

MEMBRANE FILTRATION

**ADVANCED CHARACTERIZATION TECHNOLOGIES
FOR MEMBRANE FILTERS**

FULLY AUTOMATED | DIGITAL

At M19 Material Intelligence Lab, Baroda, we develop and deliver game-changing Membrane Testing Instruments. These instruments empower you to:

- **Develop High-Performance Membrane Products**
- **Enhance your R&D and QA/QC Efforts**
- **Gain a Competitive Market Position**

All supported by our ASTM based Characterization Products, Lab Testing Services Division.

Membrane Filtration plays a vital role in separating and purifying materials across various industries. Imagine tiny sieves that selectively allow certain things to pass through while capturing others. This is the essence of membrane filtration technology. These membranes with precisely controlled pore sizes act as barriers, separating particles, microorganisms, and even dissolved substances from liquids and gases. Membrane Filtration is a constantly evolving technology. It tackles a wide range of challenges across diverse industries, from pharmaceuticals and food production to water treatment and wastewater management. This translates to real-world benefits.



Improved Product Quality: By removing impurities, membrane filtration ensures higher quality products across various industries.



Enhanced Environmental Sustainability: The technology helps reduce waste and water usage, supporting a more sustainable future.



Efficient Resource Management: It allows for the recovery and reuse of valuable materials, contributing to responsible resource management.



HOW WE HELP?

- Design & Manufacture ASTM based Membrane Testing Instruments
- Provide Lab Testing & Contract Research Services
- Identify & Rectify Failures
- Improve Product Performance
- Ensure Your QA/QC Requirements





APPLICATIONS

- All types of Polymer Membranes
- Nanoporous UF/RO Membranes
- Hollow Fibers
- Silica/Zeolite Membranes
- MMM and MOF Membranes
- Perovskite Membranes
- Pharmaceutical Grade Sterility Filters
- Battery Separators & Fuel Cells
- SWRO/Desalination Cartridge Filters

MICROPORE ANALYZER







The advanced MicroPore Analyzer (Model: MPA-100) with sophisticated technology, employing Liquid Displacement and Capillary Flow Porometry, proves to be highly effective in evaluating the absolute/nominal micron rating, pore size distribution of a wide range of filters and membranes. It is an indispensable ASTM F316 based standard which helps researchers and industrial professionals suitable for pore size testing.

-  Standard : ASTM F316, ASTM D6767
-  Test Range : 0.1 -100 microns
-  Test Duration : 2-3 minutes
-  Precision : 0.01% F.S.

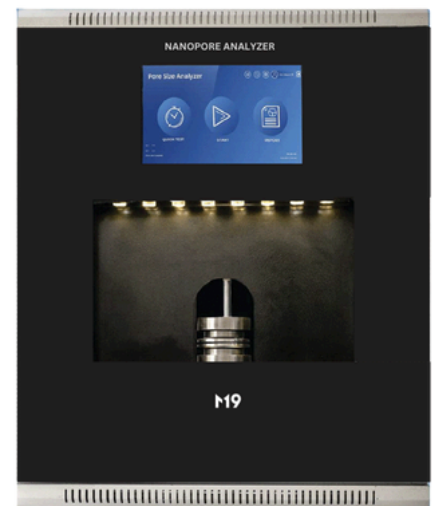
Application: Microporous Media, PTFE/PVDF Membranes, Water Filters, Air Filters, Pharmaceutical Membranes, Meltblown/Spunbond Media, Wound Filters, Depth Filters, MOFs, Packaging Materials, Supercapacitors & Batteries.

NANOPORE ANALYZER

The Nanopore Analyzer (Model: NPA-500) distinguishes itself as a state-of-the-art Pore Size Analyzer, equipped with remarkable capabilities. Its advanced technology, leveraging both Liquid Displacement and High Pressure Capillary Flow Porometry to determine absolute/nominal micron ratings, pore size distribution, for evaluating the performance of a wide range of membranes and filters for the precise filtration. It is an indispensable tool which allows researchers and industrial professionals to select high-performance filters, maintain quality standards, and meet regulatory requirements in Filtration & Separation system.

-  Standard : ASTM F316, ASTM D6767
-  Test Range : 0.01-10 microns
-  Test Duration : 1-3 minutes
-  Precision : 0.01% F.S.


Application: SWRO Membranes, UF Membranes, PTFE/PVDF Membranes, Gas Separation Membranes, Hollow Fibers, Depth Cartridge Filters, Ion Exchange Membranes.



LIQUID PERMEABILITY ANALYZER




The Liquid Permeability Analyzer (Model: LP-100) is a sophisticated instrument designed for understanding the fluid transport properties of porous material across various fields. Liquid Permeability Analyzer plays a crucial role in the filter development, QA/QC, and performance evaluation. It provides valuable insights into the designing of filters and membranes.

 Standard : REF. ISO 7231, REF. ASTM F778

 Test Range : 0 - 100 slpm


 Test Duration : 5-6 minutes

 Precision : 0.15% of reading

Application: Water Filters, Sterility Filters, SWRO Membranes, UF Membranes, Pharmaceutical Membranes, PTFE/PVDF Membranes, Hollow Fibers, Depth Filters, Ceramic Filters, Carbon Filters, Ion Exchange Membranes, Fuel Filters, Woven/Non-Woven Fabrics, Meltblown/Spunbond Fabrics.


GAS PERMEABILITY ANALYZER

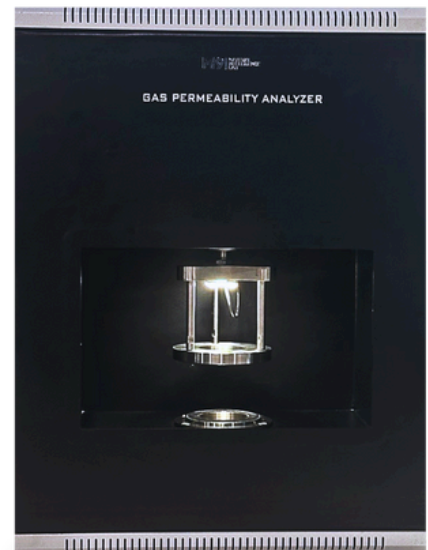
The Gas Permeability Analyzer (Model: GP-100) is a sophisticated instrument designed to measure the rate at which gases pass through membranes under controlled conditions. In the Filtration & Separation industry, the GP-100 is essential for evaluating the permeability of various materials such as membranes and filters. The specifications of GP-100 can vary depending on the intended applications and the range of materials by providing accurate measurements of gas permeability, GP-100 contributes to improving efficiency, safety, and sustainability across different stages of filtration & separation system.

 Standard : ASTM D737-18, ISO 9237, ASTM F778

 Test Range : 0 - 10,000 CFM

 Test Duration : 5-6 minutes

 Precision : 0.15% of reading





Application: Gas Separation Membranes, Microporous Membranes, Packaging Materials, Aerospace Materials, Breathable Fabrics, Coated/Laminated Fabrics, Meltblown/Spunbond Media.


DIFFUSIONAL PERMEABILITY ANALYZER




The Diffusional Permeability Analyzer (Model: DP-500) is an advanced instrument used to measure the permeability of materials to gases by assessing the rate of diffusion through the material. These materials selectively allow certain gases to pass through while blocking others based on their permeation rates. By measuring the diffusional permeability of different gases, researchers can determine the selectivity of the membrane. This information is essential for designing and optimizing membranes for gas filtration/separation processes in gas purification and carbon capture.

 Standard : ISO 15105-1, ASTM D1434, JIS K 7126, GB 1038

 Test Range : 0.05 -50,000 cm³/m²·24h·0.1MPa

 Test Duration : 60 minutes

 Precision : 0.001 cm³/m²·24h·0.1MPa


Application: Gas Separation Membranes, Polymeric Membranes, Food Packaging Material, Pharmaceutical Packaging Material, Water Treatment Materials, Barrier Films, Protective Clothing, Wound Dressing Material, Geotextiles, Fuel Cell Membranes, Insulation Materials.

FILTER INTEGRITY ANALYZER

In the Pharmaceutical industry, maintaining the filter's integrity is crucial for product quality and safety. The Filter Integrity Analyzer (Model: FIA-100) verifies the filter's effectiveness throughout the production line, ensuring sterility in processes such as sterilizing filtration by checking Bubble Point, Forward Flow, and Water Intrusion conditions. It conducts quality control tests, providing real-time feedback to optimize processes and validate cleaning procedures for filter reuse. The Filter Integrity Analyzer also confirms proper filter installation, preventing contamination, and meeting regulatory standards like GMP guidelines.

 Standard : ASTM F316

 Test Range : 0.1-1 microns

 Test Duration : 6-7 minutes

 Precision : 0.1%

Application: PTFE/PVDF Membranes, Cartridge Filters, Capsule Filters, Depth Filters



Step 1: Sample Preparation

1.1 Select the Sample: Choose representative samples from your batch for testing.

1.2 Package Your Sample: Pack your samples securely to prevent any damage during transit. Each sample should be individually wrapped and labeled to ensure they can be easily identified.

Make sure to include the Sample Specification Sheet detailing important information about each sample, such as the type of sample, material composition, manufacturer, and any other specific test parameters.

Step 2: Sample Dispatch

2.1 Select a Reputable Courier: Choose a reliable courier service that offers tracking and ensures your package will arrive safely at the lab.

2.2 Address and Dispatch: Clearly write the laboratory's address on your package and dispatch it via your chosen courier.

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Ph- +91 8140308833*

2.3 Share Tracking Information: Share the courier tracking number with the lab so they can anticipate the arrival of your samples.

Step 3: Lab Confirmation and Follow-up

3.1 Arrival Confirmation: Upon receipt of your samples, M19 lab team shall confirm their arrival and condition.

3.2 Lab Testing: The lab will then perform the requested tests. The timeline for this can vary depending on the complexity and volume of the tests.

3.3 Results and Report: Once testing is complete, M19 lab team will compile a detailed report and share the results with you. This may be done via email, through a client portal, or provided as a hard copy, depending on the lab's practices and your preferences.

✓ **What is the importance of Membrane Filters?**

Membrane Filters are vital across industries for separation, purification, and quality control. They ensure clean drinking water, product quality in food and pharmaceuticals, environmental protection, and more. Membrane Filters are versatile tools with applications in water treatment, food processing, oil and gas, chemicals, electronics, and healthcare, contributing to safety, quality, and environmental sustainability.

✓ **What are the different types of Membrane Filtrations?**

Each type of membrane filter has distinct characteristics and is chosen based on the specific separation requirements of the application. Microfiltration (MF), Ultrafiltration (UF), Nanofiltration (NF), Reverse Osmosis (RO), Forward Osmosis (FO), Gas Separation Membranes, Pervaporation Membranes, Electrodialysis Membranes, Hemodialysis Membranes, Gas Permeable Membrane.

✓ **What is the importance of Membrane Filtration in the Desalination Process?**

Filter membranes are vital in desalination processes, where they perform several key functions:

Pre-Treatment

Membranes like MF and UF remove large particles and impurities from incoming seawater, ensuring it's clean and safe for further processing.

Reverse Osmosis (RO)

RO Membranes are the core of desalination, selectively allowing water molecules to pass through while rejecting salts and impurities, yielding freshwater.

Membrane Scaling

Scaling is the formation of mineral deposits on the membrane surface or within the pores, often due to the precipitation of dissolved salts.

Pressure and Flow Control

Membrane Filters protect pressure vessels and control flow rates in the RO process, ensuring efficiency.

✓ **What is the difference between Membrane Filtration and Conventional Filtration?**

Conventional filtration typically uses physical barriers like sand, cloth, or paper to remove particles based on size. On the other hand, membrane filtration uses semi-permeable membranes that can selectively separate substances at the molecular level, offering higher precision and efficiency in removing contaminants.

✓ **What is the difference between selectivity and permeability in Gas Separation Membranes?**

Permeability refers to the rate at which a gas passes through a membrane, while selectivity is the membrane's ability to preferentially separate one gas from a mixture over another. High selectivity and high permeability are desired for efficient gas separation.

✓ **What is Membrane Integrity Testing?**

Membrane Integrity Test involves assessing the structural integrity of a membrane to ensure it does not have defects, cracks, or leaks. Common Integrity Tests include the Water Intrusion Test and the Pressure Hold Test. The choice of testing method depends on the specific application and the information required about the membrane's permeability. It's important to follow standardized testing procedures and protocols, especially in industries where quality control and regulatory compliance are critical, such as pharmaceuticals and water treatment.

✓ **What are the advantages of Filter Integrity Analyzer?**

Filter Integrity Analyzer is an essential tool used to ensure that filtration systems, particularly in critical applications like Pharmaceuticals, Biotechnology, and Food and Beverage industries, are operating effectively and reliably. The use of a Filter Integrity Analyzer provides significant advantages in ensuring the effectiveness and reliability of filtration systems. These benefits span from maintaining product quality and regulatory compliance to optimizing operational efficiency and cost savings. Integrating this tool into regular maintenance and quality control protocols is a best practice for industries where filtration is a critical component of the production process.

✓ **What is a Bubble Point Test?**

The Bubble Point Test is a method used to determine the pore size distribution and pore structure of porous materials, such as membranes, filters, and porous ceramics. It is particularly useful in characterizing the largest pore size and the effectiveness of a material in filtering or separating fluids. The Bubble Point Test measures the pressure required to force a non-wetting liquid (typically a liquid that does not easily wet the material's surface, such as mercury or certain organic liquids) through the largest pore in a porous material. When the pressure exceeds the bubble point, the liquid starts to pass through the largest pore, and this pressure is used to calculate the size of the largest pore.

✓ **How Pore Size Distribution is useful for Membrane Manufacturers?**

Pore size distribution is crucial for membrane manufacturers as it directly impacts the membrane's performance, functionality, and suitability for various applications. By accurately measuring and controlling pore size distribution, manufacturers can develop high-quality membranes tailored to specific applications, ensure regulatory compliance, and optimize performance and cost. Also, Performance Optimization of Filtration Efficiency, Cutoff Size, Flux Rate and Permeability.

✓ **What are the applications of Diffusional Permeability of Membranes?**

Gas Diffusion of membranes has diverse applications, including gas separation in natural gas processing, air and gas filtration, fuel cells for clean energy, food packaging, environmental monitoring, wastewater treatment, biotechnology, medical devices, laboratory analysis, and hydrogen separation in various industrial processes. These membranes play a crucial role in controlling gas passage, ensuring efficient and selective gas separation and filtration for improved processes and product quality.

✓ **Why is Liquid Permeability of a Membrane an important parameter in the filtration process?**

Assessing the Liquid Permeability of a membrane is a critical aspect of filtration processes, with implications for various industries. It provides insights into how effectively a membrane can filter liquids, which is essential in applications such as

water treatment and product manufacturing, where the purity and quality of the filtered liquid are paramount. Liquid Permeability analysis also plays a vital role in optimizing filtration processes by enabling adjustments to parameters for enhanced efficiency. It aids in selecting the most suitable membrane for specific applications, whether it's ultrafiltration, microfiltration, or nanofiltration.

Additionally, understanding liquid permeability contributes to environmental sustainability by evaluating a membrane's capacity to remove pollutants before discharge. It fuels research and development efforts, leading to innovative membrane materials and filtration technologies, and supports cost-efficient decision-making by helping choose the right membrane solutions.

✓ **Which factors should be considered while selecting a Membrane material for Water Treatment?**

When selecting a membrane material for water treatment, consider pore size, chemical compatibility, and hydrophilicity. Ensure durability under operating conditions and assess flux rate, cost, and longevity. Evaluate the ease of cleaning and compliance with regulations, considering environmental impact and resistance to scaling and fouling.

✓ **What is the importance of Bubble Point Test and Pore Size Distribution of Membranes for the Water Treatment Desalination Process?**

The Bubble Point Test is crucial for characterizing membrane filters used in water treatment. Advantages are: Determining Pore Size and Integrity, Ensuring Membrane Integrity, Quality Control, Filtration Efficiency, Flux and Permeability, Fouling Behavior, Performance Consistency.

Both characterizations are essential for ensuring the effectiveness and reliability of membranes used in water treatment and desalination, also ensuring the production of high-quality water.

✓ **What are the challenges in Water Filtration Membranes?**

Challenges in Water Filtration Membranes include fouling, scaling, biofouling, chemical compatibility, selectivity, pressure requirements, cleaning, maintenance, environmental impact, energy efficiency, and cost.

CLIENTS



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Filtrex



Gopani



ARVIND
Advanced Materials



MISSION

Why we exist; why the world will be different because we are here?

The mission of M19 Team is to provide high precision insights in the Nanoscale World with seamless coordination and provide advance material characterizations through unrivaled education, research and outreach in the many diverse industry we serve.

VISION

Who we want to become; what we want to achieve or create?

The M19 lab's vision is to continue to grow and challenge convention through our pioneering spirit, scientific advancements, forward thinking leadership, collaborative approach to provide exceptional material testing support.

BRAND PROMISE

The net benefit we deliver to those we serve.

M19 lab is the choice for ground-breaking Material Research. Our unrivaled education, translational Research Laboratory, Custom Instruments ensure that we deliver the best laboratory support from everyday products to testing of the most serious and complex material products.



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