Cincinnati Sub-Zero

Humidity Water Supply and Maintenance for Environmental Test Chambers

Humidity is a crucial variable in environmental testing, exerting a significant impact on the chemical and physical properties of different materials. Therefore, it's important to pay attention to the quality of water used in humidity systems. Impurities such as minerals and chemicals from public water supplies can cause significant damage to test chambers, leading to corrosion and reliability issues. For instance, if the water is too hard, it may lead to calcification, while excessively pure water may result in rust.

RECOMMENDED WATER TYPES

De-Ionized (DI) or Reverse Osmosis (RO) water is recommended for use in humidity systems. Water should be provided within a resistivity range of 0.05 to 2MΩ to prevent corrosion. DI and RO systems offer different benefits and limitations:

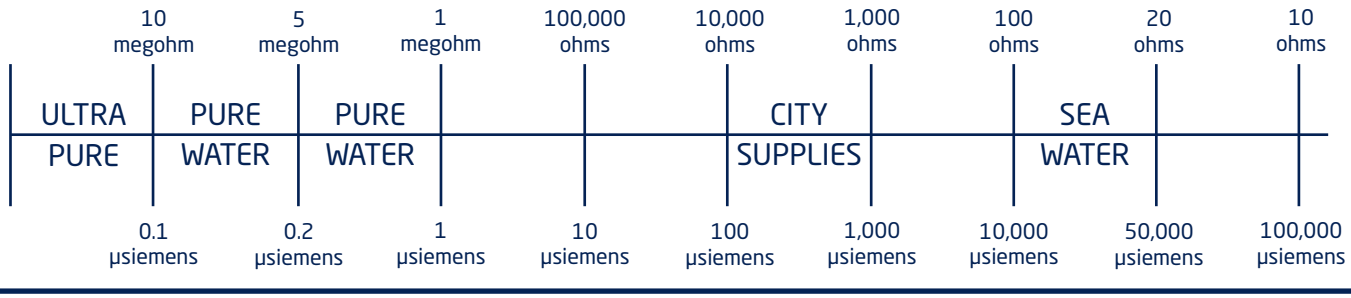
- Reverse Osmosis (RO) Systems: These systems are efficient and provide consistent water quality, lasting three to five years with proper maintenance. Despite higher upfront costs and more expensive equipment, they are economical for high water usage as they require less frequent filter changes. Additionally, they offer an effective solution for supplying water to multiple chambers.
- De-Ionized (DI) Systems: DI filters are easy to install and require 25 psi water pressure. These filters need regular replacement, indicated by a color change from violet or dark blue (new) to brown, orange, yellow, or white (spent). DI systems are simpler but may allow water to pass through even when the filter is spent, potentially leading to poor water quality and corrosion.

WATER FILTRATION OPTIONS

For customers using tap water, an optional Demineralizer Filtration System is recommended to remove impurities. This is not necessary for those already using DI or RO water.

In locations without an external water supply, a re-circulating DI system can be used. This system collects condensate from the chamber, filters it, and reuses it. However, any contaminants released during testing cycles can be drawn into the water cycle, so precautions must be taken to avoid cross-contamination.

RESISTIVITY VS. CONDUCTIVITY



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SPECIFIC FILTRATION NEEDS

If the water source contains organic matter, free chlorine, chloramines, or phosphate complexes, additional filtration may be required, such as roughing filters (e.g., US Filter Model: Absorber). It's crucial to occasionally check the water supply for contaminants and resistivity to ensure it meets the necessary standards.

MAINTENANCE OF FILTRATION SYSTEMS

The longevity of filtration systems depends on the amount of water passing through them. CSZ reach-in humidity chambers typically use between 0.5 GPH and 3 GPH during normal operation, while larger chambers may use more water. Factors influencing water usage include:

- Test relative humidity (RH) setpoint
- Chamber size
- Heater size (kW)
- Frequency and duration of temperature and humidity cycles

Regular maintenance is vital to prevent system failures. RO systems will shut down if not maintained, while DI systems may continue to pass water even when the filter is spent, potentially causing damage. Performing simple maintenance and replacing cartridges will keep the system running efficiently. To order a replacement filter, please contact our service department.

WATER PRESSURE REQUIREMENTS

Proper water pressure is necessary for the performance of humidity systems. A water pressure regulator is necessary to maintain:

- 25 PSIG for steam generator/boiler systems
- 10 PSIG for atomizing systems

Exceeding these pressure levels can cause filter cap failures and leaks, damaging the test chamber and surrounding property.

Maintaining proper water quality and system maintenance is essential for the effective operation of humidity test chambers. Using DI or RO water within the recommended resistivity range, implementing appropriate filtration systems, and adhering to maintenance guidelines will help prevent damage and ensure accurate test results.

Comparison between a new cartridge (left), versus a spent cartridge (right).