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[Paper ID639](#)

### **INFLUENCE OF PUPIL ACTIVITIES AND CLEANING PRODUCTS ON INDOOR AIR QUALITY IN SCHOOLS**

cleaning products; pupil supplies; VOC emission

*Nicolas, MN. , MANDIN, CM , MAUPETIT, FM , DERBEZ, MD*

Pupil supplies and cleaning products need to be documented in order to understand how they could impact on indoor air quality in schools and expose children to high levels of specific contaminants. The aim of this study was to evaluate emissions of volatile organic compounds (VOCs) and aldehydes of different products from these two families.

[Paper ID640](#)

### **EFFECTS OF THE LOCATIONS OF AIR CLEANER, AIR SUPPLY, EXHAUST, AND HUMAN ON CLEAN AIR AMOUNT INHALED BY THE HUMAN; A COMPUTATIONAL STUDY**

Air cleaning; CFD; Human-based ventilation

*Abolfazl, Mr. , Ardkapan, Mr. , Rahimi, M ,*

A computational study was conducted to enhance thermal comfort in an office using an air cleaner which is capable of cooling its output clean air. The practical idea was to use a thermoelectric device (peltier-element) in an air cleaner unit in order to simultaneously improve clean air delivery to person's breathing zone and lower the body surface temperature as the target aims of the study. The simulation therefore was exposed to different conditions with regard to air cleaner's flow rate and temperature as well as the manikin and exhaust location to gain a good insight into the flow pattern of the room for a new design.

The target aims showed high sensitivity to air cleaner's flow and the manikin's location, while weakly influenced by air cleaner flow's temperature. In addition it was negligibly affected by the exhaust's location as a result of stratification height formation. It was concluded that to achieve the best clean air delivery to the manikin's breathing zone, the air cleaner flow rate should maintain a fairly higher momentum and 2-4 degrees lower temperature relative to the infiltration flow, and the best location for manikin proved to be under the exhaust location.

[Paper ID641](#)

### **ADSORPTION CHARACTERISTICS OF SEMI-VOLATILE ORGANIC COMPOUNDS ON SETTLED DUST**

Adsorption; House dust; Semi Volatile Organic Compounds (SVOC)

















Classrooms, Reverberance; Sound, Absorption; Thermal Mass

*Klamerek, G. , Campbell, C. , Svensson, C. , Nilsson, E.*

The benefits of 'thermal mass' in stabilizing temperature for thermal comfort and reducing building energy consumption for sustainable green buildings are well documented. However, when exposing the concrete soffit for thermal purposes it is then not possible to have a fully covered sound absorbing suspended ceiling in classrooms for acoustic comfort. In turn, this potentially compromises the achievement of good acoustic comfort while still utilizing the thermal mass of the exposed soffit. For this paper we measured a classroom configuration with free hanging sound absorbing units and wall absorbers instead of a fully covering traditional suspended ceiling. We looked into solving the low frequency imbalance - a potential negative consequence of not having a full suspended ceiling - with an enclosed void which can trap the low frequency sound (125Hz) which can build up and interfere with the important speech frequencies. We looked at the challenge of optimizing the acoustic coverage range without affecting the thermal comfort. We also wanted to improve the balance of the potentially negative low frequencies to achieve good speech communication and acoustic comfort for all students and teachers, while also providing an inclusive acoustic environment for sensitive listeners.

[Paper ID656](#)

#### **NATIONWIDE ESTIMATES OF SEMI-VOLATILE ORGANIC COMPOUNDS CONCENTRATIONS IN SETTLED DUST AND SUSPENDED PARTICLES IN FRENCH DWELLINGS**

airborne particles; settled dust; SVOCs

*Mandin, CM. , Mercier, FM , Lucas, JPL , Ramalho, OR , Blanchard, OB , Bonvallot, NB , Raffy, GR , Gilles, EG , Glorennec, PG , Le Bot, BLB , Le Bot, BLB ,*

**INTRODUCTION:** Semi-volatile organic compounds (SVOCs) are of concern due to their health effects and to the widespread exposure through different environmental media and pathways. The objective of this study was to assess the concentrations of a large group of SVOCs both in floor settled dust and on airborne particles in dwellings.

**METHODS:** Vacuum cleaner bags were collected during a nationwide survey carried out in French dwellings where at least one child aged 6 months to 6 years lives (2008-2009). PM10 were sampled on Teflon filters over one week in the living-room during a nationwide survey carried out in a representative sample of the housing stock (2003-2005).

**RESULTS:** In settled dust, 32 SVOCs out of 48 were detected in more than half of the dwellings. Similarly on PM10 35 SVOCs out of 66 were detected in more than half of the dwellings. The most concentrated compounds in both media were phthalates, polycyclic aromatic hydrocarbons (PAHs), and bisphenol-A. Additionally, permethrin, synthetic musks, and BDE-209 were among the most concentrated compounds in settled dust, and triclosan on PM10.

**CONCLUSIONS:** The concentrations appeared to be in the same order of magnitude as in other countries, except for permethrin, DiBP, and bisphenol-A in settled dust.