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Beyond  
Measure.

# Versatile Water-Based Condensation Particle Counter

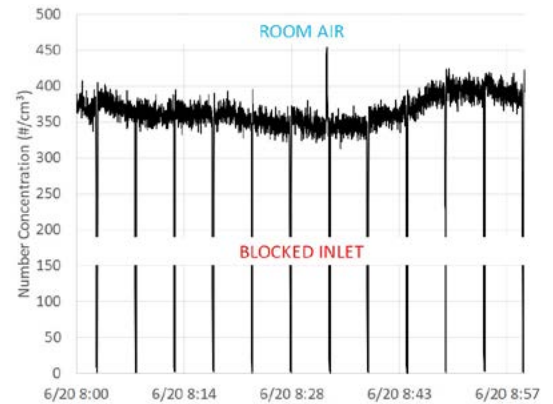
Model 3789



# Reliable Under (Under) Pressure

**We tested this new Water-Based Condensation Particle Counter (WCPC) to the extreme and can confidently say that this one is more robust than ever.**

Our reliability testing consisted of operating a valve at the CPC's inlet to close the inlet completely for 10 seconds, every 5 minutes, for 5 days. This created large pressure drops which would cause problems for many other instruments. The new Versatile Water-based CPC recovered every single time, accurately measuring the particle number concentration as if nothing had happened.



## Lower Maintenance

With the new wick and water handling design, the operation time is now six months with the same wick. While the new design can even stand up to tap water, we still recommend using distilled water to reach and exceed the six-month lifetime.



**Successfully passed pressure test (see "Reliable Under (Under) Pressure" above)**

# How it Works

## 4. Counting

The enlarged particles pass through a laser beam and scatter light. Each pulse of scattered light is counted individually.

## 3. Moderation

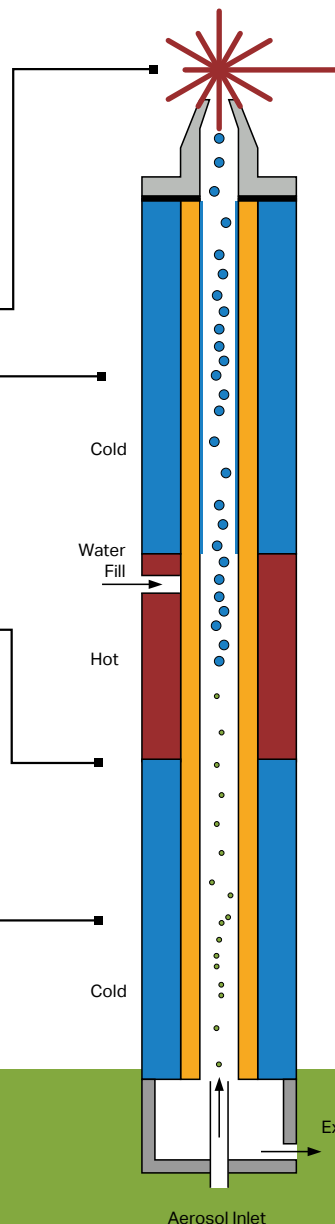
Even after the condensation step in #2, some vapor-phase water remains. The moderator stage condenses this water out of the vapor phase and onto the walls of the wick. This allows that water to be re-used, and also protects the optics (#4) from condensation.

## 2. Growth

The sample moves through a humid chamber where it becomes supersaturated, forcing water vapor to condense onto the cooled particles. The particles are now large enough to be detected when they pass through the laser beams in #4.

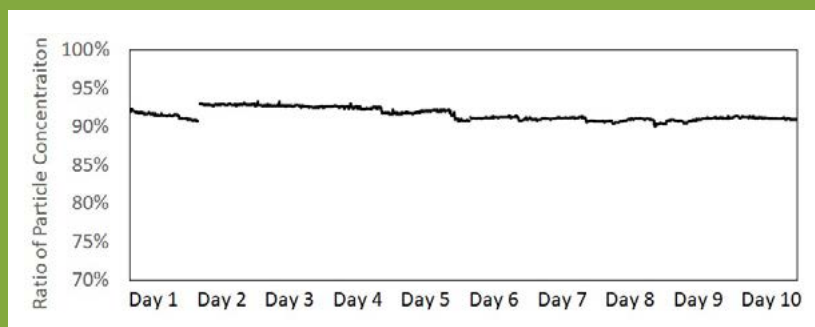
## 1. Conditioning

The aerosol moves through a humid chamber to surround the particles with water vapor.



## Reliable At High Concentration

Another test was challenging the WCPC with aerosol concentrations close to its maximum concentration range for 10 consecutive days. Every 15 minutes a reference butanol-based CPC was used to check the accuracy of the particle concentration reading. Despite being continuously challenged with a high aerosol concentration, the new water-based CPC provided stable measurements throughout the test.



# Selectable Particle Size Cut-Off

No more deciding between fixed counting efficiencies. The new Versatile Water-based CPC provides selectable particle size-cut-off options: 2 nm and 7 nm for D50%. Furthermore, a custom setting can be stored. For particle detection near 1 nm see publication: Hering et al. (2017) Aerosol Science and Technology, 51:3, 354-362.

## Features and Specifications

### Selectable Particle Size Cut-Off (D50%)

2.2 nm, 7 nm, custom

### Particle Concentration Range

Up to 200,000 particles/cm<sup>3</sup>

### Particle Concentration Accuracy

±5% at <200,000 particles/cm<sup>3</sup>

### Inlet flow

0.6, 1.5, or 2.5 L/min (option)

### Aerosol flow

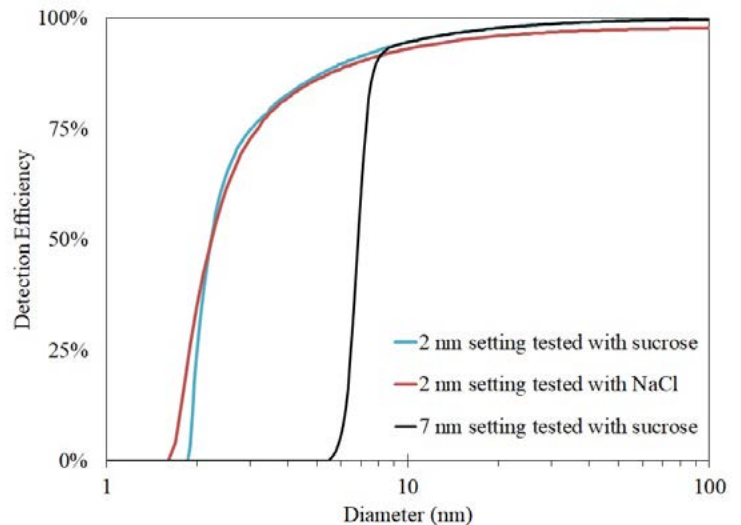
0.3 L/min

### Data rate

50 Hz

Internal memory for up to 1 year.  
Remote control via Ethernet option.

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