

Ultrafine Particles Point to Inadequate Container Storage

P-TRAK™ Ultrafine Particle Counter Case Study #7

Background

At a 900-student school, students and staff complained daily of burning eyes, nausea and headaches. Administrators were especially concerned about the continual stream of these indoor air quality-related complaints, because the 10-year-old, three-story school was carefully maintained. In addition, the complaints were limited to individuals using the basement floor. To address these concerns, administrators evaluated the building's indoor environment and found that it met existing standards. However, this evaluation did nothing to solve the problem."

Problem Assessment

After this conventional approach failed to identify the cause of the complaints, the school requested an investigation that would examine levels of ultrafine particles, also known as UFPs (particles less than 0.1 micrometer in diameter). To do this, the investigator used a P-TRAK™ Ultrafine Particle Counter to collect data in real time. All readings were taken in particles/cubic centimeter (cc).

The investigator first measured outside air and found an average level of 4,000. He then moved inside to conduct an initial survey of the building. Because

UFPs Tracked to the Source...

• Background (outdoors)	4,000
• First and second floor classrooms	2,600
• Basement classrooms	22,000
• Basement supply air	2,600
• Janitor's closet	50,000
• Basement after cleanup	2,600

outside air passed through filters with 60 percent dust spot efficiency ratings, he expected a 35 percent reduction in ultrafine particle readings indoors, or levels somewhere near 2,600.

With the knowledge that each of the three floors was served by a separate air-handling system, he quickly measured UFPs on each floor. First and second floor classrooms contained expected levels of 2,600, but some basement classrooms exhibited readings as high as 22,000. These higher readings focussed the investigation on the basement.



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Supply air delivered to the basement classrooms contained expected UFP levels of 2,600. This reading clearly indicated that the supply air system was not the source of higher UFP levels throughout the basement. To find the source, the investigator surveyed the basement corridor. He observed increasing UFP readings as he walked down the hall and found the highest readings outside a janitor's closet. Once the door was opened, the investigator discovered levels as high as 50,000.



These high levels were emanating from cleaning solution containers stored within the closet. The released vapors were condensing to form high concentrations of UFPs.

Outcome

The corrective action was simple and inexpensive. School maintenance cleaned the closet thoroughly and then stored the solutions properly. Once this action was taken, the building was again surveyed with the P-TRAK™ Ultrafine Particle Counter and found free of these high levels of UFPs. Classroom conditions returned to normal, and the IAQ-related complaints ended.

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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