



# Fresh Water Systems CLEANROOM

## WHAT IS A CLEANROOM

Imagine the air around you right now. It may look clean but in reality, every cubic foot contains up to a million microscopic particles. Most of the time, we never notice them. But when you're manufacturing high-purity products, even the tiniest speck can make a big difference. That's where cleanrooms come in.

A cleanroom is more than just a controlled environment it's a safeguard against contamination. Using advanced HEPA (high-efficiency particulate air) filtration, these spaces drastically reduce airborne particles, creating the ideal conditions for precision manufacturing. From pharmaceuticals and electronics to high-performance filtration products, cleanrooms are essential anywhere quality and consistency can't be compromised.

At Fresh Water Systems, our cleanroom plays a critical role in how we build our high-purity water filters. Designed to meet ISO 7 (Class 10,000) standards, our facility contains only a fraction of the airborne particles found in a typical room. Every detail from airflow and pressure to temperature and humidity is carefully regulated to ensure a stable, contaminant-controlled environment. But maintaining that level of cleanliness doesn't happen by accident. Even people themselves are one of the biggest sources of contamination, shedding millions of particles every day. That's why strict protocols are followed inside the cleanroom. Operators wear full protective gear, movements are minimized, and all materials are carefully cleaned, sealed, and transferred through controlled entry points.

The result? A manufacturing environment built for precision and reliability!

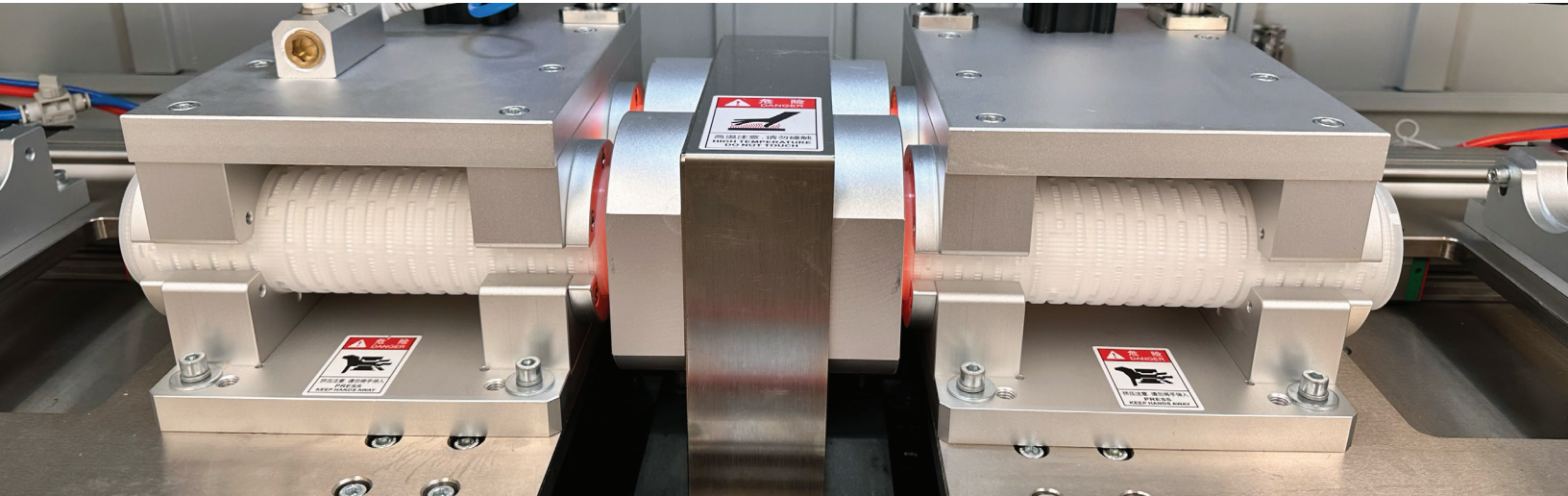


# HOW IS A CLEANROOM USED?

Inside our cleanroom, we assemble high-purity filters using a wide range of advanced materials like Polyethersulfone (PES), Polysulfone (PS), and Polypropylene (PP). Each filter can be customized to exact specifications from micron rating to gasket materials ensuring it performs exactly as needed for your application.

Because quality doesn't stop at production, every filter is individually bagged before leaving the cleanroom, preserving its integrity until it reaches you.

Our commitment to cleanliness goes beyond industry standards. With annual recertification, FDA-compliant materials, and rigorous testing protocols, we ensure every product meets the highest levels of safety and performance.



# CLEANROOM CLASSIFICATIONS




Cleanrooms are classified by their ISO (International Standards Organization) and FS 209E (Federal Standard) classes. ISO classifications are determined by air contamination per cubic meter of air, while FS 209E classes are measured by contamination per cubic foot of air. Each classification reduces particles by 90% of the previous class. Below are listed all ISO and FS 209E classifications from ISO 1 (cleanest) to ISO 9 (typical room levels).



ISO Class	FS 209E Class	Particle Limit Per Cubic Meter ( $\mu\text{m}^3$ )						Particle Limit/ft <sup>3</sup>
		$\geq 0.1 \mu\text{m}$	$\geq 0.2 \mu\text{m}$	$\geq 0.3 \mu\text{m}$	$\geq 0.5 \mu\text{m}$	$\geq 1 \mu\text{m}$	$\geq 5 \mu\text{m}$	$\geq 0.5 \mu\text{m}$
ISO 1		10						
ISO 2		100	24	10				
ISO 3	Class 1	1,000	237	102	35			1
ISO 4	Class 10	10,000	2,370	1,020	352	83		10
ISO 5	Class 100	100,000	23,700	10,200	3,520	832	29	100
ISO 6	Class 1,000	1,000,000	237,000	102,000	35,200	8,320	293	1,000
ISO 7	Class 10,000				352,000	83,200	2,930	10,000
ISO 8	Class 100,000				3,520,000	832,000	29,300	100,000
ISO 9					35,200,000	8,320,000	293,000	

# CLEANROOMS MUST MEET AIRFLOW STANDARDS

These are measured in air changes per hour and the ceiling coverage of fan filter units (FFU). FFUs are stand-alone modules with a HEPA filter, fan, and control system. Below are the air changes and ceiling coverage required for each ISO class.

 ISO CLASS	 AIR CHANGES PER HOUR	 CEILING COVERAGE
ISO 1	500-750	80-100%
ISO 2	500-750	80-100%
ISO 3	500-750	60-100%
ISO 4	400-750	50-90%
ISO 5	240-600	35-70%
ISO 6	150-240	25-40%
ISO 7	60-150	15-25%
ISO 8	5-60	5-15%

## WHY DO CLEANROOMS MATTER?

Cleanrooms are essential for maintaining strict quality control across a wide range of products. The most advanced environments, such as ISO 1 cleanrooms, are critical for industries like nanotechnology and life sciences. These controlled spaces protect sensitive electronic components such as semiconductors and digital displays from damage caused by airborne particles, as well as fluctuations in temperature and humidity.

As technology advances and components become smaller, the risk of particle contamination continues to grow. This is especially true for high-resolution LCD screens, where even microscopic particles can compromise performance or damage specific areas of a device.

Cleanrooms are also vital in the production of water filtration systems. At Fresh Water Systems, we manufacture high-purity water filters in a controlled cleanroom environment to ensure exceptional quality and performance. By adhering to rigorous cleanroom standards, we deliver reliable, consistent filtration solutions you can trust.



# CLEANROOM SPECIFICATIONS

Our cleanroom features the following specifications:

- ISO 7 (Class 10,000) level contamination control
- Maximum 10,000 particles larger than 0.5  $\mu\text{m}$  per cubic foot of air
- 60 air changes per hour
- Controlled temperature and humidity
- Pass-through window for sealed products entering and exiting the cleanroom
- Sticky mats for footwear

All operators entering the room must equip a proper gown, cap, mask, and gloves to reduce the risk of human-caused contamination. Sticky mats must also be used for all footwear prior to entry to reduce the number of foreign objects introduced to the room. These features grant peace of mind knowing that our high-purity filters can operate at optimal performance with a very low risk of contamination or inefficiency. We are proud to be able to provide you with industry-trusted high purity filtration components from our meticulously maintained cleanroom facility. Our variety of filter configurations offers you customized filtration solutions and ensures that quality or purity is uncompromised.



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Mon. - Fri. 8a - 8p, Sat 8:30a - 4:30p EST.  
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