HCTM CO., LTD.

WCPC

Water based Condensation Particle Counter

- Designed for todays' Cleanrooms

HCTM has been an industry leader in the development and applications of Condensation Particle Counter (CPC) technology since 2002 including the first high flow 2.83 L/min rate water based Condensation Particle Counter (WCPC) that meets the requirements of ISO 14644-12. These systems have been adopted into the Semiconductor industry to monitor particulates in process gases, tool enclosures, exhaust scrubbers, chimneys and other workplace areas where sub 0.1 um nanoparticles are a concern.

Workplace exposure to nano-size particles has become a concern within the Semiconductor and other Industrial environments. Globally, local governments are putting new standards in place to protect employees and the environment from exposure to fine particles.

Integrating nanoparticle monitoring, measurement, and control into your production and workplace environments will lead to increased product yield while protecting your most valuable human resources. HCTM and our global partners are here to support your implementation programs to monitor and control nanoparticles within your facilities.

Take the next step and invest in your future and purchase your WCPC now!



Features

- Detection limit: 10 nm ~ 1 ㎛
- Single particle counting in real-time for accurate measurement
- High Pressure Diffuser (HPD): Monitor high pressure gas lines for CDA, N2
- Internal Thermal printer: Immediate access to data
- Data Storage : > 10,000,000 samples
- Simple and easy to use
- Communication: Ethernet, USB Flash drive
- Working Fluid Consumption: 140 ml / 24 hrs

Applications

- Cleanroom Air Monitoring & Certification
- Semiconductor & Flat panel Process Monitoring
- Nano Particle Monitoring in FOUP & Tool Enclosures
- Process Trend Analysis
- Mini-Environment Monitoring

WCPC (Water based Condensation Particle Counter)

A Contamination Free High Flow Rate Water Based Condensation Particle Counter

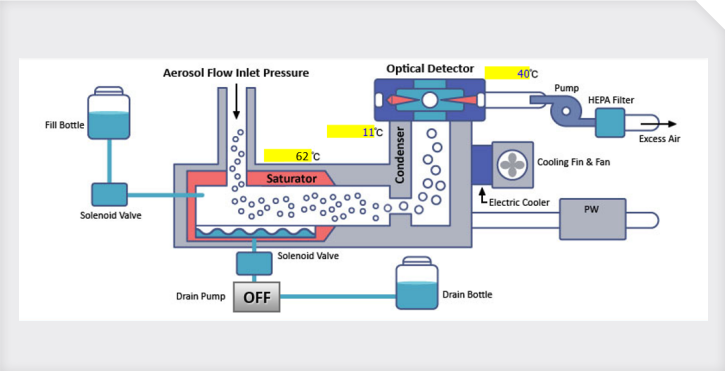
Today's Optical Particle Counting (OPC) technology is limited to 100 nm (0.1 um) and are not suited to monitor environments where nanoparticles are becoming a factor in yield enhancement and workplace safety. Nano particles are affected by diffusion and electrostatic forces while larger particles are affected by impaction, interception, and gravitational forces.

CPC technology was first used in the late 1870's to count dust particles. Earlier generation CPC's used Butanol, Glycerol or Dimethyl Phthalate as their working fluids none of which are considered today to be environmentally friendly. HCTM's WCPC uses deionized water working fluid making this system environmentally friendly and easy to use in all environments.

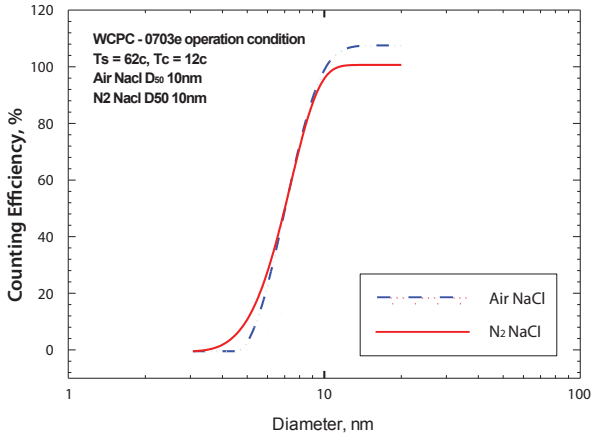
Also, since condensed particles that pass through condenser and saturator using WCPC grow similarly to the particles generated in the atmosphere, it is highly recommended to use to simulate simi3lar conditions.

Operating Principle Water based Particle Counter (WCPC)

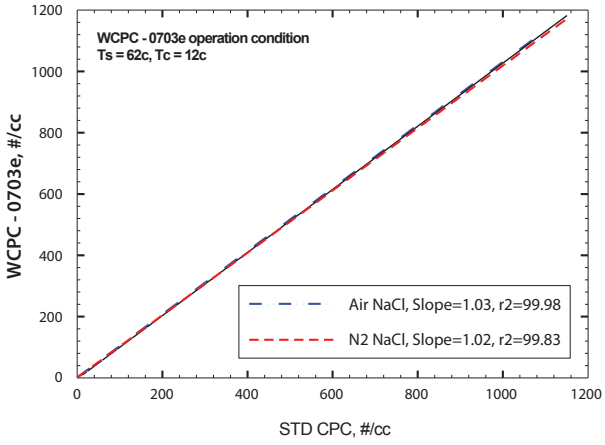
As the aerosol enters the counter, it passes through a chamber containing a nearly saturated ultra-pure water vapor. The aerosol water vapor mixture then passes through a cooled condensing tube causing the water vapor to condense onto the particles. The condensing water causes the particles to grow to a size easily detected by an optical particle counter at the exit of the condensing tube. In the optical particle counter, the particles pass through a focused light beam and scatter light onto a photo-detector. In the single-particle counting mode used for lower particle concentrations, counting of individual pulses from the photo-detector provides the particle concentration.



Counting Efficiency Curve



Linearity

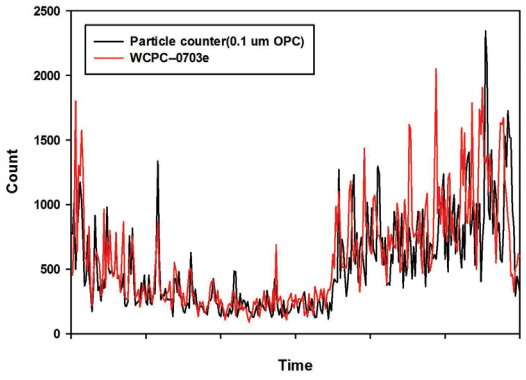


Particle Counter (1st Ch-0.1um) vs WCPC-0703e in Cleanroom

The Flow Rate and Concentration are inversely proportional making the flow rate a key factor in choosing the right WCPC for your application. WCPC's utilizing a 1 L/min flow rate can measure high concentrations. However, they are unsuitable for use in the today's leading edge cleanrooms where the low number of expected particles and a low sampling rate leads to poor data statistics.

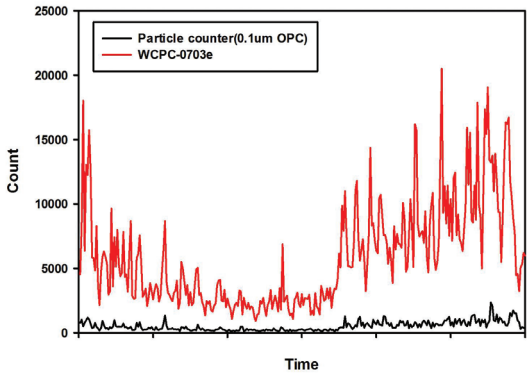
HCTM's WCPC-0703e with a higher flow rate of 2.83 L/min takes more samplings to provide measurements in cleanrooms with confidence.

OPC - #/ft^3, WCPC - #/0.1ft^3



- Similar trend is shown from Optical Particle Counter and WCPC comparison measurements.

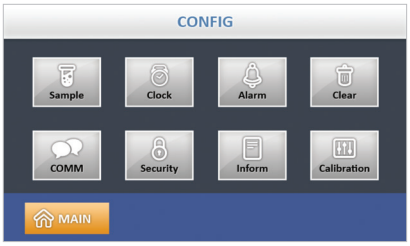
OPC - #/ft^3, WCPC - #/ft^3



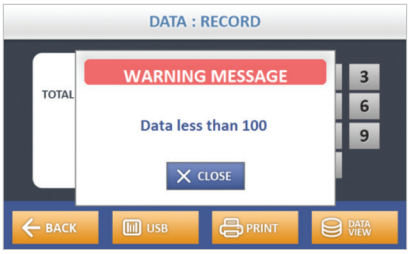
- Since flow rates of Optical Particle Counter and WCPC are different from each other, WCPC measures relatively more particles when flow rate is converted to equal conditions.

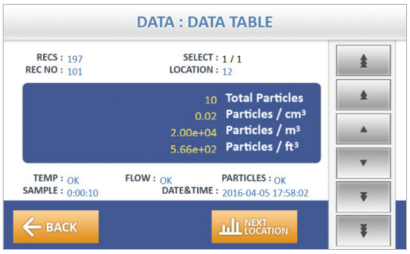
Easy operating Water Based High Flow Rate Condensation Particle Counter

The WCPC's GUI is similar to that of a typical Optical Particle Counter and is easy to navigate. Data can be viewed on the large 7" Color Display or printed to the Internal Thermal Printer, downloaded directly to a PC or transferred to a PC via a USB drive. The large color touch screen also displays interactive system messages.









WCPC (Water based Condensation Particle Counter)

Specifications

Description	WCPC-0703e
Min. Detectable particle Size (D_{50})	10 nm, verified with DMA-classified sucrose particles
Max. Detectable particle Size	>1 ㎛
Particle Concentration Range	Single Particle Counting 0 to 1,000 /cm^3
Concentration limits	1,000 particles/cm^3, 28,300,000 particles/ft^3
Accuracy(%)	10 % at 1,000 Particle /cm^3
Zero count level	< 1 count /5 min. (per ISO-21501-4 & JIS 9921B)
Flow Rate	0.1 CFM (2.83 L/min)
Operating temperatures	Saturator : 62℃±0.5℃, Condenser : 12℃±0.5℃, Optic : 40℃±0.5℃
Aerosol Medium	Inert Gas for Air, N2
Sample Time	1 sec - 24 hrs (User selectable)
Response Time	~ 4 sec
Warm up Time	< 20 mins
Vacuum source	Internal pump
Inlet Pressure Operation	1 ATM (75 to 110 kPa)
Working Fluid	Distilled Water only
Working Fluid Reservoir (liter)	1L (External Bottle)
Working Fluid Consumption	140 ㎖ / 24 hrs. (7 days continuous operation)
Display	7inch color TFT LCD touch screen display
Printer	built-in thermal printer
Communication Modes	USB Flash drive, Ethernet (TCP/IP, Modbus TCP)
Data Storage	32 GB (> 10,000,000 sample records)
Dimension (LWH)	24 x 37 x 30 cm (9.45 x 14.6 x 11.8 in)
Weight	13.5 kg (29.8 lb)
Enclosure	304 stainless steel
Operating Range	20 to 30 ℃, 0 to 90 %RH, Non condensing
Power	220AVC, 50/60Hz
Warranty	1 year

- **ACCESSORIES** Power Cable / Purge Filter / Fill Bottle / Drain Bottle / Bottle Bracket
- **OPTIONAL ACCESSORIES** HPD-01 (High Pressure Diffuser), Monitoring Program

HPD-01 Specification

- Air Flow Rate: 0.1 CFM
- Material: Stainless steel body with orifice, exhaust filter
- Pressure: 35~75 psi for 0.1 CFM
- Inlet fitting: ¼" VCR Male connector and ¼" tube(stainless steel)
- Sample gas: Dry, inert, non-toxic, non-flammable gases (CDA, Nitrogen)
- Dimensions(LWH): 18.2 x 7.7 x 15.5cm(7.2 x 3 x 6.1 in)
- Weight: 1.8 kg (3.97lb)

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