

Respiratory Complaints Linked to Improperly Stored Chemicals

P-TRAK™ Ultrafine Particle Counter Case Study #5

Background

A junior high chemistry student could not participate in laboratory sessions because the laboratory environment aggravated his asthma. He experienced difficulty breathing shortly after entering the laboratory, even when chemicals were not in use. The student did not have these symptoms at any other locations in the school.

The student's parents wanted their child to attend this laboratory class and asked the school board to determine the cause of his complaints.

Problem Assessment

The school board, familiar with ultrafine particles (UFPs) and their application in tracking pollutant sources, authorized an investigation employing a P-TRAK™ Ultrafine Particle Counter. Within 2 hours after arrival, the investigator measured UFPs at various locations outside and within the school and characterized air quality within the laboratory. All readings were recorded in particles/cc.

The investigator first surveyed outside air and found a UFP level of 4,300.

Knowing that the school's HVAC

system had 30 percent

efficient filters, the anticipated reading within the building was 2,870.

These levels were found throughout the building, except in the chemistry laboratory. Here the UFP level was 22,600—five times greater than outside air concentrations.

UFPs Tracked to the Source...

• Background (outdoors)	4,300
• Chemistry laboratory	22,600
• Other school locations	2,900
• Chemical storage closet	85,600
• Laboratory after chemicals were moved	2,900



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The investigator systematically surveyed the entire laboratory using the P-TRAK™ Ultrafine Particle Counter and found a count of 85,600 at a chemical storage closet. This unventilated storage area held several containers of corrosive acid, many with damaged caps. Acid fumes were leaking from these containers, condensing into ultrafine particles, and escaping from the closet.



Outcome

School maintenance provided a ready solution to this problem when they discarded outdated chemicals and transferred the remaining containers to a properly ventilated storage cabinet. Once maintenance completed this work, UFP readings in the laboratory decreased to the same levels as elsewhere in the school. The student could enter the laboratory and participate in the laboratory class without experiencing breathing difficulty.

The P-TRAK™ Ultrafine Particle Counter from TSI...

Tracking UFPs with the P-TRAK™ Ultrafine Particle Counter is a new and effective method for identifying the root cause of problems. Targeting the true source, or sources, of unexpected ultrafine particle concentrations helps to clarify indoor air quality and other problems. Removing, repairing or controlling the source and shutting down pathways has been shown to effectively eliminate related complaints.



The P-TRAK™ Ultrafine Particle Counter uses fundamental measurement technology proven around the world in research and industrial applications since 1978. Its data logging feature allows the user to download field measurements for evaluation in TSI's TRAKPRO™ Data Analysis Software or in common word processing and spreadsheet programs, simplifying record keeping and reports.

See www.tsi.com for more information on the P-TRAK™ Ultrafine Particle Counter and TSI's full line of IAQ instruments.

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