Fundamentals, Advantages, and the Road Ahead A comprehensive guide

Hollow Fiber Ultrafiltration Membrane: Complete Guide

This comprehensive guide covers the working principle, applications, and latest industry trends for 2026.

What is a Hollow Fiber Filter and How Does It Work?

A hollow fiber filter uses porous fibers to separate contaminants from liquids or gases, offering efficient filtration for

Understanding Hollow Fiber Membrane Bioreactors

This blog post summarizes the features of hollow fiber membrane bioreactors. If you're exploring bioreactors for your

How Does Hollow Fiber Membrane Work?

Hollow fiber membranes work on the principle of size exclusion. When a fluid mixture is passed through these fibers,

Operating Principle of the Hollow Fiber UF Membrane

The operating principle of hollow fiber ultrafiltration membranes is to use a certain pressure

Hollow Fibers: From Fabrication to Applications

Hollow fibers have attracted more and more attention due to their broad range of applications in numerous fields. We

What is a Hollow Fiber Membrane?

In this article, we will explore what hollow fiber membranes are, how they work, their

How Does Hollow Fiber Membrane Work?

Hollow fiber membranes play a vital role in filtration technology. They find extensive applications across diverse

How a Hollow Fiber Membrane Module Works

Explore the physical design, selective separation mechanisms, and real-world engineering benefits of hollow fiber

A Comprehensive Review of Hollow-Fiber Membrane Fabrication

This work presents methods of obtaining polymeric hollow-fiber membranes produced via the dry-wet phase inversion

Hollow Fiber Membrane: How It Works, Uses, and Key

Hollow fiber membrane technology is an important part of contemporary filtration systems, which are

Fibers | Special Issue : Hollow Fiber Membranes: Sustainable ...

Since the inventions of Mahon and the group at Dow Chemical to use polymeric hollow-fiber (HF) membranes as a separation

Production and applications of hollow fibers

The manner in which this technology works is depicted in the figure titled "Basic principle of hollow fiber" in reference 4. Each

Hollow Fibre Membrane Module

A hollow fiber module is defined as a filtration system that contains numerous empty filaments arranged in a compact configuration,

What Is a Hollow Fiber and How Does It Work?

The mechanism by which a hollow fiber separates substances is known as selective permeability, driven primarily by a

Hollow Fiber Membrane: The Ultimate Expert Guide

Polychloronitril (PAN)- provides better fouling resistance Science behind Hollow Fiber Solutions Understanding science behind

Review of Hollow Fiber Membranes for Gas Separation: Exploring

Hollow fiber membranes have revolutionized various gas separation processes due to their unique characteristics

Hollow Fiber Filtration: Features, Benefits, and Applications

In the world of filtration technologies, hollow fiber filtration has emerged as a game-changer, offering a wide range of

How Does a Hollow Fiber Membrane Work?

Learn how hollow fiber membranes work, how they filter fluids, their key roles in water treatment, and why they are essential in

Hollow fiber membrane

As the polymer is extruded through the annulus of the spinneret, it retains a hollow cylindrical shape. As the polymer exits the

How Hollow Fiber Membranes Work for Filtration

Hollow fiber membranes are a class of artificial filters defined by a semi-permeable barrier shaped like a straw, often

Hollow fibre and hollow fibre membrane – production, structure, and ...

Basically, HFMs contain fibre having a 0.10–1.0 mm inner diameter of hollow space, and they can also vary according to the demand

Understanding the Scientific Principles of Hollow Fiber Filter ...

Hollow fiber filter technology uses selective permeability and transport phenomena to optimize filtration, ensuring high

Contact Us

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