

# Survey Protects Workers From Environmental Tobacco Smoke

P-TRAK™ Ultrafine Particle Counter Case Study #4

## Background

With complaints of headaches, eye irritation and sore throats, employees at a 50-person organization were missing work and attributing their illnesses to the building's indoor air quality (IAQ). The company's leased office space was part of a building complex that included a swimming pool, cafeteria, and smoking area, all likely sources of indoor air pollutants. Exhaustive IAQ investigations produced inconclusive results. Believing that there were no other alternatives to reducing absenteeism, the office manager relocated the staff to a new, 10-floor, environmentally friendly building.

The new location was well-maintained, with no evidence of mold or water damage. Air quality appeared to be good, and the building's smoke-free policy appealed to the office manager. Soon after the relocation, however, employees began voicing their complaints again. Concern arose that they had brought their problem with them.

## Problem Assessment

Frustrated by the high costs and inconclusive results of previous IAQ investigations, the office manager authorized an investigation of ultrafine particle (UFP) levels at the new building. Using a P-TRAK™ Ultrafine Particle Counter, the investigator measured UFP concentrations (particles/cc) at a background location outside the building and at various locations throughout the building. Within three hours, the office manager had a clear picture of building conditions.

The average outside UFP reading was 4,110. With 60 percent efficient filters, the investigator anticipated an office area reading less than 2,500; instead, the UFP level exceeded 15,600. Further investigation revealed a UFP level of 16,200 coming from the supply air diffusers in the employees' first-floor office area.

### UFPs Tracked to the Source...

• Background (outdoors)	4,110
• Office area	15,600
• Supply air at air-handling unit	16,200
• Return air at air handling unit	29,700
• Behind closed door	85,600
• With enforced smoke-free policy	2,550



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The investigation of the air-handling unit provided similar results. UFP levels at the supply air plenum were 16,200, while the reading for outside air was the same as the previously recorded background of 4,110. The return air plenum provided the highest reading of all. This reading of 29,700 indicated that the source of the UFPs might be coming from within the building.

With this knowledge, the investigator methodically surveyed the building, starting with single readings near the elevator on each floor. He then returned to the third floor, where readings were the highest. Again starting at the elevator area, the P-TRAK™ Ultrafine Particle Counter tracked the high UFP level to a closed office door, where the reading was 50,300. Behind the door, three workers were smoking cigarettes. The P-TRAK™ Ultrafine Particle Counter showed a UFP level of 85,600 within the room. This third-floor activity appeared to be the likely cause of the first-floor complaints.

## Outcome

Agreements signed by all building tenants and employees clearly prohibited smoking within this building. To prove this clandestine smoking was a problem, building management reminded employees of the no-smoking policy. They then aired out the building using higher than normal ventilation rates. Once that was done, they again checked UFP levels throughout the building.

A follow-up survey with the P-TRAK™ Ultrafine Particle Counter confirmed that UFP levels had been reduced to the expected level of 2,550. The relocated employees were finally able to work in their new offices without complaints and absenteeism related to building conditions.

## 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](http://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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