Pilot Study of High Performance Air Filtration for Classrooms Applications

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ABSTRACT

A pilot study was conducted between April and December 2008 to investigate the effectiveness of three different air purification systems in reducing the exposure of children to air contaminants inside nine classrooms at three Southern California schools (three classrooms per school). Two of them, Del Amo Elementary and Dominguez Elementary, are part of the Los Angeles Unified School District (LAUSD), while the third school, Hudson Elementary, is part of the Long Beach Unified School District (LBUSD). Continuous and integrated measurements were conducted to monitor the indoor and outdoor concentrations of the following species: ultrafine particles (UFP), particulate matter mass (both $PM_{2.5}$ and PM_{10}), black carbon (BC), and volatile organic compounds (VOCs). An HVAC-based high-performance panel filter (HP-PF), a register-based air purifier (RS), and a standalone system (SA) were tested alone and in different combinations for their ability to remove the monitored pollutants from the indoor air.

Overall, the coupling between a register system and a high-performance panel filter (RS + HP-PF) was the most effective solution for reducing the indoor concentrations of BC, UFP, and $PM_{2.5}$, with study average removal efficiencies varying from 87 to 96%. When using a HP-PF alone, reductions close to 90% were also obtained. Due to re-suspension of dust and other relatively large particles from common indoor activities such as walking and cleaning, the removal performance of PM_{10} was lower than that of other particle measurements (68% when using a RS + HP-PF combination). In all cases, air quality conditions were improved substantially with respect to the corresponding baseline (pre-existing) conditions, when removal efficiencies for the different particulate pollutants varied between 20% and 50%. Data obtained from the analysis of canister samples collected at Dominguez elementary showed that the total VOC removal performance of the register system (RS) was 28%. These values were substantially higher for the standalone unit (SA) operated with and without the use of the HVAC system (58 and 86%, respectively). Because gas-absorbing media may be subject to saturation after experiencing high short-term concentrations, the effectiveness, lifetime, costs, benefits, and maintenance of the gas removal systems tested in this pilot study must be further assessed before conclusions and recommendations can be made.

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INTRODUCTION

Background

Numerous epidemiological and toxicological studies have found positive associations between exposure to atmospheric particulate matter (PM) and adverse health effects (Pope and Dockery, 2006; Environmental Protection Agency Integrated Science Assessments, 2009). Although air quality standards have been established for outdoor ambient environments, a significant portion of human exposures to PM occurs indoors, where people spend around 85-90% of their time. Hence, it is important to understand and reduce the sources of both indoor and outdoor PM. Indoor PM consists of outdoor particles that have infiltrated indoors, particles emitted indoors (primary), and particles formed indoors (secondary) from precursors emitted both indoors and outdoors.

Children are regarded as particularly susceptible to potential health hazards related to PM exposure, which include asthma, lung inflammation, allergies and other types of respiratory and cardiovascular problems. School-aged children spend approximately 30% of their day in classrooms. For this reason, minimizing the concentration of PM (as well as that of other air contaminants) inside classrooms is important, especially at schools located in close proximity to roadways and other substantial sources of air pollution. One approach is the installation of panel filters inside the Heating, Ventilating, and Air Conditioning (HVAC) system. Common medium performance filters with a Minimum Performance Reporting Value (MERV) of 7 (those installed in most commercial buildings) remove only a small fraction of the particles with aerodynamic diameters lower than 0.3 µm, although higher removal efficiencies are generally achieved for larger particles. Diesel particulate matter, which is considered an air toxic, generally consists of particles less than 0.3 µm. New evidence also suggests that ultrafine particles, less than 0.1 µm by definition, have harmful health effects beyond those caused by particle mass.

Filtration in classrooms presents some unique challenges. The older HVAC systems that exist in older schools were not designed with air filtration in mind. The classroom is a noise sensitive environment, so filtration systems must meet strict decibel limits when in operation. Classrooms often have high ventilation rates with doors and windows that are frequently open to outside air. Finally, classrooms are large, densely occupied spaces with a lot of activity that can lead to indoor generation of particles and other pollutants.

Objectives and Study Design

The objective of this pilot study was to investigate the effectiveness of three different air purification systems/solutions in reducing the exposure of children to outdoor-infiltrated and indoor-generated air contaminants inside nine classrooms at three Southern California schools. To this end, the South Coast Air Quality Management District (SCAQMD; 21865 Copley Dr, Diamond Bar, CA 91765) worked in close collaboration with IQAir (IQAir North America, 10440 Ontiveros Place, Santa Fe Springs, CA 90670), a company that specializes in air purification solutions, and Thermal Comfort Systems (Thermal Comfort Systems Inc., 8038 Andasol Ave., Northridge, CA 91325), an HVAC contractor. Of particular interest was the removal of various sizes and types of particulate matter, especially the smaller sizes associated with diesel engine

exhaust. Solutions for removing gaseous air contaminants that may be air toxics or cause odors were also examined. The types of pollutants for which the performance of the installed systems were tested are described below:

- Ultra-fine particles (UFPs; particles with an aerodynamic diameter less than 0.1 µm): UFP are primarily produced from the combustion of fossil fuels (e.g. motor-vehicle emissions). Recent health studies suggest that UFPs are more toxic than fine particles, possibly due to their chemical composition and their ability to penetrate cell walls, enter the blood stream, and translocate to organs throughout the body. UFP are currently unregulated in the United States.

- Fine PM ($PM_{2.5}$; particles with an aerodynamic diameter less than 2.5 µm): Sources of $PM_{2.5}$ include emissions from motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and other combustion activities. Fine particles have well established health effects, including multiple adverse respiratory and cardiovascular outcomes. $PM_{2.5}$ is a U.S. Environmental Protection Agency (U.S. EPA) criteria pollutant for which there exist National Ambient Air Quality Standards (NAAQS).

- PM_{10} (particles with an aerodynamic diameter less than 10 µm): PM_{10} includes all $PM_{2.5}$ particles, but also larger particles between 2.5 and 10 µm in diameter. Sources of these coarse particles include crushing or grinding operations, re-suspension of dust from vehicles traveling on roads, and other mechanical processes. PM_{10} is also a U.S. Environmental Protection Agency (U.S. EPA) criteria pollutant and also has associated National Ambient Air Quality Standards (NAAQS).

- Black Carbon (BC; sometimes referred to as soot; related closely to elemental carbon): BC is a component of PM and is formed through the incomplete combustion of fossil fuels and biomass, and is emitted from both natural and anthropogenic sources. Most atmospheric BC is in the fine or ultra-fine particle size ranges. The majority of BC in Southern California comes from diesel particulate matter (DPM) emissions. DPM is considered an air toxic by the State of California, and the SCAQMD has recently estimated that DPM accounts for more than 80% of the total cancer risk from air toxics in the South Coast Air Basin (MATES III Study, 2008).

- Volatile Organic Compounds (VOCs): these gases are emitted by a variety of evaporative processes and combustion sources, including paints, cleaning supplies, pesticides, building materials, household products, refineries, and mobile sources. Given some of the indoor sources, concentrations of many VOCs may be much higher indoors than outdoors (Jia et al., 2007; Bruno et al., 2008). Gasoline and diesel fuels are also important sources of VOCs. Exposure to many of these organic contaminants has also been associated with a wide array of toxic health effects.

METHODS

Schools and Classrooms Characteristics

Three elementary schools (all located in Southern Los Angeles County in the Carson-Long Beach area) were selected for this pilot study. Two of them, Del Amo Elementary and Dominguez Elementary, are part of the Los Angeles Unified School District (LAUSD), while the third school, Hudson Elementary, is part of the Long Beach Unified School District (LBUSD). All three schools are in close proximity to at least three large refineries and several heavily trafficked highways and freeways including the I-110, I-405, I-710, and CA-103 (Figure 1). The Los Angeles and Long Beach Port complexes and the Union Pacific Railroad Intermodal Container Transfer Facility (UPRR ICTF) are other major emissions sources in the area. The presence of these important emissions sources has lead to local concerns about the air quality in the surrounding communities.

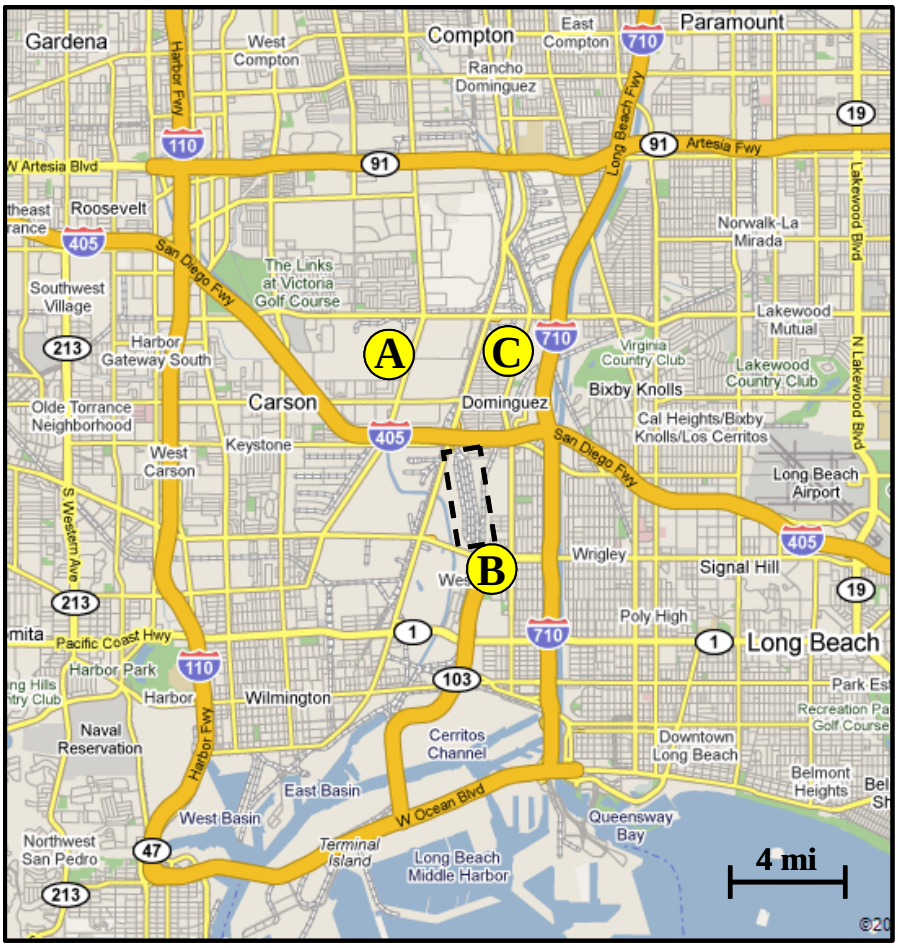


Figure 1. Map of the study area as obtained from Google Earth (Google Inc. 1400 Amphitheatre Pkwy, Mountain View, CA 94043). The yellow circles indicate the locations of the three elementary schools participating in this pilot study: Del Amo (A), Hudson (B), and Dominguez (C). The Union Pacific Railroad Intermodal Container Transfer Facility is marked by the black rectangle

At each of the three elementary schools, three classrooms with similar structural characteristics and ventilation conditions were selected to provide reproducible test conditions for the various air purification systems deployed. All classrooms (varying between 7533 and 9196 ft^3 in size) already included forced-air HVAC systems, although windows and doors were regularly used for additional ventilation. The most relevant characteristics of all nine classrooms are listed in Table 1, along with their respective identification numbers.

Table 1. Structural characteristics and ventilation conditions of the nine classrooms selected for this pilot study

	SCHOOL								
	DEL AMO			HUDSON			DOMINGUEZ		
Classroom ID	DA-6	DA-7	DA-8	H-11	H-15	H-52	DZ-7	DZ-9	DZ-11
Total Number of Occupants	18	19	22	21	11	17	28	28	29
Room Size (ft)	38×24×10	38×24×10	38×24×10	30×30×9	30×30×9	31×27×9	38×22×11	38×22×11	38×22×11
Room Volume (ft^3)	9120	9120	9120	8100	8100	7533	9196	9196	9196
HVAC System Type	DW-M*	DW-M*	DW-M*	DM-ZR**	DM-ZR**	DR***	DR***	DR***	DR***
HVAC Panel Filter Type	2" Pleated	2" Pleated	2" Pleated	2" Pleated	2" Pleated	2" Fiberglass	1" Pleated	1" Pleated	1" Pleated
Filter Rating	MERV 7	MERV 7	MERV 7	MERV 7	MERV 7	Unclassified	MERV 7	MERV 7	MERV 7
HVAC Operation	Manual	Manual	Manual	Automatic	Automatic	Manual	Manual	Manual	Manual
Number of Supply Vents	1	1	1	1	1	4	3	3	3
Supplied Airflow# (cfm)	1200	1200	1250	840	903	1236	1642	1681	1772
Air Exchange Rate	7.9	7.9	8.2	6.2	6.7	9.8	10.7	11.0	11.5

*DW-M = Ducted Wall-Mount

**DM-ZR = Ducted Multi-Zone Rooftop

***DR = Ducted Rooftop

#With existing panel filter

Prior to beginning this study, none of the selected classrooms featured any specific air purification device other than one or more medium performance panel filters (MERV 7) installed inside the respective HVAC systems. The typical replacement interval for these air filters is approximately three months according to schools schedules. The primary purpose of this panel filter is to remove coarser particles and dust to protect the HVAC system's heating and cooling coils. These filters generally provide little or no removal of smaller particles or gaseous pollutants.

Air Purification Solutions

Three different air purification solutions were tested for their ability to remove UFP, $PM_{2.5}$, PM_{10}, BC and, where possible, VOCs from the air stream:

a) an HVAC-based high-performance panel filter (**HP-PF**),

b) a register-based air purifier (here referred to as register system or **RS**), and

c) a standalone system (**SA**).

All air purification solutions were provided, installed, and maintained by IQAir, and their primary features are summarized in Table 2.

Table 2. Summary of the primary features of the three air purification devices adopted for this pilot study: high-performance panel filter (HP-PF), register system (RS), and standalone system (SA)

	High-performance Panel Filter (PF)	Register Sysyem (RS)	Standalone System (SA)
High UFP and $PM_{2.5}$ Filtration Efficiency	√	√	√
High Gas Phase Filtration Efficiency	0	√	√
Low Pressure Drop / High Air Flow	√	√	√
Low Noise	√	√	√
Low Maintenance	√	√	√
High Classroom Compatibility	√	√	√
No HVAC System Retrofit	√	0	√
Minimal Impact on Classroom Space	√	√	√
Low Power Consumption	N/A	N/A	√
Tamper-Resistant Design	N/A	N/A	√

√ = featured
0 = not featured

High-performance panel filter (HP-PF)

In most classrooms, the existing medium performance panel filters were replaced with one or more HP-PFs as shown to in Figure 2.

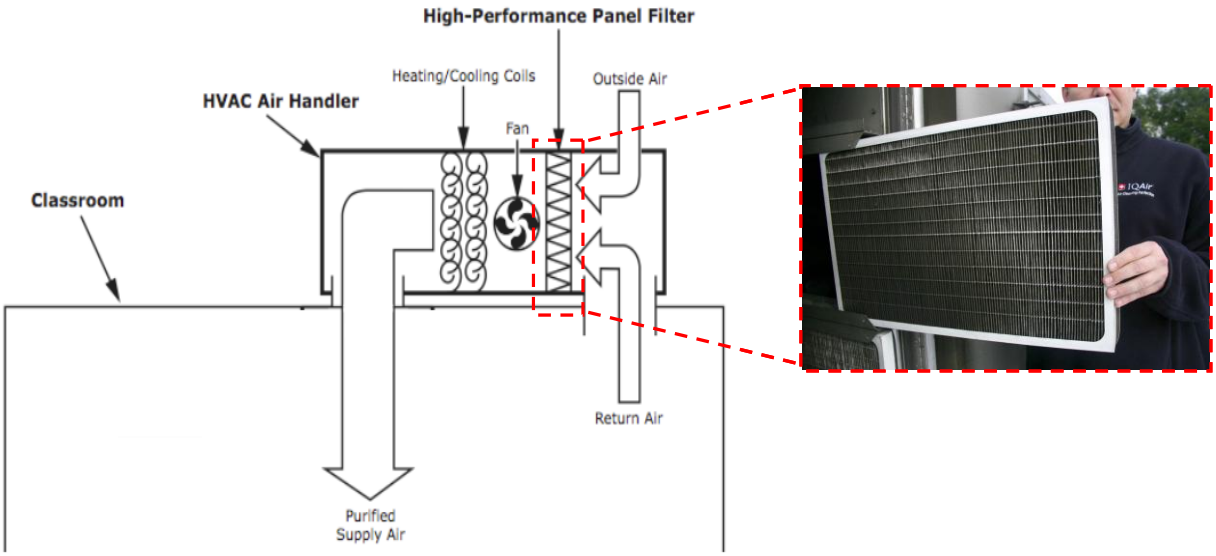


Figure 2. Schematic of a typical HVAC system. The picture on the right-hand side shows a typical high-performance panel filter (HP-PF) after several months of usage

Compared to standard/conventional medium performance MERV filters, the high-performance panel filters used for this pilot study are twice as thick (2" in depth) and have a much larger filter surface area (five to nine times larger). Due to the increased surface area and the special filter material used, they generally have similar air resistance properties as conventional filters and, thus, do not act to reduce the air flow through the HVAC system. Also, due to the increased surface area and specific design, these media have the potential to last longer than conventional filters before replacement is required. Because these filters are manufactured using a proprietary "nano-fiber" technology, their ability to remove UFPs and BC from the air stream is also higher. Table 3 shows a comparison between the characteristics of several conventional MERV filters available for residential and commercial applications and the HP-PF employed in this pilot study.

Table 3. Comparison between the main characteristics of several conventional MERV filters and the high-performance panel filters (HP-PF) tested in this study

Panel Filter Type	Filter Rating	Filter Efficiency (%)[1] at 0.3 µm	Filter Efficiency (%)[1] at 1.0 µm	Pressure Drop (in w.g.)[2]	Media Area (ft^2)	Filter Life (months)	Filter Cost ($)	Annual Filter Cost ($)	Annual Maintenance Cost ($)[3]	Total Annual Cost ($)
CONVENTIONAL PANEL FILTERS										
Low Efficiency 2" Fiberglass	(unrated)	1	10	0.28	4.0	3	3 to 5	12 to 20	50	62 to 70
Medium Efficiency 1" Pleated	MERV 7	3	25	0.48	7.5	3	5 to 7	20 to 28	50	70 to 78
Medium Efficiency 2" Pleated	MERV 7	5	35	0.30	11.8	3	7 to 10	28 to 40	50	78 to 90
High Efficiency 2" Pleated	MERV 11	15	58	0.39	17.8	3	13 to 20	52 to 80	50	102 to 130
High Efficiency 2" Pleated	MERV 13	30	85	0.41	21.1	3	25 to 40	100 to 160	50	150 to 210
High Efficiency 2" Mini-Pleat	MERV 16	90	99	2.00	55.0	3	80	320	50	370
PILOT STUDY HIGH-PERFORMANCE PANEL FILTER										
High-performance 2" Mini-Pleat	MERV 16	93	99	0.38	60.0	6 to 12	120	120 to 240	13 to 25	133 to 245

Data are based on a nominal 24" × 24" filter size

[1]Typical minimum efficiency at rated face velocity of 492 fpm

[2]Typical pressure drop of a new filter; based on a face velocity of 492 fpm

[3]Based on an estimated maintenance time of 15 min per filter change (at $50/hr)

Register system (RS)

This device is installed directly on the HVAC register, where the air supply enters the room. The unit is equipped with a "nano-technology" filter media for the removal of PM and high-capacity gas phase filter cartridges to eliminate certain gaseous pollutants from the air stream (e.g. VOCs) (Figure 3). This particular design allows for a longer contact time between the filtration media and the gaseous pollutants than would be permitted by using an activated carbon panel filter in the HVAC system. Nevertheless, the RS does not reduce the overall HVAC system airflow if installed by a trained specialist.

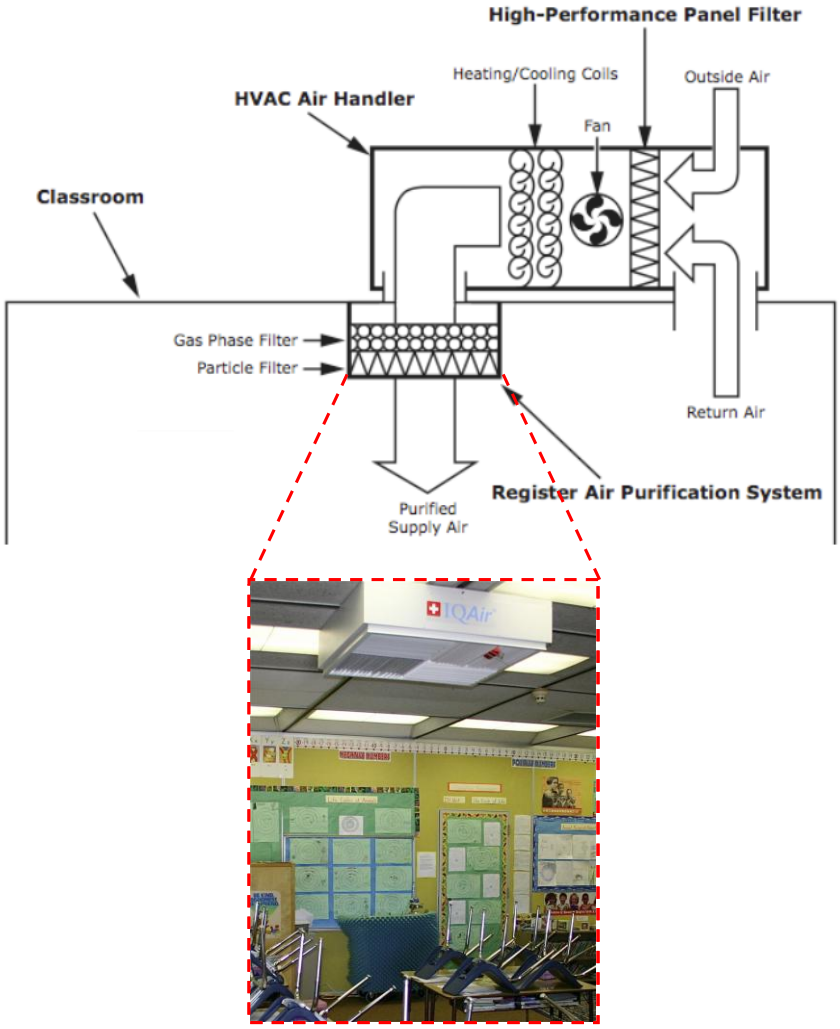


Figure 3. Schematic of the register system (RS) as installed in one of the study classrooms. A high-performance panel filter (HP-PF) may also be installed in the HVAC air handler to provide additional particle filtration

Standalone system (SA)

A standalone system (SA) is a self-contained air cleaning device that operates independently of a classroom's HVAC system. This air filtration system is 6 feet tall and has a footprint of about 4 ft^2 (Figure 4). The SA is tamper proof, runs on a standard power circuit, and is built with an energy efficient fan, located inside a specially designed box for ultra quiet operation (<45 db(A) at high airflow). Indoor air enters from the lower part of the system (about 6 inches off the ground) and passes, sequentially, through a large "nano-technology" filter media, for the removal of PM, and 12 high-capacity gas phase filter cartridges, for removal of the gaseous pollutants commonly found indoors (VOCs) (Figure 4).

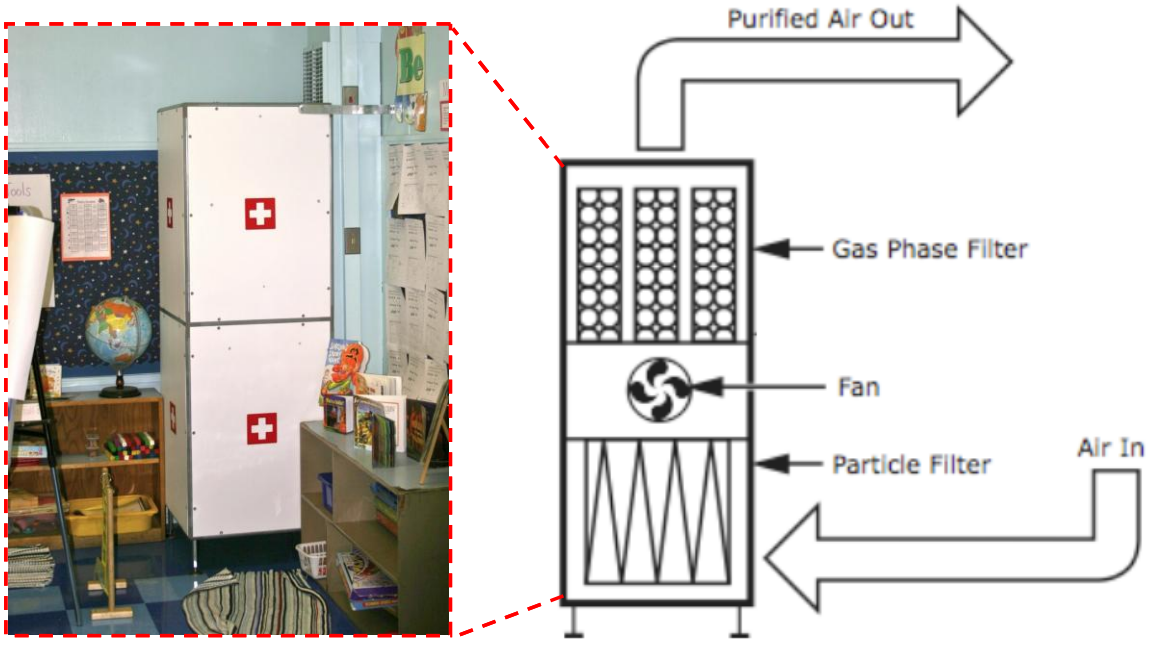


Figure 4. Schematic of the standalone system (SA) as installed in one of the classrooms

The main characteristics of the SA tested in this pilot study have been summarized in Table 4 and compared to those of other typical "residential" and "commercial" standalone units available on the market. A major design consideration for the SA was low noise. Many school districts have set a 45db(A) noise threshold for new in classroom equipment. At this noise level, available residential and commercial air purification devices offer less than two air changes per hour (ACH) in a typical classroom. This SA unit offers more than five ACH.

Table 4. Comparison between the main features of the standalone system used for this pilot study and those of other commercially available standalone air purifiers

	Residential Air Purifier	**Commercial Standalone**	**Pilot Study Standalone**
Particle Filtration Technology	Electronic / Media	Electronic / Media	Media
Removal Efficiency at 0.3 µm (%)	40 to 99	60 to 99	> 99
Maximum Airflow (cfm)	150 to 400	400 to 1200	1200
Airflow at 45 dB(A) (cfm)	25 to 100	100 to 200	800
Gas-phase Filtration Media (lb)	0.5 to 18	10 to 80	100
Price ($)	200 to 1,000	1,500 to 12,000	8,500
Price / CFM at 45 db(A) ($)	8 to 10	15 to 60	11
Classroom ACH at 45 db(A)*	0.2 to 0.7	0.7 to 1.3	5.3

*Air Changes per Hour (ACH) based on a 9000 ft^3 room

In-classroom configurations

Different combinations of the standalone system, HVAC-based high-performance panel filter, and register-based air purifier were used inside the studied classrooms to evaluate the performance of these air filtration devices:

1. High-performance panel filter alone: **HP-PF**
2. Register-based air purifier alone (RS). It should be noted that in some cases a conventional / medium performance panel filter (PF) was already installed inside the HVAC system prior to the beginning of the study: **RS+PF**
3. Register-based air purifier in conjunction with a high-performance panel filter: **RS + HP-PF**
4. Standalone system in classrooms with no HVAC running: **SA**
5. Standalone system in classrooms with a HVAC running, in which case a conventional / medium performance panel filter (PF) was already installed inside the HVAC system prior to the beginning of the study: **SA + PF**
6. Standalone system in conjunction with a high-performance panel filter: **SA + HP-PF**

A schematic representation of these six configurations is shown below (Figure 5).

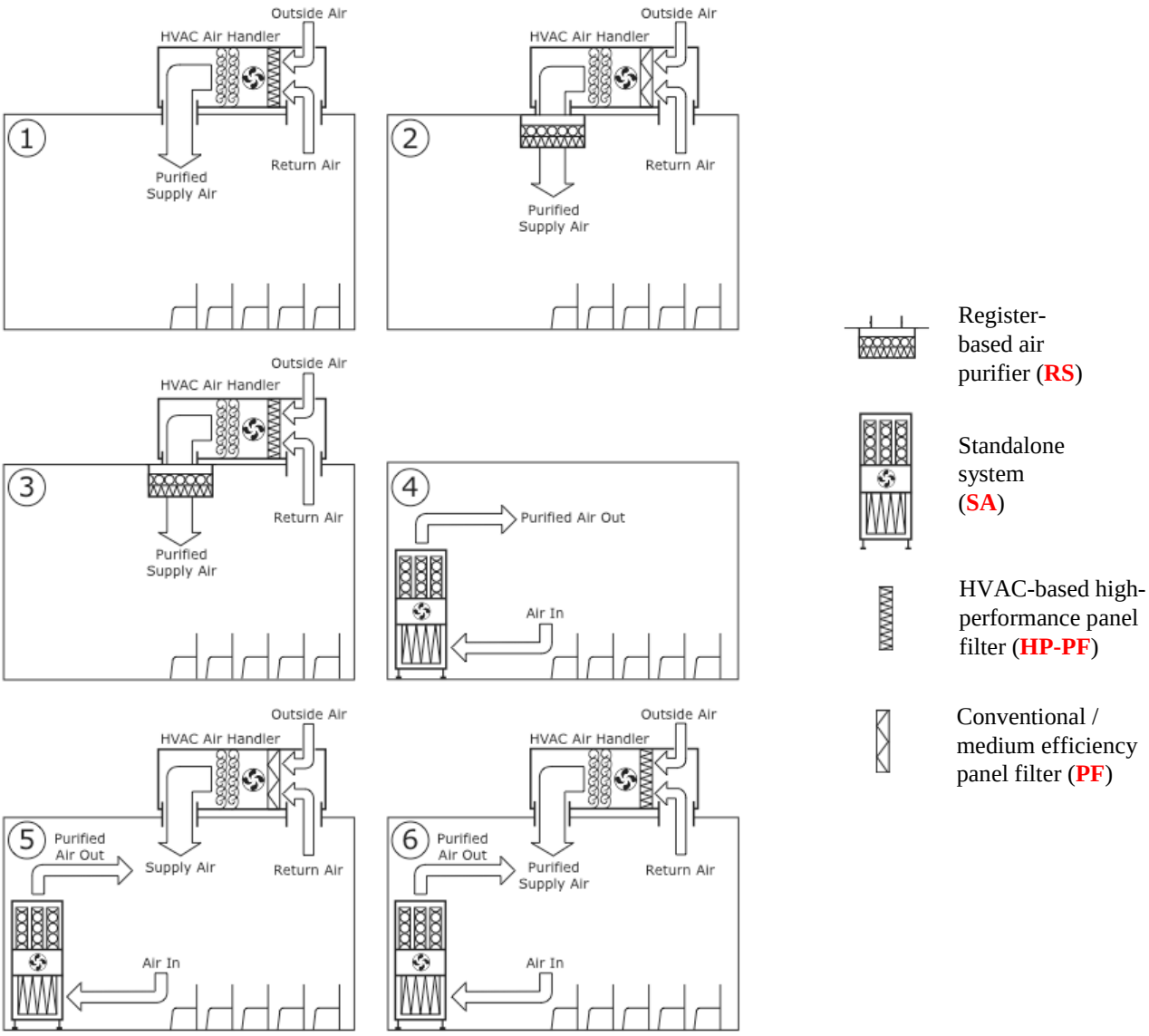


Figure 5. Schematic representation of the six air purification solutions tested in this pilot study

Indoor and outdoor measurements

Four mobile air quality monitoring stations were used to measure the indoor and outdoor concentrations of the targeted air pollutants. Each of these stations was comprised of a mobile cart supporting the following instruments (Figure 6):

- A portable Aethalometer (model AE42, Magee Scientific, 2800 Adeline St., Berkeley CA 94703) to provide continuous measurements of BC concentrations (ng/m^3)
- A water-based condensation particle counter (CPC model 3781, TSI, 500 Cardigan Road, Shoreview, MN 55126) to provide continuous measurements of the particle number concentration ($\#/cm^3$), an indicator of UFPs
- A laser particle counter (IQAir ParticleScan Pro): for determining the number concentration ($\#/cm^3$) of particles down to 0.3 μm in diameter. Since the $PM_{2.5}$ particle mass concentration in urban areas tends to be dominated by particles in the 0.3 – 1.0 μm range, this instrument provides a rough estimate of the $PM_{2.5}$ mass.
- A laser-based particle mass monitor (Aerocet 531 Aerosol Particulate Profiler, MetOne; 1600 Washington Blvd., Grants Pass, Oregon 97526): to provide continuous measurements of the mass concentration ($\mu g/m^3$) of both $PM_{2.5}$ and PM_{10}
- A low volume filter sampler (SKC Leland Legacy Sample Pump with SKC DPS Impactor, 863 Valley View Road Eighty Four, PA 15330): to collect time-integrated filter-based PM_{10} samples. Samples were collected at 10L/min on 47mm Teflon filters for the duration of a typical school day. These substrates were weighed before and after collection using a microbalance, and the PM_{10} concentration ($\mu g/m^3$) was calculated by dividing the difference in PM_{10} mass by the corresponding sampling volume. These gravimetric measurements were considered as primary indicators of the PM_{10} mass.
- 6L EPA TO-15 SUMMA canisters: to collect time-integrated air samples over the course of a typical school day. Samples were then analyzed by gas chromatography-mass spectrometry (GC-MS) to measure the concentrations of 61 specific VOCs (ppbv).

Figure 6. One of the four mobile stations used to monitor the indoor and outdoor concentrations of the targeted air pollutants

At each school, one air quality monitoring cart was set-up outside to sample outdoor air. The remaining three stations were placed indoors, one in each classroom, near one of the walls and just a few meters away from the students. Measurements were made away from all air conditioning vents to better represent mixed indoor air quality conditions as experienced by students and teachers. All sensors and inlets were approximately three feet above the floor, or about the height of a child's head when seated. The effectiveness of each of the tested air purification solutions was then evaluated by comparing the indoor concentrations of the targeted air pollutants to the corresponding outdoor levels. Baseline measurements were taken before installing any of the air purification solutions to estimate the pre-existing removal efficiencies of the classrooms before modification. Measurements that were found to be inaccurate or unrepresentative due to meteorological conditions (e.g. rain), improper cart placement, or instrument malfunction were not considered in the data analysis.

Before and after school hours, the four measurement stations were collocated in a storage room and the continuous instruments were run "side-by-side" to provide quality assurance of the measurements, to estimate the precision characteristics, and to identify any potential problems. Table 5 shows the specific air purification solutions that were tested inside each of the nine classrooms, along with the dates when all baseline and actual measurements were taken.

Table 5. Summary of the air purification solutions tested in each of the nine classrooms. The dates when all baseline and actual measurements were taken are also included

School / Class ID	Configurations Used			
	04 / 07-11 / 08	*04 / 14-18 / 08*	*04 / 21-25 / 08*	*04 / 28 / 08 to 05 / 02 / 08*
Del Amo / DA-6	Baseline	SA + PF	SA + PF	SA + HP-PF
Del Amo / DA-7	Baseline	RS	RS	RS
Del Amo / DA-8	Baseline	HP-PF	HP-PF	HP-PF
	05 / 12-16 / 08	*05 / 19-23 / 08*	*05 / 26-30 / 08*	*06 / 02-06 / 08*
Hudson / H-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-15	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-52	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
	11 / 18-26 / 08	*12 / 01-05 / 08*	*12 / 08-12 / 08*	*12 / 15-19 / 08*
Dominguez / DZ-7	Baseline	SA / SA + PF	SA + HP-PF	SA + HP-PF
Dominguez / DZ-9	Baseline	HP-PF	HP-PF	HP-PF
Dominguez / DZ-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

The three schools were tested one at a time from April to December 2008 for a total of over 150 valid measurement days across all schools and classrooms. The period of sampling was during regularly scheduled school hours, with minor adjustments for school schedule changes.

RESULTS AND DISCUSSION

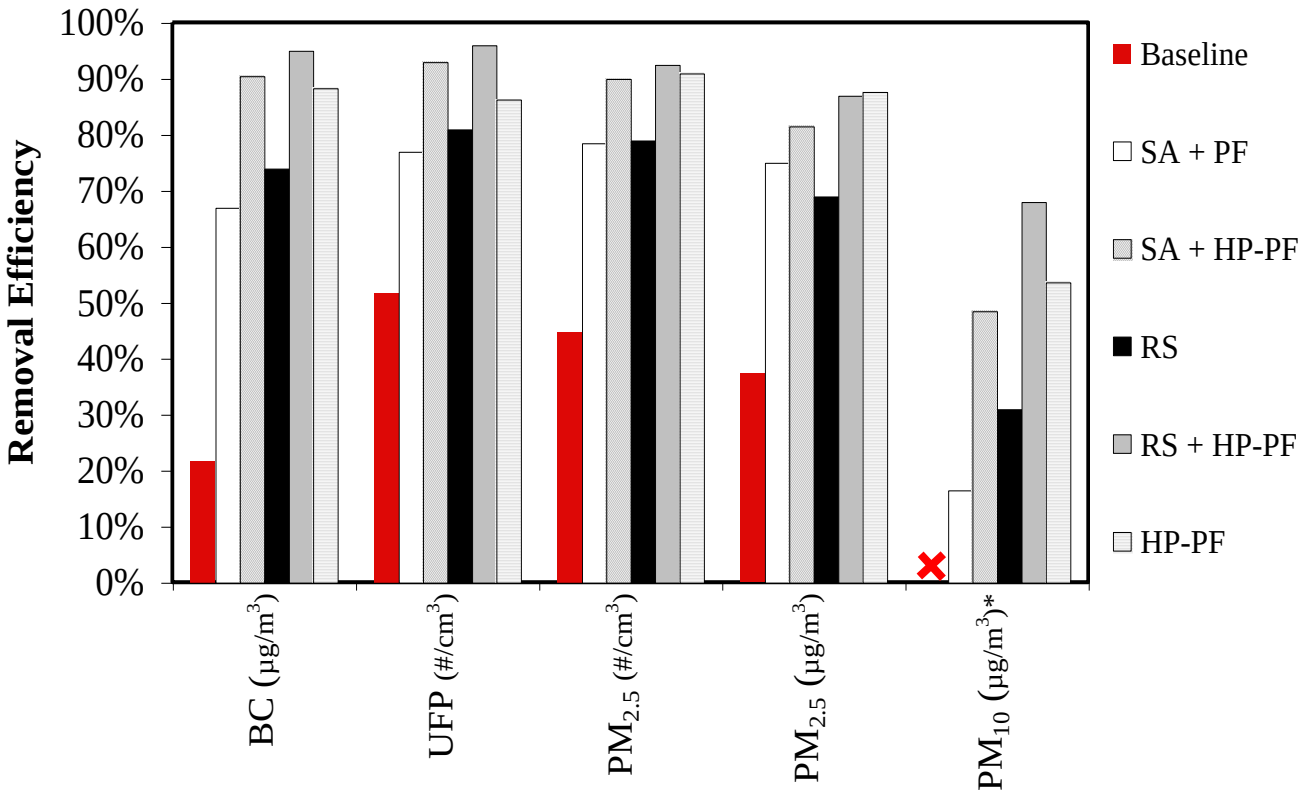
Removal of PM and other particle species

Figure 7a summarizes the study average particle removal efficiencies (here defined as the percentage reduction in the indoor concentration of a particular pollutant relative to its concurrent outdoor concentration) achieved by the six air purification solutions. Indoor and outdoor mass and particle number concentrations were averaged over the duration of a typical school day and across all days, classrooms and schools. The corresponding study average particle removal efficiencies for each elementary school are shown in Figures 7b, 7c, and 7d for Del Amo, Hudson and Dominguez, respectively. Daily and weekly average indoor and outdoor concentrations of BC, UFP, $PM_{2.5}$ and PM_{10} at all schools and classrooms are provided in APPENDIX A, along with the corresponding average indoor/outdoor ratios and removal efficiencies.

Overall, the combination of a register system and a high-performance panel filter (RS + HP-PF) was the most effective solution for reducing the indoor concentrations of BC, UFP, and $PM_{2.5}$ (both mass and particle count), with average removal efficiencies varying from 87 to 96% (Figure 7a). Replacing a conventional HVAC-based panel filter (PF) with a HP-PF resulted in a substantial reduction in the indoor levels of all particulate pollutants inside all classrooms, especially when this high-performance panel filter was operated in conjunction with other air filtration devices. When using the HP-PF alone, the study average removal efficiencies were also close to 90% (88, 86, 91, and 88%, for BC,

UFP, $PM_{2.5}$ count, and $PM_{2.5}$ mass, respectively). These average values are significantly higher than baseline (pre-existing) conditions, when removal efficiencies for the different pollutants were only about 20-50%.

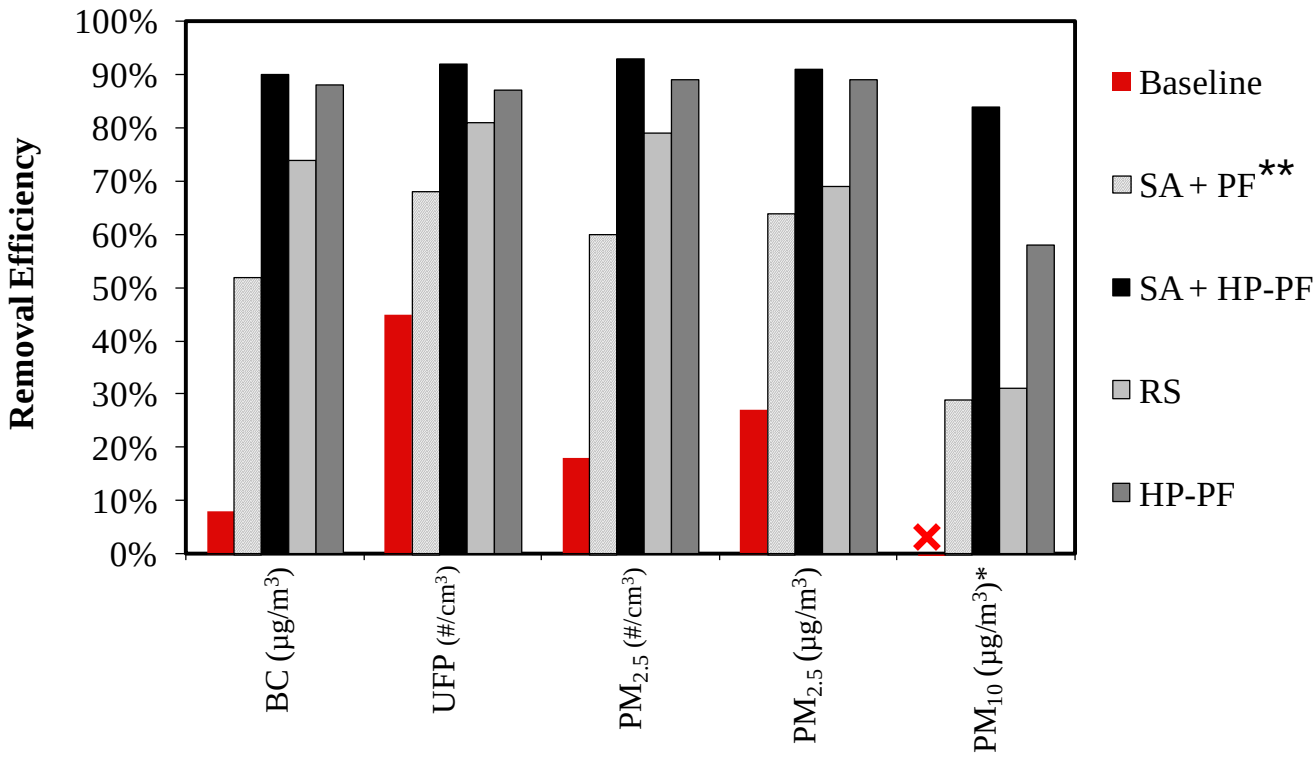
a) **ALL CLASSROOMS AT ALL SCHOOLS**



* From gravimetric / filter measurements

✖ The PM_{10} concentration was higher indoors than outdoors due to indoor sources

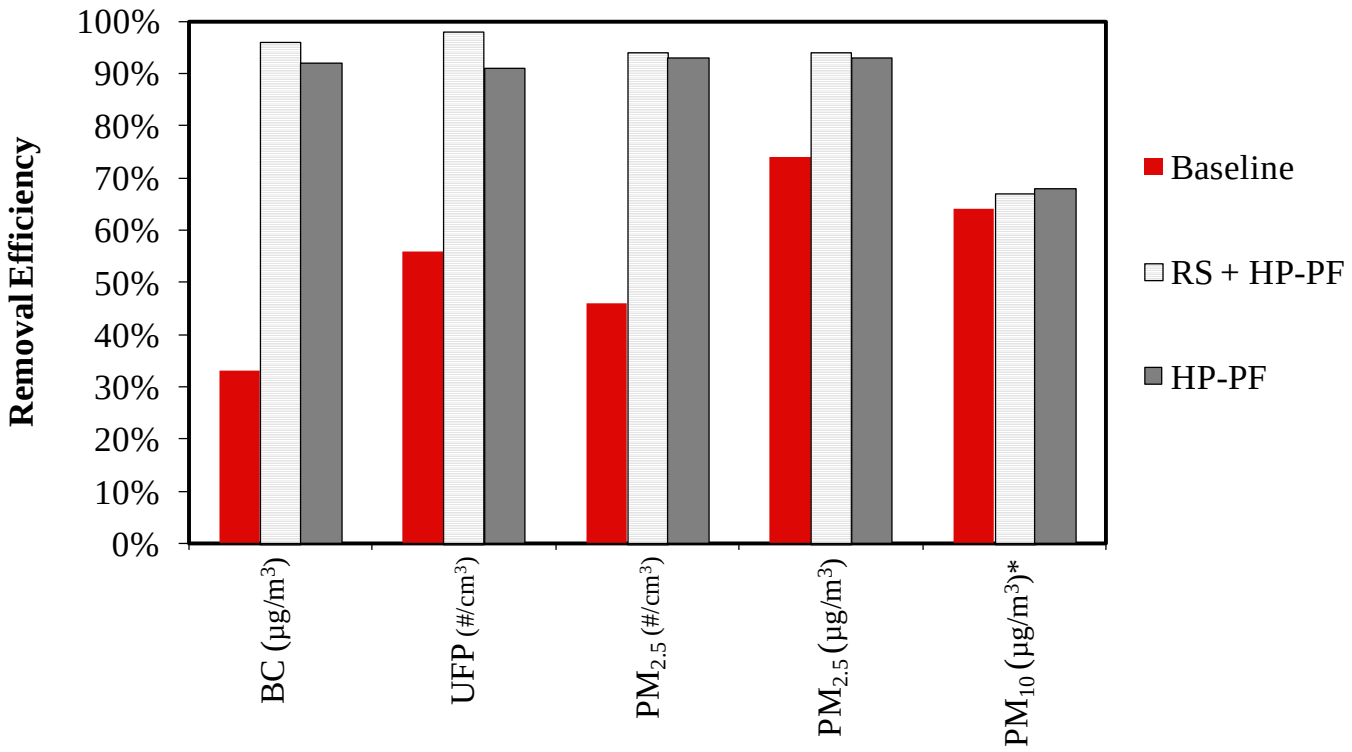
b) **DEL AMO ELEMENTARY SCHOOL**



* From gravimetric / filter measurements ** With HVAC

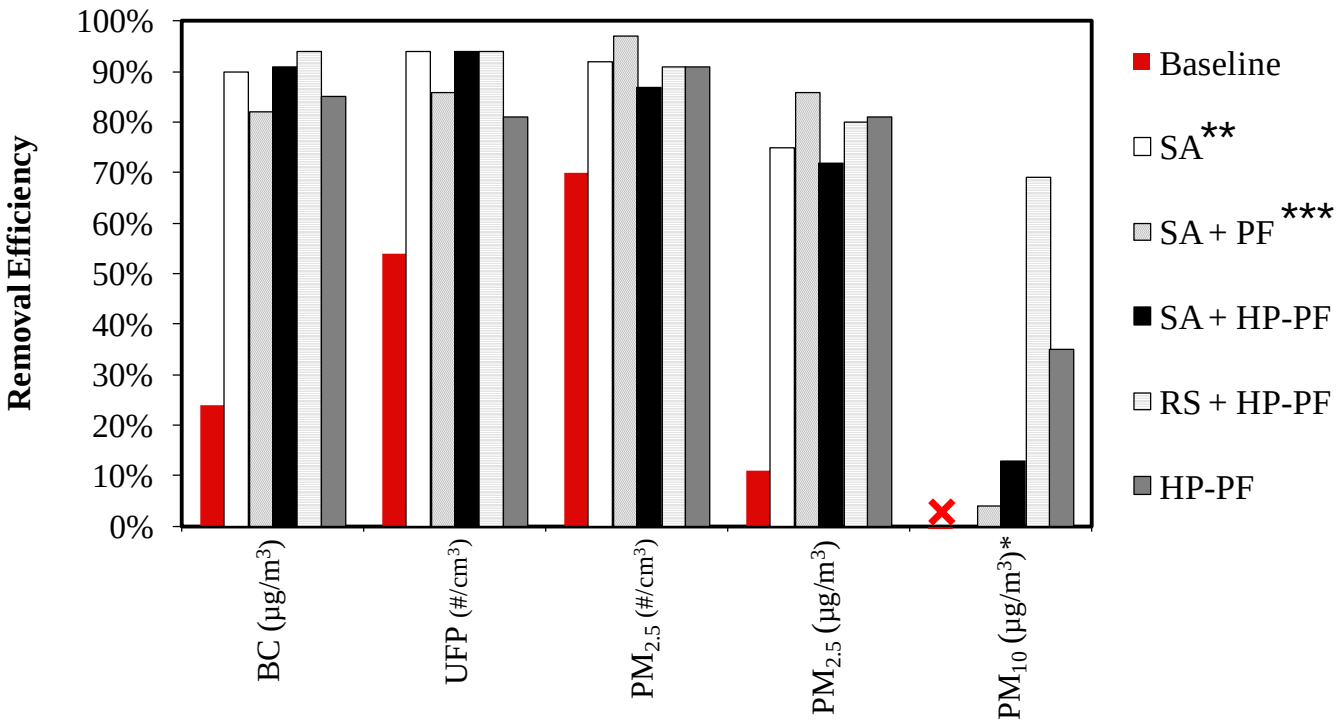
✕ The PM_{10} concentration was higher indoors than outdoors due to indoor sources

c) **HUDSON ELEMENTARY SCHOOL**



* From gravimetric / filter measurements

d) **DOMINGUEZ ELEMENTARY SCHOOL**



* From gravimetric / filter measurements ** Without HVAC *** With HVAC

✕ The PM_{10} concentration was higher indoors than outdoors because of indoor sources

Figure 7. Particle removal efficiencies (%) achieved by the six air purification solutions. Bars indicate data averaged a) at all schools and in all classrooms, b) at Del Amo, c) at Hudson, and d) at Dominguez

In all cases, air quality conditions were improved substantially with respect to the corresponding baseline measurements. The intra-classroom variability of the measured removal efficiencies was low, as indicated by the low standard deviations given in Table 6a. This reflects the fact that all air purification solutions were highly effective at all schools and in all classrooms, as confirmed by the particle removal performance data for each of the three elementary schools in Tables 6b (Del Amo), 6c (Hudson) and 6d (Dominguez).

The stand-alone system (SA) is well suited for indoor environments not equipped with an HVAC. In order to simulate conditions similar to those encountered in older classrooms not equipped with a forced air climate control device, the HVAC in room DZ-7 (at Dominguez) was intentionally turned off for part of the study. When the SA unit was running with the HVAC off, removal efficiencies were close to 90% for BC, UFP and $PM_{2.5}$ (count) (Table 6d). For BC and UFP, these percentages were slightly lower when the HVAC was running since more of the smaller particles (mostly unfiltered by the existing conventional panel filter) were entering the classrooms from outdoors. Overall, our results confirmed that conventional HVAC panel filters are not particularly effective in removing UFP, although they can be effective in removing coarser particles.

Table 6. Particle removal efficiencies (%) achieved by the six air purification solutions. Data represent averages a) at all schools and in all classrooms, b) at Del Amo, c) at Hudson, and d) at Dominguez

a)

ALL CLASSROOMS AND ALL SCHOOLS												
	Study days (#)	BC (%)		UFP (%)		$PM_{2.5}$ count (%)		$PM_{2.5}$ mass (%)		PM_{10} gravimetric mass (%)[1]		PM_{10} mass monitor (%)[2]
Baseline	48	22	± 13	52	± 17	45	± 14	37	± 26	-67	± 156	13	± 36
SA + PF**	14	67	± 6	77	± 6	79	± 5	75	± 5	17	± 71	59	± 9
SA + HP-PF	11	91	± 6	93	± 4	90	± 3	82	± 12	49	± 16	53	± 33
RS + PF	15	74	± 20	81	± 10	79	± 17	69	± 24	31	± 55	22	± 46
RS + HP-PF	35	95	± 2	96	± 3	93	± 5	87	± 11	68	± 11	42	± 28
HP-PF	35	88	± 5	86	± 7	91	± 4	88	± 8	54	± 25	53	± 31

b)

DEL AMO ELEMENTARY SCHOOL												
	Study days (#)	BC (%)		UFP (%)		$PM_{2.5}$ count (%)		$PM_{2.5}$ mass (%)		PM_{10} gravimetric mass (%)[1]		PM_{10} mass monitor (%)[2]
Baseline	15	8	± 9	45	± 16	18	± 20	27	± 17	-224	± 278	26	± 26
SA*	N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A
SA + PF**	10	52	± 7	68	± 6	60	± 7	64	± 5	29	± 102	51	± 9
SA + HP-PF	5	90	± 5	92	± 3	93	± 1	91	± 4	84	± 11	74	± 11
RS + PF	15	74	± 20	81	± 10	79	± 17	69	± 24	31	± 55	22	± 46
RS + HP-PF	N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A
HP-PF	15	88	± 4	87	± 4	89	± 5	89	± 5	58	± 28	62	± 13

c)

HUDSON ELEMENTARY SCHOOL												
	Study days (#)	BC (%)		UFP (%)		$PM_{2.5}$ count (%)		$PM_{2.5}$ mass (%)		PM_{10} gravimetric mass (%)[1]		PM_{10} mass monitor (%)[2]
Baseline	15	33	± 9	56	± 18	46	± 11	74	± 5	64	± 28	54	± 23
SA*	N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A
SA + PF**	N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A
SA + HP-PF	N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A
RS + PF	N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A
RS + HP-PF	27	96	± 2	98	± 2	94	± 4	94	± 5	67	± 8	51	± 30
HP-PF	15	92	± 2	91	± 4	93	± 2	93	± 4	68	± 19	59	± 33

d)

DOMINGUEZ ELEMENTARY SCHOOL												
	Study days (#)	BC (%)		UFP (%)		$PM_{2.5}$ count (%)		$PM_{2.5}$ mass (%)		PM_{10} gravimetric mass (%)[1]		PM_{10} mass monitor (%)[2]
Baseline	18	24	± 21	54	± 16	70	± 11	11	± 55	-40	± 161	-42	± 60
SA*	3	90	± 4	94	± 2	92	± 6	75	± 10	0	± 34	31	± 42
SA + PF**	4	82	± 5	86	± 5	97	± 2	86	± 4	4	± 40	66	± 8
SA + HP-PF	6	91	± 6	94	± 4	87	± 5	72	± 20	13	± 20	32	± 55
RS + PF	N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A	N/A	± N/A
RS + HP-PF	8	94	± 2	94	± 3	91	± 6	80	± 17	69	± 14	33	± 25
HP-PF	18	85	± 8	81	± 13	91	± 5	81	± 16	35	± 28	39	± 48

Note: Negative removal efficiencies indicate the presence of an indoor source of PM_{10}

[1]From gravimetric / filter measurements

[2]Using a particle mass monitor

*The HVAC system was turned off

**Operated in conjunction with a standard (MERV 7) panel filter installed in the HVAC system

It should be noted that the negative removal efficiencies associated with several baseline PM_{10} measurements indicate conditions where indoor concentrations were higher than the corresponding outdoor levels. This is likely due to re-suspension of dust and other relatively large particles caused by in-classroom activities such as walking and cleaning. Due to the presence of these indoor sources, the removal performance of PM_{10} was lower than that of other particle measurements.

Figure 8 illustrates the effect of indoor activities on in-classroom PM_{10} levels at Hudson Elementary School (Room H-15) on May 21, 2008. On this day removal efficiencies approached 100% before the school day started and during lunchtime (when students and staff members were outside the classroom) and were substantially lower when classes were in session.

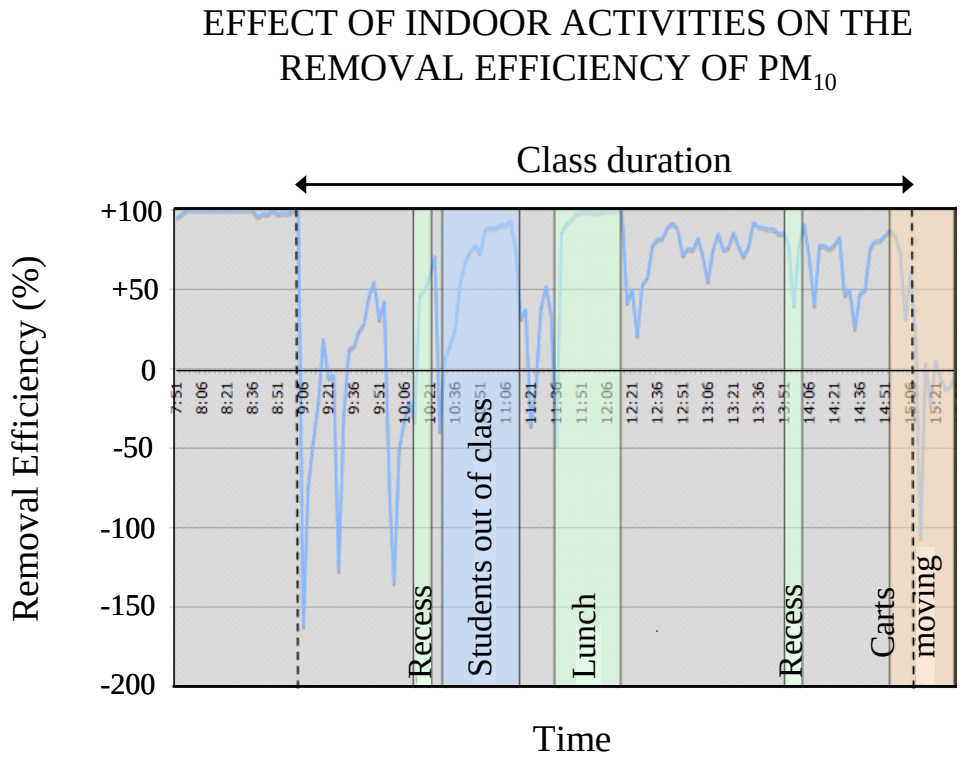


Figure 8. Effect of indoor activities on the removal performance of PM_{10} at Hudson elementary school (Room H-15) on May 21, 2008

Activities occurring immediately outside the school boundaries were observed to influence the indoor concentrations of some pollutants and, thus, their corresponding removal efficiencies. Figure 9 shows the effect of increased motor-vehicle emissions due to the morning drop-off of students (grey areas) on the outdoor concentrations of BC, and the associated spikes in indoor BC levels occurring just before the beginning of the school day, when the classroom doors were left open. Overall, these indoor peaks caused a relatively small decrease in the calculated removal performance when averaged over the course of the entire school day.

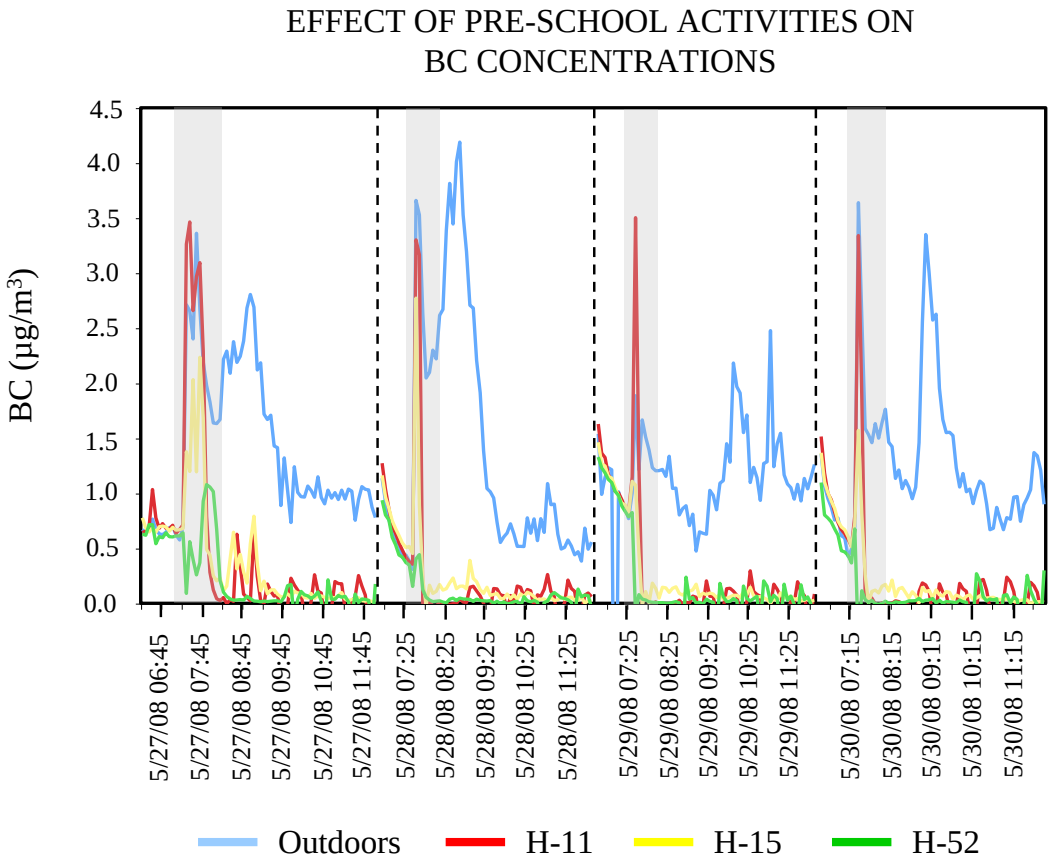


Figure 9. Effect of before school activities on BC concentrations. Grey areas show an increase in both indoor and outdoor levels due to morning drop-off traffic

Impact on the HVAC system airflow

As discussed earlier, the high-performance panel filters (HP-PF) used for this pilot study are thicker than standard/conventional medium performance MERV filters. However, due to their increased surface area and proprietary "nano-fiber" design, they generally have similar air resistance properties as conventional filters and, thus, do not reduce the airflow through the HVAC system.

As shown in Table 7, replacing a conventional panel filter (PF; typically 1" in depth) with a thicker high-performance panel filter (HP-PF; 2" deep) did not alter the measured airflow in any of the studied classrooms. Adding a register system without upgrading to a high-performance panel filter (see the RS-PF configuration data below) reduced the HVAC system airflow by an average of 9%. This small reduction is due to the increased pressure drop resulting from the addition of a gas-phase filtration media. Using a register system while also upgrading to a high-performance panel filter (RS + HP-PF configuration in Table 7) altered the airflow by only 1-3%. At Hudson elementary school, installation of the register system in classrooms H-11 and H-15 required a widening of the connection to the supply duct. This caused an airflow increase between 17 and 24%.

Table 7. Effect of a high-performance panel filter (HP-PF) and/or a register system (RS) on the HVAC system airflow

	DEL AMO ELEMENTARY SCHOOL					
	DA-6		**DA-7**		**DA-8**	
	Airflow (cfm)	Change (%)	Airflow (cfm)	Change (%)	Airflow (cfm)	Change (%)
Baseline	1200		1200		1250	
HP-PF	1210	1	N/A	N/A	1250	0
RS + PF	N/A	N/A	1090	-9	N/A	N/A

	HUDSON ELEMENTARY SCHOOL					
	H-11		**H-15**		**H-52**	
	Airflow (cfm)	Change (%)	Airflow (cfm)	Change (%)	Airflow (cfm)	Change (%)
Baseline	840		903		1236	
HP-PF	844	0	913	1	1246	1
RS + HP-PF	1039	24	1054	17	1194	-3

	DOMINGUEZ ELEMENTARY SCHOOL					
	DZ-7		**DZ-9**		**DZ-11**	
	Airflow (cfm)	Change (%)	Airflow (cfm)	Change (%)	Airflow (cfm)	Change (%)
Baseline	1642		1681		1722	
HP-PF	1661	1	1664	-1	1771	3
RS + HP-PF	N/A	N/A	N/A	N/A	1742	1

Removal of VOCs

Although canister samples were collected at all schools and classrooms, and all samples were analyzed for VOCs, the data recovery at Del Amo and Hudson was insufficient to guarantee an adequate interpretation of the results. The detection limits of the analysis method used at those schools were not low enough to quantify most of the VOCs of interest. After the analysis methods were modified to correct for this problem, reliable VOC data were obtained for Dominguez elementary. Therefore, only VOC data from Dominguez are discussed in this section. Table 8 summarizes the removal efficiencies for:

- Total VOCs: expressed as the sum of 61 individual compounds and 53 unspeciated organic compounds
- Ethanol: a chemical emitted from both indoor and outdoor evaporative sources
- Benzene: a species mostly emitted from gasoline-powered vehicles. This compound was used here as an indicator of VOCs of outdoor origin

Daily average concentrations of individual VOCs measured at Dominguez elementary school (i.e. DZ-7, DZ-9, and DZ-11) are given in APPENDIX B.

Table 8. Average removal efficiencies of total VOCs, ethanol, and benzene at Dominguez elementary school

	DOMINGUEZ ELEMENTARY SCHOOL			
	Study Days (#)	Total VOCs (%)[1]	Ethanol (%)	Benzene (%)
Baseline	18	-114 ± 731	-1230 ± 982	-11 ± 22
SA (HVAC off)*	3	15 ± 132	-349 ± 276	52 ± 35
SA + PF (HVAC on)**	4	19 ± 198	-587 ± 903	58 ± 33
SA + HP-PF	6	-6 ± 280	-929 ± 853	73 ± 11
RS	N/A	N/A ± N/A	N/A ± N/A	N/A ± N/A
RS + HP-PF	8	-3 ± 345	-534 ± 502	58 ± 49
HP-PF	18	-64 ± 404	-1111 ± 1164	1 ± 38

[1]Sum of 61 known VOCs and 53 unspeciated organic compounds

*Operated with the HVAC system turned off

**Operated with the HVAC system turned on

Large standard deviations reflect the wide concentration ranges for the different chemicals. As expected, existing and high-performance panel filters (PF and HP-PF, respectively) had virtually no effect on the VOC levels measured indoors, since these air filtration media did not include gas removal capabilities. The standalone system (SA) demonstrated a 52 to 73% removal performance for benzene.

At all three schools, the indoor concentrations of ethanol were consistently the highest among all measured VOCs and higher than outdoor levels. This organic

compound is a common solvent used in whiteboard markers, detergents and other cleaning products, and has several potential indoor sources. The negative removal efficiencies shown in Table 8 indicate that the indoor concentrations of some VOCs were often higher than the corresponding outdoor levels. Our findings are in line with those from previous research studies (Jia et al., 2007; Bruno et al., 2008), and confirm that several measured indoor VOCs are mostly of indoor origin. For this reason, a direct comparison of indoor and outdoor total VOC concentrations is not appropriate when significant indoor sources exist.

Therefore, classroom DZ-9, whose air conditioning system was equipped with a HP-PF and no gas phase filtration device, was used as the "baseline" (rather than the outdoor monitoring site) to better evaluate the actual effectiveness of the standalone unit (SA) and the register system (RS) installed in classrooms DZ-7 and DZ-11, respectively (Table 9). When compared to the control classroom (DZ-9), the removal efficiencies for total VOCs in classrooms DZ-7 and DZ-11 showed a reduction in gaseous pollutants with respect to baseline conditions.

Table 9. Average removal efficiencies of total VOCs with respect to a control classroom (DZ-9) not equipped with any gas phase filtration device. All data refer to measurements taken at Dominguez elementary school

DOMINGUEZ ELEMENTARY SCHOOL (removal efficiency with respect to classroom DZ-9)			
	Classroom Comparison[1]	Study Days (#)	Total VOCs (%)[2]
Baseline	DZ-7 & DZ-11 vs DZ-9	14	-31 ± 367
RS	DZ-11 vs DZ-9	10	-3 ± 521
SA (HVAC off)*	DZ-7 vs DZ-9	2	55 ± 50
SA + PF (HVAC on)**	DZ-7 vs DZ-9	8	27 ± 198

[1]DZ-9 = "control classroom" (HP-PF but no gas-phase filtration)

[2]Sum of 61 known VOCs and 53 unspeciated organic compounds

*Operated with the HVAC system turned off

**Operated with the HVAC system turned on

Removal efficiencies corresponding to baseline measurements indicate that the total VOC concentration inside the two test rooms (DZ-7 and DZ-11) were, on average, 31% higher than that in the control classroom (DZ-9), probably because of differences in indoor activities (e.g. cleaning). Assuming this difference persisted throughout the entire duration of the study, the actual VOC removal performance of the register system (RS) was about 28% (-3% + 31%). Similarly, when normalizing for the initial conditions in the control classroom, the removal efficiencies of the standalone (SA) unit operated with and without the use of the HVAC system were about 58% (27% + 31%) and 86% (55% + 31%), respectively.

Overall, these solutions demonstrated some ability to reduce VOCs indoors, although not as consistently or effectively as the particle filtration. This may be due to the presence of one or more indoor sources of gaseous pollutants. The removal performance of gas-absorbing media (as opposed to filtration substrates) is dependent on media history and may be subject to saturation after experiencing high short-term concentrations or after longer-term use. Therefore, the lifetime, cost, benefits, and maintenance of the gas removal media must be further assessed before conclusions and recommendations can be made.

ACKNOWLEDGEMENTS

This pilot study was funded through the use of mitigation fees collected by the South Coast Air Quality Management District (SCAQMD) under Rule 1172 for VOC releases by local refineries. AQMD is the air pollution control agency for all of Orange County and urban portions of Los Angeles, Riverside and San Bernardino counties, the smoggiest region of the United States. IQAir North America, Inc., a leading specialist in air filtration solutions for homes, hospitals and schools, and Thermal Comfort Systems, specialist in HVAC system design, were selected by SCAQMD through a competitive bid process to provide for the design, engineering and installation of the air filtration devices used for this work.

REFERENCES

Bruno, P., Caselli, M., De Gennaro, G., Iacobellis, S., and Tutino, M. (2008) "Monitoring of volatile organic compounds in non-residential indoor environments", Indoor Air, 18 (3): 250-256

Environmental Protection Agency Integrated Science Assessments (External Review Draft; 2009). http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=201805

Jia, C., Batterman, S. and Godwin, C. (2007) "VOCs in industrial, urban and suburban neighborhoods, Part 1: Indoor and outdoor concentrations, variation, and risk drivers", Atmospheric Environment, 42 (9): 2083-2100

MATES III Study, 2008 (http://www.aqmd.gov/prdas/matesIII/matesIII.html)

Pope, C. A., and Dockery, D. W. (2006) "Health effects of fine particulate air pollution: Lines that connect", Journal of the Air & Waste Management Association, 56: 709-742

APPENDIX A. Daily and weekly average indoor and outdoor concentrations of black carbon (BC), ultra-fine particles (UFP), fine particulate matter ($PM_{2.5}$) and coarse PM (PM_{10}) at all schools and classrooms. The corresponding average indoor / outdoor ratios and removal efficiencies are also included. Missing data (mostly due to instrument malfunction) and periods affected by rain have been highlighted in yellow. The air purification solutions adopted in each classroom have been summarized below each Table

Del Amo Elementary School - Black Carbon

Date	Average Outdoor Concentration (ng/m^3)	Average Indoor Concentration (ng/m^3)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DA-6	DA-7	DA-8	DA-6	DA-7	DA-8	DA-6	DA-7	DA-8
4/7/2008	1,611	1,392	1,490	1,465	0.86	0.92	0.91	14%	8%	9%
4/8/2008	948	902	1,094	887	0.95	1.15	0.94	5%	-15%	6%
4/9/2008	1,119	1,166	1,147	1,044	1.04	1.03	0.93	-4%	-3%	7%
4/10/2008	1,692	1,518	1,495	1,500	0.90	0.88	0.89	10%	12%	11%
4/11/2008	4,451	3,547	3,665	3,651	0.80	0.82	0.82	20%	18%	18%
Average (Week 1)	1,964	1,705	1,778	1,709	0.91	0.96	0.90	**9%**	**4%**	**10%**
Standard Deviation	1,426	1,056	1,071	1,117	0.09	0.13	0.05	**9%**	**13%**	**5%**
4/14/2008	3,688	1,802	383	410	0.49	0.10	0.11	51%	90%	89%
4/15/2008	1,128	595	851	93	0.53	0.75	0.08	47%	25%	92%
4/16/2008	1,353	824	703	333	0.61	0.52	0.25	39%	48%	75%
4/17/2008	4,392	2,301	1,656	435	0.52	0.38	0.10	48%	62%	90%
4/18/2008	3,387	1,752	1,061	254	0.52	0.31	0.07	48%	69%	93%
Average (Week 2)	2,789	1,455	931	305	0.53	0.41	0.12	**47%**	**59%**	**88%**
Standard Deviation	1,462	718	475	138	0.04	0.24	0.07	**4%**	**24%**	**7%**
4/21/2008	1,409	537	171	105	0.38	0.12	0.07	62%	88%	93%
4/22/2008	2,396	1,097	414	265	0.46	0.17	0.11	54%	83%	89%
4/23/2008	1,180	498	226	125	0.42	0.19	0.11	58%	81%	89%
4/24/2008	1,691	734	362	193	0.43	0.21	0.11	57%	79%	89%
4/25/2008	3,261	1,377	455	278	0.42	0.14	0.09	58%	86%	91%
Average (Week 3)	1,987	848	326	193	0.42	0.17	0.10	**58%**	**83%**	**90%**
Standard Deviation	846	379	122	79	0.03	0.04	0.02	**3%**	**4%**	**2%**
4/28/2008	3,789	209	349	375	0.06	0.09	0.10	94%	91%	90%
4/29/2008	1,908	135	269	279	0.07	0.14	0.15	93%	86%	85%
4/30/2008	1,077	104	108	127	0.10	0.10	0.12	90%	90%	88%
5/1/2008	1,055	191	156	160	0.18	0.15	0.15	82%	85%	85%
5/2/2008	3,338	292	1,899	505	0.09	0.57	0.15	91%	43%	85%
Average (Week 4)	2,233	186	556	289	0.10	0.21	0.13	**90%**	**79%**	**87%**
Standard Deviation	1,272	73	756	156	0.05	0.20	0.02	**5%**	**20%**	**2%**

School / Class ID	Configurations Used			
	04 / 07-11 / 08	*04 / 14-18 / 08*	*04 / 21-25 / 08*	*04 / 28 / 08 to 05 / 02 / 08*
Del Amo / DA-6	Baseline	SA + PF	SA + PF	SA + HP-PF
Del Amo / DA-7	Baseline	RS	RS	RS
Del Amo / DA-8	Baseline	HP-PF	HP-PF	HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Del Amo Elementary School - Ultra Fine Particles

Date	Average Outdoor Concentration (particles/cm^3)	Average Indoor Concentration (particles/cm^3)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DA-6	DA-7	DA-8	DA-6	DA-7	DA-8	DA-6	DA-7	DA-8
4/7/2008	34,674		25,215			0.73			27%	
4/8/2008	39,291	15,555	17,984	14,386	0.40	0.46	0.37	60%	54%	63%
4/9/2008	19,124	11,354	18,384	12,960	0.59	0.96	0.68	41%	4%	32%
4/10/2008	41,814	19,800	21,327	19,463	0.47	0.51	0.47	53%	49%	53%
4/11/2008	42,613	19,833	22,452	19,935	0.47	0.53	0.47	53%	47%	53%
Average (Week 1)	35,503	16,635	21,072	16,686	0.48	0.64	0.49	**52%**	**36%**	**51%**
Standard Deviation	9,665	4,054	2,996	3,533	0.08	0.21	0.13	**8%**	**21%**	**13%**
4/14/2008	53,086	16,017	6,724	7,303	0.30	0.13	0.14	70%	87%	86%
4/15/2008		7,878	8,865	10,233						
4/16/2008	35,591	14,757	14,140	8,932	0.41	0.40	0.25	59%	60%	75%
4/17/2008	55,384	13,945	12,367	5,628	0.25	0.22	0.10	75%	78%	90%
4/18/2008	35,185	14,434	11,992	4,979	0.41	0.34	0.14	59%	66%	86%
Average (Week 2)	44,812	13,406	10,818	7,415	0.34	0.27	0.16	**66%**	**73%**	**84%**
Standard Deviation	10,923	3,184	2,974	2,201	0.08	0.12	0.06	**8%**	**12%**	**6%**
4/21/2008	57,526	20,259	6,007	5,267	0.35	0.10	0.09	65%	90%	91%
4/22/2008	46,241	13,552	8,158	7,011	0.29	0.18	0.15	71%	82%	85%
4/23/2008	34,366	9,741	5,891	3,039	0.28	0.17	0.09	72%	83%	91%
4/24/2008	38,854	10,831	7,090	5,171	0.28	0.18	0.13	72%	82%	87%
4/25/2008	33,004	8,965	4,695	2,794	0.27	0.14	0.08	73%	86%	92%
Average (Week 3)	41,998	12,670	6,368	4,656	0.30	0.16	0.11	**70%**	**84%**	**89%**
Standard Deviation	10,101	4,585	1,312	1,751	0.03	0.03	0.03	**3%**	**3%**	**3%**
4/28/2008	40,429	2,179	4,967	5,287	0.05	0.12	0.13	95%	88%	87%
4/29/2008	57,136	3,963	7,457	7,819	0.07	0.13	0.14	93%	87%	86%
4/30/2008	30,692	1,909	2,347	3,136	0.06	0.08	0.10	94%	92%	90%
5/1/2008	37,507	4,076	4,677	3,640	0.11	0.12	0.10	89%	88%	90%
5/2/2008	34,214	3,845	12,424	4,961	0.11	0.36	0.14	89%	64%	86%
Average (Week 4)	39,996	3,194	6,374	4,968	0.08	0.16	0.12	**92%**	**84%**	**88%**
Standard Deviation	10,249	1,058	3,836	1,827	0.03	0.11	0.02	**3%**	**11%**	**2%**

School / Class ID	Configurations Used			
	04 / 07-11 / 08	*04 / 14-18 / 08*	*04 / 21-25 / 08*	*04 / 28 / 08 to 05 / 02 / 08*
Del Amo / DA-6	Baseline	SA + PF	SA + PF	SA + HP-PF
Del Amo / DA-7	Baseline	RS	RS	RS
Del Amo / DA-8	Baseline	HP-PF	HP-PF	HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Del Amo Elementary School - $PM_{2.5}$ (count)

Date	Average Outdoor Concentration (particles/ft^3)	Average Indoor Concentration (particles/ft^3)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DA-6	DA-7	DA-8	DA-6	DA-7	DA-8	DA-6	DA-7	DA-8
4/7/2008		1,425,737								
4/8/2008	1,129,234	860,458	818,779	859,380	0.76	0.73	0.76	24%	27%	24%
4/9/2008	606,772		589,396	761,753		0.97	1.26		3%	-26%
4/10/2008	878,513		621,944	654,570		0.71	0.75		29%	25%
4/11/2008	1,657,318	1,007,993	1,686,712	1,092,355	0.61	1.02	0.66	39%	-2%	34%
Average (Week 1)	1,067,959	1,098,063	929,208	842,014	0.69	0.86	0.86	**31%**	**14%**	**14%**
Standard Deviation	447,095	293,205	515,070	186,681	0.11	0.16	0.27	**11%**	**16%**	**27%**
4/14/2008	1,510,925	608,865	153,470	164,656	0.40	0.10	0.11	60%	90%	89%
4/15/2008	1,448,473	675,560	901,449	87,792	0.47	0.62	0.06	53%	38%	94%
4/16/2008	1,448,590	823,550	755,949	363,943	0.57	0.52	0.25	43%	48%	75%
4/17/2008	2,375,182	935,700	625,960	216,222	0.39	0.26	0.09	61%	74%	91%
4/18/2008	3,303,699	1,068,499	835,426	206,160	0.32	0.25	0.06	68%	75%	94%
Average (Week 2)	2,017,374	822,435	654,451	207,755	0.43	0.35	0.11	**57%**	**65%**	**89%**
Standard Deviation	819,499	187,458	298,268	100,893	0.09	0.21	0.08	**9%**	**21%**	**8%**
4/21/2008	1,117,692	445,613	132,034	89,866	0.40	0.12	0.08	60%	88%	92%
4/22/2008	1,962,746	721,027	258,062	184,328	0.37	0.13	0.09	63%	87%	91%
4/23/2008	1,677,902	639,840	235,809	136,928	0.38	0.14	0.08	62%	86%	92%
4/24/2008	1,606,064	565,163	258,425	167,180	0.35	0.16	0.10	65%	84%	90%
4/25/2008	1,649,781	558,423	189,268	127,409	0.34	0.11	0.08	66%	89%	92%
Average (Week 3)	1,602,837	586,013	214,719	141,142	0.37	0.13	0.09	**63%**	**87%**	**91%**
Standard Deviation	305,266	102,511	54,125	36,669	0.02	0.02	0.01	**2%**	**2%**	**1%**
4/28/2008	1,284,388	94,732	159,555	165,842	0.07	0.12	0.13	93%	88%	87%
4/29/2008	2,011,522	121,487	205,529	272,593	0.06	0.10	0.14	94%	90%	86%
4/30/2008	1,367,829	108,012	120,466	153,098	0.08	0.09	0.11	92%	91%	89%
5/1/2008			143,394	155,073						
5/2/2008			791,947	275,170						
Average (Week 4)	1,554,580	108,077	284,178	204,355	0.07	0.10	0.13	**93%**	**90%**	**87%**
Standard Deviation	397,917	13,378	285,555	63,660	0.01	0.02	0.01	**1%**	**2%**	**1%**

School / Class ID	Configurations Used			
	04 / 07-11 / 08	*04 / 14-18 / 08*	*04 / 21-25 / 08*	*04 / 28 / 08 to 05 / 02 / 08*
Del Amo / DA-6	Baseline	SA + PF	SA + PF	SA + HP-PF
Del Amo / DA-7	Baseline	RS	RS	RS
Del Amo / DA-8	Baseline	HP-PF	HP-PF	HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Del Amo Elementary School - $PM_{2.5}$ (mass)

Date	Average Outdoor Concentration ($\mu g/m^3$)	Average Indoor Concentration ($\mu g/m^3$)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DA-6	DA-7	DA-8	DA-6	DA-7	DA-8	DA-6	DA-7	DA-8
4/7/2008	8.74	10.50	6.68	6.51	1.20	0.76	74%	-20%	24%	26%
4/8/2008	14.25		10.54	7.04		0.74	0.49		26%	51%
4/9/2008	8.61	5.07	6.43	6.05	0.59	0.75	0.70	41%	25%	30%
4/10/2008	7.48	6.53	5.73	4.55	0.87	0.77	0.61	13%	23%	39%
4/11/2008	7.24	3.89	5.94	4.73	0.54	0.82	0.65	46%	18%	35%
Average (Week 1)	9.27	6.50	7.06	5.77	0.80	0.77	0.64	**20%**	**23%**	**36%**
Standard Deviation	2.86	2.88	1.98	1.10	0.31	0.03	0.10	**31%**	**3%**	**10%**
4/14/2008	10.14	3.61	1.93	0.90	0.36	0.19	0.09	64%	81%	91%
4/15/2008	15.06	4.75	12.40	1.15	0.32	0.82	0.08	68%	18%	92%
4/16/2008	12.49	5.44	9.75	3.31	0.44	0.78	0.26	56%	22%	74%
4/17/2008	10.60		5.21	0.62		0.49	0.06		51%	94%
4/18/2008	8.25	3.76	3.68	1.05	0.46	0.45	0.13	54%	55%	87%
Average (Week 2)	11.31	4.39	6.59	1.41	0.39	0.55	0.12	**61%**	**45%**	**88%**
Standard Deviation	2.58	0.86	4.35	1.08	0.07	0.26	0.08	**7%**	**26%**	**8%**
4/21/2008	10.99	3.56	2.28	0.81	0.32	0.21	0.07	68%	79%	93%
4/22/2008	11.03	3.65	1.82	1.31	0.33	0.17	0.12	67%	83%	88%
4/23/2008	8.59	2.81	2.54	1.18	0.33	0.30	0.14	67%	70%	86%
4/24/2008	12.72	4.27	2.74	1.70	0.34	0.22	0.13	66%	78%	87%
4/25/2008	7.09	2.44	1.31	0.52	0.34	0.19	0.07	66%	81%	93%
Average (Week 3)	10.08	3.35	2.14	1.10	0.33	0.21	0.11	**67%**	**79%**	**89%**
Standard Deviation	2.23	0.73	0.58	0.45	0.01	0.05	0.03	**1%**	**5%**	**3%**
4/28/2008	5.61	0.69	1.05	0.34	0.12	0.19	0.06	88%	81%	94%
4/29/2008	17.88	0.87	1.61	1.79	0.05	0.09	0.10	95%	91%	90%
4/30/2008	14.50	1.35	1.25	1.87	0.09	0.09	0.13	91%	91%	87%
5/1/2008	12.95	1.78	1.17	1.62	0.14	0.09	0.13	86%	91%	88%
5/2/2008	14.08	0.75	5.79	2.10	0.05	0.41	0.15	95%	59%	85%
Average (Week 4)	13.00	1.09	2.17	1.55	0.09	0.17	0.11	**91%**	**83%**	**89%**
Standard Deviation	4.52	0.46	2.03	0.69	0.04	0.14	0.03	**4%**	**14%**	**3%**

School / Class ID	Configurations Used			
	04 / 07-11 / 08	*04 / 14-18 / 08*	*04 / 21-25 / 08*	*04 / 28 / 08 to 05 / 02 / 08*
Del Amo / DA-6	Baseline	SA + PF	SA + PF	SA + HP-PF
Del Amo / DA-7	Baseline	RS	RS	RS
Del Amo / DA-8	Baseline	HP-PF	HP-PF	HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Del Amo Elementary School - PM_{10} (from particle mass monitor measurements)

Date	Average Outdoor Concentration (µg/m³)	Average Indoor Concentration (µg/m³)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DA-6	DA-7	DA-8	DA-6	DA-7	DA-8	DA-6	DA-7	DA-8
4/7/2008	35.78	35.22	28.42	21.97	0.98	0.79	61%	2%	21%	39%
4/8/2008	45.40		55.07	23.04		1.21	0.51		-21%	49%
4/9/2008	28.99	20.88	24.58	23.40	0.72	0.85	0.81	28%	15%	19%
4/10/2008	29.55	34.72	22.50	18.44	1.18	0.76	0.62	-18%	24%	38%
4/11/2008	41.44	11.06	25.65	20.46	0.27	0.62	0.49	73%	38%	51%
Average (Week 1)	36.23	25.47	31.25	21.46	0.79	0.85	0.61	**21%**	**15%**	**39%**
Standard Deviation	7.22	11.68	13.49	2.04	0.39	0.22	0.13	**39%**	**22%**	**13%**
4/14/2008	37.29	16.79	31.87	11.31	0.45	0.85	0.30	55%	15%	70%
4/15/2008	49.49	18.09	81.10	17.11	0.37	1.64	0.35	63%	-64%	65%
4/16/2008	43.89	27.44	75.71	22.75	0.63	1.72	0.52	37%	-72%	48%
4/17/2008	43.78		48.13	11.29		1.10	0.26		-10%	74%
4/18/2008	33.84	19.71	38.90	16.90	0.58	1.15	0.50	42%	-15%	50%
Average (Week 2)	41.66	20.51	55.14	15.87	0.51	1.29	0.38	**49%**	**-29%**	**62%**
Standard Deviation	6.14	4.77	22.09	4.79	0.12	0.37	0.12	**12%**	**37%**	**12%**
4/21/2008	45.13	17.94	31.35	14.58	0.40	0.69	0.32	60%	31%	68%
4/22/2008	39.96	23.99	20.92	18.86	0.60	0.52	0.47	40%	48%	53%
4/23/2008	33.54	14.53	32.46	18.54	0.43	0.97	0.55	57%	3%	45%
4/24/2008	40.68	21.02	26.43	21.74	0.52	0.65	0.53	48%	35%	47%
4/25/2008	35.52	15.42	18.02	10.66	0.43	0.51	0.30	57%	49%	70%
Average (Week 3)	38.96	18.58	25.83	16.88	0.48	0.67	0.44	**52%**	**33%**	**56%**
Standard Deviation	4.56	3.94	6.33	4.31	0.08	0.19	0.12	**8%**	**19%**	**12%**
4/28/2008	5.61	0.69	1.05	0.34	0.12	0.19	0.06	88%	81%	94%
4/29/2008	49.89	12.13	17.43	13.57	0.24	0.35	0.27	76%	65%	73%
4/30/2008	55.49	19.75	18.17	23.04	0.36	0.33	0.42	64%	67%	58%
5/1/2008	44.69	17.16	17.06	21.40	0.38	0.38	0.48	62%	62%	52%
5/2/2008	52.56	9.90	32.02	19.66	0.19	0.61	0.37	81%	39%	63%
Average (Week 4)	41.65	11.93	17.14	15.60	0.26	0.37	0.32	**74%**	**63%**	**68%**
Standard Deviation	20.53	7.40	10.97	9.25	0.11	0.15	0.16	**11%**	**15%**	**16%**

School / Class ID	Configurations Used			
	04 / 07-11 / 08	*04 / 14-18 / 08*	*04 / 21-25 / 08*	*04 / 28 / 08 to 05 / 02 / 08*
Del Amo / DA-6	Baseline	SA + PF	SA + PF	SA + HP-PF
Del Amo / DA-7	Baseline	RS	RS	RS
Del Amo / DA-8	Baseline	HP-PF	HP-PF	HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Del Amo Elementary School - PM_{10} (from filter-based measurements)

Date	Average Outdoor Concentration (µg/m³)	Average Indoor Concentration (µg/m³)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DA-6	DA-7	DA-8	DA-6	DA-7	DA-8	DA-6	DA-7	DA-8
4/7/2008	11	72	44	80	6.55	4.00	727%	-555%	-300%	-627%
4/8/2008	15		72	22		4.80	1.47		-380%	-47%
4/9/2008		66	60	11						
4/10/2008		53	29	65						
4/11/2008	64	47	29	43	0.73	0.45	0.67	27%	55%	33%
Average (Week 1)	30	60	47	44	3.64	3.08	3.14	**-264%**	**-208%**	**-214%**
Standard Deviation	30	12	19	29	4.11	2.31	3.60	**411%**	**231%**	**360%**
4/14/2008	83	87	150	11	1.05	1.81	0.13	-5%	-81%	87%
4/15/2008	61	25	76	52	0.41	1.25	0.85	59%	-25%	15%
4/16/2008	84	41	71	42	0.49	0.85	0.50	51%	15%	50%
4/17/2008	85	20	61	32	0.24	0.72	0.38	76%	28%	62%
4/18/2008	73	11	29	53	0.15	0.40	0.73	85%	60%	27%
Average (Week 2)	77	37	77	38	0.47	1.00	0.52	**53%**	**0%**	**48%**
Standard Deviation	10	30	45	17	0.35	0.54	0.28	**35%**	**54%**	**28%**
4/21/2008	100	71	31	11	0.71	0.31	0.11	29%	69%	89%
4/22/2008	14	49	26	14	3.50	1.86	1.00	-250%	-86%	0%
4/23/2008	110	11	46	21	0.10	0.42	0.19	90%	58%	81%
4/24/2008	61	20	33	43	0.33	0.54	0.70	67%	46%	30%
4/25/2008	73	12	29	21	0.16	0.40	0.29	84%	60%	71%
Average (Week 3)	72	33	33	22	0.96	0.70	0.46	**4%**	**30%**	**54%**
Standard Deviation	38	26	8	13	1.44	0.65	0.38	**144%**	**65%**	**38%**
4/28/2008	88	11	59	30	0.13	0.67	0.34	88%	33%	66%
4/29/2008	780	14	25	36	0.02	0.03	0.05	98%	97%	95%
4/30/2008	67	12	12	22	0.18	0.18	0.33	82%	82%	67%
5/1/2008	63	21	42	28	0.33	0.67	0.44	67%	33%	56%
5/2/2008	86	12	28	28	0.14	0.33	0.33	86%	67%	67%
Average (Week 4)	217	14	33	29	0.16	0.37	0.30	**84%**	**63%**	**70%**
Standard Deviation	315	4	18	5	0.11	0.29	0.15	**11%**	**29%**	**15%**

School / Class ID	Configurations Used			
	04 / 07-11 / 08	*04 / 14-18 / 08*	*04 / 21-25 / 08*	*04 / 28 / 08 to 05 / 02 / 08*
Del Amo / DA-6	Baseline	SA + PF	SA + PF	SA + HP-PF
Del Amo / DA-7	Baseline	RS	RS	RS
Del Amo / DA-8	Baseline	HP-PF	HP-PF	HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Hudson Elementary School - Black Carbon

Date	Average Outdoor Concentration (ng/m^3)	Average Indoor Concentration (ng/m^3)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		H-11	H-15	H-52	H-11	H-15	H-52	H-11	H-15	H-52
5/12/2008	889	557	643	666	0.63	0.72	0.75	37%	28%	25%
5/13/2008	1,765	983	1,155	1,208	0.56	0.65	0.68	44%	35%	32%
5/14/2008	1,906	1,031	1,297	1,616	0.54	0.68	0.85	46%	32%	15%
5/15/2008	3,632	2,026	2,597	2,903	0.56	0.72	0.80	44%	28%	20%
5/16/2008	3,756	2,163	2,486	2,771	0.58	0.66	0.74	42%	34%	26%
Average (Week 1)	2,390	1,352	1,636	1,833	0.57	0.69	0.76	**43%**	**31%**	**24%**
Standard Deviation	1,253	704	863	978	0.03	0.03	0.06	**3%**	**3%**	**6%**
5/19/2008	2,007	78	97	194	0.04	0.05	0.10	96%	95%	90%
5/20/2008	1,066	74	71	96	0.07	0.07	0.09	93%	93%	91%
5/21/2008	1,344	104	75	111	0.08	0.06	0.08	92%	94%	92%
5/22/2008	903	95	67	82	0.11	0.07	0.09	89%	93%	91%
5/23/2008	731	68	71	73	0.09	0.10	0.10	91%	90%	90%
Average (Week 2)	1,210	84	76	111	0.08	0.07	0.09	**92%**	**93%**	**91%**
Standard Deviation	499	15	12	49	0.03	0.02	0.01	**3%**	**2%**	**1%**
5/26/2008										
5/27/2008	1,028	63	72	26	0.06	0.07	0.03	94%	93%	97%
5/28/2008	778	59	58	19	0.08	0.07	0.02	92%	93%	98%
5/29/2008	1,098	37	53	23	0.03	0.05	0.02	97%	95%	98%
5/30/2008	1,140	35	41	27	0.03	0.04	0.02	97%	96%	98%
Average (Week 3)	1,011	48	56	24	0.05	0.06	0.02	**95%**	**94%**	**98%**
Standard Deviation	162	15	13	4	0.02	0.02	0.00	**2%**	**2%**	**0%**
6/2/2008	1,128		45	36		0.04	0.03		96%	97%
6/3/2008	1,495	50	69	33	0.03	0.05	0.02	97%	95%	98%
6/4/2008	1,106	55	63	18	0.05	0.06	0.02	95%	94%	98%
6/5/2008	1,320	60	58	65	0.05	0.04	0.05	95%	96%	95%
6/6/2008	2,046	51	52	38	0.03	0.03	0.02	97%	97%	98%
Average (Week 4)	1,419	54	57	38	0.04	0.04	0.03	**96%**	**96%**	**97%**
Standard Deviation	384	5	9	17	0.01	0.01	0.01	**1%**	**1%**	**1%**

School / Class ID	Configurations Used			
	05 / 12-16 / 08	*05 / 19-23 / 08*	*05 / 26-30 / 08*	*06 / 02-06 / 08*
Hudson / H-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-15	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-52	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Hudson Elementary School - Ultra Fine Particles

Date	Average Outdoor Concentration (particles/cm^3)	Average Indoor Concentration (particles/cm^3)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		H-11	H-15	H-52	H-11	H-15	H-52	H-11	H-15	H-52
5/12/2008	14,643	4,083	5,190	8,433	0.28	0.35	0.58	72%	65%	42%
5/13/2008	40,865	10,619	9,421	19,956	0.26	0.23	0.49	74%	77%	51%
5/14/2008	47,145	11,563	14,730	19,466	0.25	0.31	0.41	75%	69%	59%
5/15/2008	44,862	18,397	27,694	29,422	0.41	0.62	0.66	59%	38%	34%
5/16/2008	38,322	10,435	24,291	29,818	0.27	0.63	0.78	73%	37%	22%
Average (Week 1)	37,167	11,019	16,265	21,419	0.29	0.43	0.58	**71%**	**57%**	**42%**
Standard Deviation	13,049	5,083	9,577	8,792	0.07	0.18	0.14	**7%**	**18%**	**14%**
5/19/2008	38,368	1,835	2,732	5,456	0.05	0.07	0.14	95%	93%	86%
5/20/2008	17,442	755	2,099	2,033	0.04	0.12	0.12	96%	88%	88%
5/21/2008	80,163	6,255	4,714	10,681	0.08	0.06	0.13	92%	94%	87%
5/22/2008	27,886	1,381	1,291	3,353	0.05	0.05	0.12	95%	95%	88%
5/23/2008	20,524	1,792	1,367	3,214	0.09	0.07	0.16	91%	93%	84%
Average (Week 2)	36,877	2,404	2,440	4,947	0.06	0.07	0.13	**94%**	**93%**	**87%**
Standard Deviation	25,505	2,197	1,401	3,434	0.02	0.03	0.02	**2%**	**3%**	**2%**
5/26/2008										
5/27/2008	50,891	763	1,295	793	0.01	0.03	0.02	99%	97%	98%
5/28/2008	36,964	452	458	594	0.01	0.01	0.02	99%	99%	98%
5/29/2008	40,035	367	435	572	0.01	0.01	0.01	99%	99%	99%
5/30/2008	57,760	456	566	1,006	0.01	0.01	0.02	99%	99%	98%
Average (Week 3)	46,413	510	689	741	0.01	0.01	0.02	**99%**	**99%**	**98%**
Standard Deviation	9,639	174	408	203	0.00	0.01	0.00	**0%**	**1%**	**0%**
6/2/2008	35,495		430	426		0.01	0.01		99%	99%
6/3/2008	32,336		700	432		0.02	0.01		98%	99%
6/4/2008	18,941	1,656	393	346	0.09	0.02	0.02	91%	98%	98%
6/5/2008	39,083	53	570	3,727	0.00	0.01	0.10	100%	99%	90%
6/6/2008	43,572	609	607	950	0.01	0.01	0.02	99%	99%	98%
Average (Week 4)	33,885	773	540	1,176	0.03	0.02	0.03	**97%**	**98%**	**97%**
Standard Deviation	9,343	814	127	1,446	0.05	0.00	0.04	**5%**	**0%**	**4%**

School / Class ID	Configurations Used			
	05 / 12-16 / 08	*05 / 19-23 / 08*	*05 / 26-30 / 08*	*06 / 02-06 / 08*
Hudson / H-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-15	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-52	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Hudson Elementary School - $PM_{2.5}$ (count)

Date	Average Outdoor Concentration (particles/ft^3)	Average Indoor Concentration (particles/ft^3)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		H-11	H-15	H-52	H-11	H-15	H-52	H-11	H-15	H-52
5/12/2008	1,109,627	576,204	511,734	718,130	0.52	0.46	0.65	48%	54%	35%
5/13/2008	1,850,803	757,977	897,986	1,156,730	0.41	0.49	0.62	59%	51%	38%
5/14/2008	1,760,128	682,498	838,534	1,199,580	0.39	0.48	0.68	61%	52%	32%
5/15/2008	1,839,611	767,375	1,011,002	1,191,460	0.42	0.55	0.65	58%	45%	35%
5/16/2008	1,128,564	525,461	723,482	781,768	0.47	0.64	0.69	53%	36%	31%
Average (Week 1)	1,537,747	661,903	796,548	1,009,534	0.44	0.52	0.66	**56%**	**48%**	**34%**
Standard Deviation	383,828	108,096	190,066	238,576	0.05	0.07	0.03	**5%**	**7%**	**3%**
5/19/2008	660,607	44,930	61,168	59,352	0.07	0.09	0.09	93%	91%	91%
5/20/2008	1,477,586	68,443	70,820	131,786	0.05	0.05	0.09	95%	95%	91%
5/21/2008	1,613,826	103,883	73,924	125,633	0.06	0.05	0.08	94%	95%	92%
5/22/2008	1,530,791	106,300	69,737	94,795	0.07	0.05	0.06	93%	95%	94%
5/23/2008	987,855	77,470	71,330	70,589	0.08	0.07	0.07	92%	93%	93%
Average (Week 2)	1,254,133	80,205	69,396	96,431	0.07	0.06	0.08	**93%**	**94%**	**92%**
Standard Deviation	412,015	25,650	4,850	32,203	0.01	0.02	0.01	**1%**	**2%**	**1%**
5/26/2008										
5/27/2008	440,181	52,467	51,042	26,303	0.12	0.12	0.06	88%	88%	94%
5/28/2008	362,533	66,769	46,541	18,906	0.18	0.13	0.05	82%	87%	95%
5/29/2008	369,467	33,173	50,616	17,735	0.09	0.14	0.05	91%	86%	95%
5/30/2008	529,995	35,119	28,628	23,916	0.07	0.05	0.05	93%	95%	95%
Average (Week 3)	425,544	46,882	44,207	21,715	0.11	0.11	0.05	**89%**	**89%**	**95%**
Standard Deviation	77,973	15,843	10,582	4,067	0.05	0.04	0.01	**5%**	**4%**	**1%**
6/2/2008	1,472,339		38,432	36,347		0.03	0.02		97%	98%
6/3/2008	2,102,152	56,800	81,009	39,991	0.03	0.04	0.02	97%	96%	98%
6/4/2008	1,346,575	64,055	66,975	19,669	0.05	0.05	0.01	95%	95%	99%
6/5/2008	1,167,940	77,692	56,657	29,352	0.07	0.05	0.03	93%	95%	97%
6/6/2008	998,499	67,890	40,091	24,490	0.07	0.04	0.02	93%	96%	98%
Average (Week 4)	1,417,501	66,609	56,633	29,970	0.05	0.04	0.02	**95%**	**96%**	**98%**
Standard Deviation	422,678	8,703	18,070	8,331	0.02	0.01	0.00	**2%**	**1%**	**0%**

School / Class ID	Configurations Used			
	05 / 12-16 / 08	*05 / 19-23 / 08*	*05 / 26-30 / 08*	*06 / 02-06 / 08*
Hudson / H-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-15	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-52	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Hudson Elementary School - $PM_{2.5}$ (mass)

Date	Average Outdoor Concentration (µg/m³)	Average Indoor Concentration (µg/m³)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		H-11	H-15	H-52	H-11	H-15	H-52	H-11	H-15	H-52
5/12/2008	8.19	2.68	2.55	1.82	0.33	0.31	0.22	67%	69%	78%
5/13/2008	13.38	3.36	3.62	3.02	0.25	0.27	0.23	75%	73%	77%
5/14/2008	14.65	2.55	3.74	4.09	0.17	0.25	0.28	83%	75%	72%
5/15/2008	20.11	3.60	5.52	4.92	0.18	0.27	0.24	82%	73%	76%
5/16/2008	14.66	3.13	4.81	4.41	0.21	0.33	0.30	79%	67%	70%
Average (Week 1)	14.20	3.06	4.05	3.65	0.23	0.29	0.25	**77%**	**71%**	**75%**
Standard Deviation	4.25	0.45	1.15	1.23	0.06	0.03	0.03	**6%**	**3%**	**3%**
5/19/2008	7.86	0.56	0.84	0.04	0.07	0.11	0.01	93%	89%	99%
5/20/2008	6.19	1.00	0.82	0.28	0.16	0.13	0.05	84%	87%	95%
5/21/2008	14.18	1.37	0.79	0.28	0.10	0.06	0.02	90%	94%	98%
5/22/2008	29.03	2.09	1.00	0.93	0.07	0.03	0.03	93%	97%	97%
5/23/2008	17.46	1.32	1.20	0.29	0.08	0.07	0.02	92%	93%	98%
Average (Week 2)	14.95	1.27	0.93	0.37	0.10	0.08	0.02	**90%**	**92%**	**98%**
Standard Deviation	9.11	0.56	0.17	0.33	0.04	0.04	0.02	**4%**	**4%**	**2%**
5/26/2008										
5/27/2008	3.12	0.92	0.91	0.10	0.30	0.29	0.03	70%	71%	97%
5/28/2008	2.34	1.48	0.88		0.63	0.38		37%	62%	
5/29/2008	3.36	0.47	0.84	0.07	0.14	0.25	0.02	86%	75%	98%
5/30/2008	4.65	0.54	0.59	0.17	0.12	0.13	0.04	88%	87%	96%
Average (Week 3)	3.37	0.86	0.81	1.64	0.30	0.26	0.03	**70%**	**74%**	**97%**
Standard Deviation	0.96	0.46	0.15	3.05	0.24	0.10	0.01	**24%**	**10%**	**1%**
6/2/2008	12.73		0.49	0.45		0.04	0.04		96%	96%
6/3/2008	15.40	1.09	1.07	0.31	0.07	0.07	0.02	93%	93%	98%
6/4/2008	9.62	1.43	1.10	0.00	0.15	0.11	0.00	85%	89%	100%
6/5/2008	12.63	1.72	1.16	0.22	0.14	0.09	0.02	86%	91%	98%
6/6/2008	16.85	1.25	0.79	0.17	0.07	0.05	0.01	93%	95%	99%
Average (Week 4)	13.45	1.38	0.92	0.23	0.11	0.07	0.02	**89%**	**93%**	**98%**
Standard Deviation	2.80	0.27	0.28	0.17	0.04	0.03	0.01	**4%**	**3%**	**1%**

School / Class ID	Configurations Used			
	05 / 12-16 / 08	*05 / 19-23 / 08*	*05 / 26-30 / 08*	*06 / 02-06 / 08*
Hudson / H-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-15	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-52	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Hudson Elementary School - PM_{10} (from particle mass monitor measurements)

Date	Average Outdoor Concentration (µg/m³)	Average Indoor Concentration (µg/m³)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		H-11	H-15	H-52	H-11	H-15	H-52	H-11	H-15	H-52
5/12/2008	34.99	35.13	29.94	9.35	1.00	0.86	0.27	0%	14%	73%
5/13/2008	72.87	36.97	35.03	14.02	0.51	0.48	0.19	49%	52%	81%
5/14/2008	57.56	23.93	32.32	13.91	0.42	0.56	0.24	58%	44%	76%
5/15/2008	73.56	33.55	33.75	11.95	0.46	0.46	0.16	54%	54%	84%
5/16/2008	65.32	28.13	36.48	18.64	0.43	0.56	0.29	57%	44%	71%
Average (Week 1)	60.86	31.54	33.50	13.57	0.56	0.58	0.23	**44%**	**42%**	**77%**
Standard Deviation	15.86	5.38	2.52	3.41	0.25	0.16	0.05	**25%**	**16%**	**5%**
5/19/2008	44.62	22.67	31.37	3.21	0.51	0.70	0.07	49%	30%	93%
5/20/2008	29.90	32.03	32.45	7.32	1.07	1.09	0.24	-7%	-9%	76%
5/21/2008	99.04	30.71	30.14	5.48	0.31	0.30	0.06	69%	70%	94%
5/22/2008	97.14	48.80	26.72	6.28	0.50	0.28	0.06	50%	72%	94%
5/23/2008	62.98	28.55	30.00	3.31	0.45	0.48	0.05	55%	52%	95%
Average (Week 2)	66.74	32.55	30.14	5.12	0.57	0.57	0.10	**43%**	**43%**	**90%**
Standard Deviation	30.94	9.77	2.15	1.82	0.29	0.34	0.08	**29%**	**34%**	**8%**
5/26/2008										
5/27/2008	21.70	31.71	35.38	3.04	1.46	1.63	0.14	-46%	-63%	86%
5/28/2008	18.66	37.53	29.44		2.01	1.58		-101%	-58%	
5/29/2008	24.67	20.97	32.20	3.62	0.85	1.31	0.15	15%	-31%	85%
5/30/2008	28.26	22.01	18.07	6.19	0.78	0.64	0.22	22%	36%	78%
Average (Week 3)	23.32	28.06	28.77	5.26	1.28	1.29	0.17	**-28%**	**-29%**	**83%**
Standard Deviation	4.10	7.96	7.54	2.38	0.58	0.46	0.04	**58%**	**46%**	**4%**
6/2/2008	47.55		23.85	10.14		0.50	0.21		50%	79%
6/3/2008	55.46	33.55	38.16	8.32	0.61	0.69	0.15	39%	31%	85%
6/4/2008	42.76	37.37	37.82	3.91	0.87	0.88	0.09	13%	12%	91%
6/5/2008	48.79	40.38	34.67	7.35	0.83	0.71	0.15	17%	29%	85%
6/6/2008	58.51	34.10	23.89	6.60	0.58	0.41	0.11	42%	59%	89%
Average (Week 4)	50.61	36.35	31.68	7.27	0.72	0.64	0.14	**28%**	**36%**	**86%**
Standard Deviation	6.33	3.17	7.26	2.30	0.15	0.19	0.05	**15%**	**19%**	**5%**

School / Class ID	Configurations Used			
	05 / 12-16 / 08	*05 / 19-23 / 08*	*05 / 26-30 / 08*	*06 / 02-06 / 08*
Hudson / H-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-15	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-52	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Hudson Elementary School - PM_{10} (from filter-based measurements)

Date	Average Outdoor Concentration (µg/m³)	Average Indoor Concentration (µg/m³)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		H-11	H-15	H-52	H-11	H-15	H-52	H-11	H-15	H-52
5/12/2008	120	68		92	0.57		0.77	43%		23%
5/13/2008	110	46	20		0.42	0.18		58%	82%	
5/14/2008		45	43	24						
5/15/2008	130		42	26	0.00		0.20	100%		80%
5/16/2008		26		27						
Average (Week 1)	120	46	35	42	0.33	0.18	0.48	**67%**	**82%**	**52%**
Standard Deviation	10	17	13	33	0.29		0.40	**29%**		**40%**
5/19/2008	120	35		24	0.29		0.20	71%		80%
5/20/2008	78	29		61	0.37		0.78	63%		22%
5/21/2008	60	11		28	0.18		0.47	82%		53%
5/22/2008	130	39		29	0.30		0.22	70%		78%
5/23/2008	99	20		15	0.20		0.15	80%		85%
Average (Week 2)	97	27	46	31	0.27		0.36	**73%**		**64%**
Standard Deviation	29	11	19	17	0.08		0.26	**8%**		**26%**
5/26/2008										
5/27/2008	210	31		53	0.15		0.25	85%		75%
5/28/2008	120	34		23	0.28		0.19	72%		81%
5/29/2008	99	11		35	0.11		0.35	89%		65%
5/30/2008	87	20		19	0.23		0.22	77%		78%
Average (Week 3)	129	24	90	33	0.19		0.25	**81%**		**75%**
Standard Deviation	56	11	34	15	0.08		0.07	**8%**		**7%**
6/2/2008	120			41			0.34			66%
6/3/2008	110	30		30	0.27		0.27	73%		73%
6/4/2008	82	27		41	0.33		0.50	67%		50%
6/5/2008	100	35		36	0.35		0.36	65%		64%
6/6/2008	120	27		39	0.23		0.33	78%		68%
Average (Week 4)	106	30		37	0.29		0.36	**71%**		**64%**
Standard Deviation	16	4		5	0.06		0.08	**8%**		**8%**

School / Class ID	Configurations Used			
	05 / 12-16 / 08	*05 / 19-23 / 08*	*05 / 26-30 / 08*	*06 / 02-06 / 08*
Hudson / H-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-15	Baseline	HP-PF	RS + HP-PF	RS + HP-PF
Hudson / H-52	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Dominguez Elementary School - Black Carbon

Date	Average Outdoor Concentration (ng/m^3)	Average Indoor Concentration (ng/m^3)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11
11/17/2008										
11/18/2008	5,137	2,149	4,384	5,096	0.42	0.85	0.99	58%	15%	1%
11/19/2008	8,787	3,951	5,935	6,332	0.45	0.68	0.72	55%	32%	28%
11/20/2008	9,243	3,932	7,292	6,616	0.43	0.79	0.72	57%	21%	28%
11/21/2008	11,210	6,967	8,270	8,928	0.62	0.74	0.80	38%	26%	20%
Average (Week 1)	8,594	4,250	6,470	6,743	0.48	0.76	0.81	**52%**	**24%**	**19%**
Standard Deviation	2,533	1,999	1,688	1,599	0.10	0.08	0.13	**10%**	**8%**	**13%**
11/24/2008	4,474	2,918	4,828	4,903	0.65	1.08	1.10	35%	-8%	-10%
11/25/2008	5,234	4,005	4,944	5,166	0.77	0.94	0.99	23%	6%	1%
11/26/2008										
11/27/2008										
11/28/2008										
Average (Week 2)	4,854	3,462	4,886	5,035	0.71	1.01	1.04	**29%**	**-1%**	**-4%**
Standard Deviation	538	768	82	186	0.08	0.10	0.08	**8%**	**10%**	**8%**
12/1/2008	8,642	2,023	2,996	2,744	0.23	0.35	0.32	77%	65%	68%
12/2/2008	2,434	268	217	187	0.11	0.09	0.08	89%	91%	92%
12/3/2008	4,351	557	1,024	444	0.13	0.24	0.10	87%	76%	90%
12/4/2008	3,953	819	354	267	0.21	0.09	0.07	79%	91%	93%
12/5/2008	5,734	766	856	346	0.13	0.15	0.06	87%	85%	94%
Average (Week 3)	5,023	887	1,089	798	0.16	0.18	0.12	**84%**	**82%**	**88%**
Standard Deviation	2,340	671	1,117	1,092	0.05	0.11	0.11	**5%**	**11%**	**11%**
12/8/2008	2,112	290	269	105	0.14	0.13	0.05	86%	87%	95%
12/9/2008	5,452	549	816	311	0.10	0.15	0.06	90%	85%	94%
12/10/2008	2,819	136	351	249	0.05	0.12	0.09	95%	88%	91%
12/11/2008	9,169	515	892	222	0.06	0.10	0.02	94%	90%	98%
12/12/2008	4,670	342	687	444	0.07	0.15	0.10	93%	85%	90%
Average (Week 4)	4,844	366	603	266	0.08	0.13	0.06	**92%**	**87%**	**94%**
Standard Deviation	2,769	169	279	124	0.04	0.02	0.03	**4%**	**2%**	**3%**
12/15/2008										
12/16/2008	3,274	209	432	187	0.06	0.13	0.06	94%	87%	94%
12/17/2008										
12/18/2008	1,976	397	325	109	0.20	0.16	0.05	80%	84%	95%
12/19/2008	4,558	320	904	234	0.07	0.20	0.05	93%	80%	95%
Average (Week 5)	3,269	308	554	177	0.11	0.16	0.05	**89%**	**84%**	**95%**
Standard Deviation	1,291	95	308	63	0.08	0.03	0.00	**8%**	**3%**	**0%**

School / Class ID	Configurations Used			
	11 / 18-26 / 08	*12 / 01-05 / 08*	*12 / 08-12 / 08*	*12 / 15-19 / 08*
Dominguez / DZ-7	Baseline	SA / SA + PF	SA + HP-PF	SA + HP-PF
Dominguez / DZ-9	Baseline	HP-PF	HP-PF	HP-PF
Dominguez / DZ-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Dominguez Elementary School - Ultra Fine Particles

Date	Average Outdoor Concentration (particles/cm^3)	Average Indoor Concentration (particles/cm^3)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11
11/17/2008										
11/18/2008	25,476	5,422	12,344	12,550	0.21	0.48	0.49	79%	52%	51%
11/19/2008	42,651	9,488	19,540	24,676	0.22	0.46	0.58	78%	54%	42%
11/20/2008	39,794	10,924	24,111	21,528	0.27	0.61	0.54	73%	39%	46%
11/21/2008	38,976	12,874	18,814	22,150	0.33	0.48	0.57	67%	52%	43%
Average (Week 1)	36,724	9,677	18,702	20,226	0.26	0.51	0.55	**74%**	**49%**	**45%**
Standard Deviation	7,663	3,158	4,844	5,295	0.05	0.07	0.04	**5%**	**7%**	**4%**
11/24/2008	34,386	8,720	18,565	24,049	0.25	0.54	0.70	75%	46%	30%
11/25/2008	31,838	10,383	17,528	23,812	0.33	0.55	0.75	67%	45%	25%
11/26/2008										
11/27/2008										
11/28/2008										
Average (Week 2)	33,112	9,552	18,047	23,930	0.29	0.55	0.72	**71%**	**45%**	**28%**
Standard Deviation	1,802	1,176	733	168	0.05	0.01	0.03	**5%**	**1%**	**3%**
12/1/2008	41,439	8,349	9,891	13,190	0.20	0.24	0.32	80%	76%	68%
12/2/2008	17,370	1,000	1,962	1,613	0.06	0.11	0.09	94%	89%	91%
12/3/2008	16,420	1,805	3,508	2,413	0.11	0.21	0.15	89%	79%	85%
12/4/2008	16,970	2,768	2,214	1,469	0.16	0.13	0.09	84%	87%	91%
12/5/2008	29,061	2,522	5,130	2,277	0.09	0.18	0.08	91%	82%	92%
Average (Week 3)	24,252	3,289	4,541	4,192	0.12	0.17	0.14	**88%**	**83%**	**86%**
Standard Deviation	10,957	2,911	3,244	5,046	0.06	0.05	0.10	**6%**	**5%**	**10%**
12/8/2008	16,048	1,148	9,995	440	0.07	0.62	0.03	93%	38%	97%
12/9/2008	34,610	2,241	4,785	1,755	0.06	0.14	0.05	94%	86%	95%
12/10/2008	32,657	817	5,299	2,790	0.03	0.16	0.09	97%	84%	91%
12/11/2008	29,250	1,146	3,203	812	0.04	0.11	0.03	96%	89%	97%
12/12/2008	23,839	1,262	4,040	2,750	0.05	0.17	0.12	95%	83%	88%
Average (Week 4)	27,281	1,323	5,464	1,709	0.05	0.24	0.06	**95%**	**76%**	**94%**
Standard Deviation	7,492	539	2,653	1,080	0.02	0.22	0.04	**2%**	**22%**	**4%**
12/15/2008										
12/16/2008	26,441	1,066	4,072	1,209	0.04	0.15	0.05	96%	85%	95%
12/17/2008										
12/18/2008	23,513	3,355	2,871	1,283	0.14	0.12	0.05	86%	88%	95%
12/19/2008	28,783	1,247	7,747	2,101	0.04	0.27	0.07	96%	73%	93%
Average (Week 5)	26,246	1,889	4,897	1,531	0.08	0.18	0.06	**92%**	**82%**	**94%**
Standard Deviation	2,641	1,272	2,540	495	0.06	0.08	0.01	**6%**	**8%**	**1%**

School / Class ID	Configurations Used			
	11 / 18-26 / 08	*12 / 01-05 / 08*	*12 / 08-12 / 08*	*12 / 15-19 / 08*
Dominguez / DZ-7	Baseline	SA / SA + PF	SA + HP-PF	SA + HP-PF
Dominguez / DZ-9	Baseline	HP-PF	HP-PF	HP-PF
Dominguez / DZ-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Dominguez Elementary School - $PM_{2.5}$ (count)

Date	Average Outdoor Concentration (particles/ft^3)	Average Indoor Concentration (particles/ft^3)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11
11/17/2008										
11/18/2008										
11/19/2008	8,866,226	1,411,242	2,600,108	3,571,960	0.16	0.29	0.40	84%	71%	60%
11/20/2008	8,237,390	1,286,754	3,015,586	2,734,509	0.16	0.37	0.33	84%	63%	67%
11/21/2008	7,625,250	1,471,170	2,634,126	3,393,425	0.19	0.35	0.45	81%	65%	55%
Average (Week 1)	8,242,955	1,389,722	2,749,940	3,233,298	0.17	0.33	0.39	**87%**	**75%**	**71%**
Standard Deviation	620,507	94,073	230,684	441,091	0.02	0.04	0.06	**9%**	**17%**	**20%**
11/24/2008	8,511,436	1,151,144	3,000,744	3,943,011	0.14	0.35	0.46	86%	65%	54%
11/25/2008	6,035,358	949,498	1,853,996	2,542,878	0.16	0.31	0.42	84%	69%	58%
11/26/2008										
11/27/2008										
11/28/2008										
Average (Week 2)	7,273,397	1,050,321	2,427,370	3,242,944	0.15	0.33	0.44	**85%**	**67%**	**56%**
Standard Deviation	1,750,852	142,585	810,873	990,043	0.02	0.03	0.03	**2%**	**3%**	**3%**
12/1/2008	7,115,843	375,673	1,197,684	1,210,391	0.05	0.17	0.17	95%	83%	83%
12/2/2008	6,472,443	120,635	344,786	289,496	0.02	0.05	0.04	98%	95%	96%
12/3/2008	10,298,411	190,597	1,628,370	753,983	0.02	0.16	0.07	98%	84%	93%
12/4/2008	10,129,374	294,693	520,489	458,324	0.03	0.05	0.05	97%	95%	95%
12/5/2008	5,018,869	103,392	368,715	228,546	0.02	0.07	0.05	98%	93%	95%
Average (Week 3)	7,806,988	216,998	812,009	588,148	0.03	0.10	0.08	**97%**	**90%**	**92%**
Standard Deviation	2,325,563	116,301	573,363	403,128	0.01	0.06	0.05	**1%**	**6%**	**5%**
12/8/2008	1,539,967	207,455	112,870		0.13	0.07		87%	93%	
12/9/2008	2,540,284	271,444	165,653	85,637	0.11	0.07	0.03	89%	93%	97%
12/10/2008	425,792	74,899	59,053	73,412	0.18	0.14	0.17	82%	86%	83%
12/11/2008	2,040,036	147,307	136,505	62,538	0.07	0.07	0.03	93%	93%	97%
12/12/2008	2,259,506	157,821	151,593	190,241	0.07	0.07	0.08	93%	93%	92%
Average (Week 4)	1,761,117	171,785	125,135	102,957	0.11	0.08	0.08	**89%**	**92%**	**92%**
Standard Deviation	831,458	73,119	41,798	58,950	0.04	0.03	0.07	**4%**	**3%**	**7%**
12/15/2008										
12/16/2008	518,108	83,088	73,452	54,664	0.16	0.14	0.11	84%	86%	89%
12/17/2008										
12/18/2008		148,282	83,984	1,067						
12/19/2008		108,951	203,523	2,678						
Average (Week 5)	518,108	113,440	120,320	19,470	0.16	0.14	0.11	**84%**	**86%**	**89%**
Standard Deviation		32,828	72,249	30,490						

School / Class ID	Configurations Used			
	11 / 18-26 / 08	*12 / 01-05 / 08*	*12 / 08-12 / 08*	*12 / 15-19 / 08*
Dominguez / DZ-7	Baseline	SA / SA + PF	SA + HP-PF	SA + HP-PF
Dominguez / DZ-9	Baseline	HP-PF	HP-PF	HP-PF
Dominguez / DZ-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Dominguez Elementary School - $PM_{2.5}$ (mass)

Date	Average Outdoor Concentration (µg/m³)	Average Indoor Concentration (µg/m³)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11
11/17/2008										
11/18/2008	4.11	4.66	3.70	11.47	1.13	0.90	2.79	-13%	10%	-179%
11/19/2008	13.52	9.93	6.52	10.89	0.73	0.48	0.81	27%	52%	19%
11/20/2008	30.59	10.79	14.26	12.27	0.35	0.47	0.40	65%	53%	60%
11/21/2008	16.15	11.71	8.78	11.07	0.72	0.54	0.69	28%	46%	31%
Average (Week 1)	16.09	9.27	8.31	11.43	0.74	0.60	1.17	**26%**	**40%**	**-17%**
Standard Deviation	10.96	3.16	4.48	0.61	0.32	0.20	1.09	**32%**	**20%**	**109%**
11/24/2008	17.12	11.75	12.16	18.94	0.69	0.71	1.11	31%	29%	-11%
11/25/2008	12.77	15.62	11.33	17.13	1.22	0.89	1.34	-22%	11%	-34%
11/26/2008										
11/27/2008										
11/28/2008										
Average (Week 2)	14.95	13.69	11.74	18.04	0.95	0.80	1.22	**5%**	**20%**	**-22%**
Standard Deviation	3.07	2.73	0.58	1.28	0.38	0.13	0.17	**38%**	**13%**	**17%**
12/1/2008	17.46	3.27	5.87	3.81	0.19	0.34	0.22	81%	66%	78%
12/2/2008	9.45	2.08	0.87	0.87	0.22	0.09	0.09	78%	91%	91%
12/3/2008	35.25	3.24	8.29	2.21	0.09	0.24	0.06	91%	76%	94%
12/4/2008	27.93	4.50	1.85	1.27	0.16	0.07	0.05	84%	93%	95%
12/5/2008	13.35	1.84	1.71	1.22	0.14	0.13	0.09	86%	87%	91%
Average (Week 3)	20.69	2.99	3.72	1.87	0.16	0.17	0.10	**84%**	**83%**	**90%**
Standard Deviation	10.67	1.07	3.21	1.19	0.05	0.11	0.07	**5%**	**11%**	**7%**
12/8/2008	5.77	2.08	1.10	0.79	0.36	0.19	0.14	64%	81%	86%
12/9/2008	7.96	2.55	0.87	0.87	0.32	0.11	0.11	68%	89%	89%
12/10/2008	1.80	0.84	1.02	1.10	0.47	0.57	0.61	53%	43%	39%
12/11/2008	5.82	1.01	0.79	0.88	0.17	0.14	0.15	83%	86%	85%
12/12/2008	10.99	0.94	1.35	1.91	0.09	0.12	0.17	91%	88%	83%
Average (Week 4)	6.47	1.49	1.03	1.11	0.28	0.23	0.24	**72%**	**77%**	**76%**
Standard Deviation	3.37	0.78	0.22	0.46	0.15	0.20	0.21	**15%**	**20%**	**21%**
12/15/2008										
12/16/2008	3.31	0.55	0.41	0.57	0.17	0.12	0.17	83%	88%	83%
12/17/2008										
12/18/2008	1.29	0.73	0.75	0.14	0.57	0.58	0.11	43%	42%	89%
12/19/2008	6.18	0.59	1.48	0.68	0.10	0.24	0.11	90%	76%	89%
Average (Week 5)	3.59	0.63	0.88	0.46	0.28	0.31	0.13	**72%**	**69%**	**87%**
Standard Deviation	2.46	0.09	0.55	0.29	0.25	0.24	0.04	**25%**	**24%**	**4%**

School / Class ID	Configurations Used			
	11 / 18-26 / 08	*12 / 01-05 / 08*	*12 / 08-12 / 08*	*12 / 15-19 / 08*
Dominguez / DZ-7	Baseline	SA / SA + PF	SA + HP-PF	SA + HP-PF
Dominguez / DZ-9	Baseline	HP-PF	HP-PF	HP-PF
Dominguez / DZ-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Dominguez Elementary School - PM_{10} (from particle mass monitor measurements)

Date	Average Outdoor Concentration (µg/m³)	Average Indoor Concentration (µg/m³)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11
11/17/2008										
11/18/2008	51.98	64.34	34.38	91.83	1.24	0.66	1.77	-24%	34%	-77%
11/19/2008	52.85	73.95	47.85	79.93	1.40	0.91	1.51	-40%	9%	-51%
11/20/2008	84.85	62.75	69.89	85.40	0.74	0.82	1.01	26%	18%	-1%
11/21/2008	61.53	69.08	58.16	72.86	1.12	0.95	1.18	-12%	5%	-18%
Average (Week 1)	62.81	67.53	52.57	82.51	1.12	0.83	1.37	**-12%**	**17%**	**-37%**
Standard Deviation	15.32	5.06	15.11	8.06	0.28	0.13	0.34	**28%**	**13%**	**34%**
11/24/2008	50.13	74.55	76.61	135.45	1.49	1.53	2.70	-49%	-53%	-170%
11/25/2008	48.79	98.76	88.63	128.96	2.02	1.82	2.64	-102%	-82%	-164%
11/26/2008										
11/27/2008										
11/28/2008										
Average (Week 2)	49.46	86.66	82.62	132.21	1.76	1.67	2.67	**-76%**	**-67%**	**-167%**
Standard Deviation	0.95	17.12	8.49	4.59	0.38	0.20	0.04	**38%**	**20%**	**4%**
12/1/2008	86.09	27.81	54.38	37.73	0.32	0.63	0.44	68%	37%	56%
12/2/2008	25.06	26.79	16.38	15.78	1.07	0.65	0.63	-7%	35%	37%
12/3/2008	57.34	13.40	43.07	18.36	0.23	0.75	0.32	77%	25%	68%
12/4/2008	52.74	23.08	13.42	12.93	0.44	0.25	0.25	56%	75%	75%
12/5/2008	41.97	14.59	17.31	18.03	0.35	0.41	0.43	65%	59%	57%
Average (Week 3)	52.64	21.13	28.91	20.56	0.48	0.54	0.41	**52%**	**46%**	**59%**
Standard Deviation	22.45	6.76	18.58	9.84	0.34	0.20	0.15	**34%**	**20%**	**15%**
12/8/2008	28.57	21.91	19.27	18.93	0.77	0.67	0.66	23%	33%	34%
12/9/2008	39.04	23.09	11.40	17.01	0.59	0.29	0.44	41%	71%	56%
12/10/2008	21.52	11.43	16.69	18.02	0.53	0.78	0.84	47%	22%	16%
12/11/2008	44.75	11.02	12.31	15.96	0.25	0.28	0.36	75%	72%	64%
12/12/2008	46.70	11.24	18.51	24.48	0.24	0.40	0.52	76%	60%	48%
Average (Week 4)	36.12	15.74	15.63	18.88	0.48	0.48	0.56	**52%**	**52%**	**44%**
Standard Deviation	10.78	6.19	3.59	3.32	0.23	0.23	0.19	**23%**	**23%**	**19%**
12/15/2008										
12/16/2008	15.49	8.83	8.94	14.83	0.57	0.58	0.96	43%	42%	4%
12/17/2008										
12/18/2008	7.99	14.10	19.02	8.39	1.76	2.38	1.05	-76%	-138%	-5%
12/19/2008	27.12	10.76	23.70	14.98	0.40	0.87	0.55	60%	13%	45%
Average (Week 5)	16.87	11.23	17.22	12.73	0.91	1.28	0.85	**9%**	**-28%**	**15%**
Standard Deviation	9.64	2.66	7.54	3.76	0.74	0.97	0.26	**74%**	**97%**	**26%**

School / Class ID	Configurations Used			
	11 / 18-26 / 08	*12 / 01-05 / 08*	*12 / 08-12 / 08*	*12 / 15-19 / 08*
Dominguez / DZ-7	Baseline	SA / SA + PF	SA + HP-PF	SA + HP-PF
Dominguez / DZ-9	Baseline	HP-PF	HP-PF	HP-PF
Dominguez / DZ-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

Dominguez Elementary School - PM_{10} (from filter-based measurements)

Date	Average Outdoor Concentration (µg/m³)	Average Indoor Concentration (µg/m³)			Average Indoor/Outdoor Ratio			Average Removal Efficiency		
		DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11	DZ-7	DZ-9	DZ-11
11/17/2008										
11/18/2008	720	940	740	310	1.31	1.03	0.43	-31%	-3%	57%
11/19/2008	290	100	250	160	0.34	0.86	0.55	66%	14%	45%
11/20/2008	33	220	150	38	6.67	4.55	1.15	-567%	-355%	-15%
11/21/2008	200	120	180	25	0.60	0.90	0.13	40%	10%	88%
Average (Week 1)	311	345	330	133	2.23	1.83	0.56	**-123%**	**-83%**	**44%**
Standard Deviation	293	400	277	133	2.99	1.81	0.43	**299%**	**181%**	**43%**
11/24/2008	180	220	200	180	1.22	1.11	1.00	-22%	-11%	0%
11/25/2008	150	220	140	140	1.47	0.93	0.93	-47%	7%	7%
11/26/2008										
11/27/2008										
11/28/2008										
Average (Week 2)	165	220	170	160	1.34	1.02	0.97	**-34%**	**-2%**	**3%**
Standard Deviation	21	0	42	28	0.17	0.13	0.05	**17%**	**13%**	**5%**
12/1/2008	180	280	180	82	1.56	1.00	0.46	-56%	0%	54%
12/2/2008	130	170	110	40	1.31	0.85	0.31	-31%	15%	69%
12/3/2008	150	110	120	36	0.73	0.80	0.24	27%	20%	76%
12/4/2008	140	120	90	36	0.86	0.64	0.26	14%	36%	74%
12/5/2008	130	91	87	41	0.70	0.67	0.32	30%	33%	68%
Average (Week 3)	146	154	117	47	1.03	0.79	0.32	**-3%**	**21%**	**68%**
Standard Deviation	21	76	38	20	0.38	0.14	0.08	**38%**	**14%**	**8%**
12/8/2008	140	150	120	25	1.07	0.86	0.18	-7%	14%	82%
12/9/2008	130	100	100	30	0.77	0.77	0.23	23%	23%	77%
12/10/2008	91	95	100	34	1.04	1.10	0.37	-4%	-10%	63%
12/11/2008	130	82	77	33	0.63	0.59	0.25	37%	41%	75%
12/12/2008	140	78	36	87	0.56	0.26	0.62	44%	74%	38%
Average (Week 4)	126	101	87	42	0.81	0.71	0.33	**19%**	**29%**	**67%**
Standard Deviation	20	29	32	26	0.23	0.31	0.18	**23%**	**31%**	**18%**
12/15/2008										
12/16/2008	91	84	70	30	0.92	0.77	0.33	8%	23%	67%
12/17/2008										
12/18/2008	71	79	68	17	1.11	0.96	0.24	-11%	4%	76%
12/19/2008	93	75	73	23	0.81	0.78	0.25	19%	22%	75%
Average (Week 5)	85	79	70	23	0.95	0.84	0.27	**5%**	**16%**	**73%**
Standard Deviation	12	5	3	7	0.15	0.10	0.05	**15%**	**10%**	**5%**

School / Class ID	Configurations Used			
	11 / 18-26 / 08	*12 / 01-05 / 08*	*12 / 08-12 / 08*	*12 / 15-19 / 08*
Dominguez / DZ-7	Baseline	SA / SA + PF	SA + HP-PF	SA + HP-PF
Dominguez / DZ-9	Baseline	HP-PF	HP-PF	HP-PF
Dominguez / DZ-11	Baseline	HP-PF	RS + HP-PF	RS + HP-PF

HP-PF = HVAC-based high-performance panel filter
RS = register-based air purifier
SA = stand alone system
PF = conventional / medium efficiency panel filter

APPENDIX B. Daily average concentrations of individual VOCs measured outside Dominguez elementary school and inside three of its classrooms (here referred to as DZ-7, DZ-9, and DZ-11)

Dominguez Elementary School - Outdoor VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/18/08	11/19/08	11/20/08	11/21/08	11/24/08	11/25/08
Propylene	1.0	0.04	7.7	5.7	4.5		4.7	3.2
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.7	0.7	0.7	0.7	0.6	0.6
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03	0.03		0.02		0.02	0.02
Chloromethane	0.5	0.08	0.6	0.7	0.6	0.6	0.6	0.6
Vinyl chloride	0.5	0.04						
Bromomethane	0.5	0.05			0.07			0.03
Ethanol	1.5	0.30	47	36	24	24	15	14
Freon 11(Trichlorofluoromethane)	0.5	0.04			0.3			0.2
Isopropyl alcohol(2-Propanol)	1.5	0.03	7.7	5.4	2.1	4.9	2	1.9
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.07	0.06	0.06	0.07	0.06	0.06
Acetone	3.0	0.08	25	23	16	20	17	11
Carbon disulfide	1.0	0.04	0.04	0.06	0.03	0.04	0.04	0.01
Methylene chloride	1.5	0.04	1.2	1	0.6	1.1	0.6	0.4
Methyl-tert-butyl ether(MTBE)	0.5	0.05						
trans-1,2-Dichloroethene	0.5	0.04						
n-Hexane	0.5	0.03	1	1	1.2	1.2	0.5	0.4
1,-Dichloroethane	0.5	0.04						
Vinyl acetate	0.5	0.05						
2-Butanone(MEK)	1.5	0.07	1.8	3	3	1.9	1.8	0.9
cis-1,2-Dichloroethene	0.5	0.05						
Ethyl acetate	0.5	0.07	0.5	0.6	0.2	0.4	0.2	0.2
Chloroform	0.5	0.03		0.08	0.06	0.08	0.03	0.03
Tetrahydrofuran	0.5	0.07		0.2	0.2	0.3	0.3	0.2
1,1,1-Trichloroethane	0.5	0.04				0.02		
Cyclohexane	0.5	0.04	0.7	0.6	0.6	0.7	0.2	0.2
Carbon tetrachloride	0.5	0.04	0.08	0.07	0.07	0.07	0.07	0.06
n-Heptane	0.5	0.04	0.9	0.7	0.7	0.8	0.4	0.3
1,2-Dichlroethane	0.5	0.02						
Benzene	0.5	0.02	1.2	1.2	1	1.4	0.6	0.5
Trichloroethene	0.5	0.04	0.1	0.09	0.05	0.06	0.03	0.05
1,2-Dichloropropane	0.5	0.05						
Bromodichloromethane	0.5	0.04			0.04			
4-Methyl-2-pentanone(MIBK)	0.5	0.06		0.2	0.2	0.2	0.2	0.09
cis-1,3-Dichloropropene	0.5	0.04						
Toluene	0.5	0.05	5.2	4.8	3.8	5.5	2.2	1.8
trans-1,3-Dichloropropene	0.5	0.04						
1,1,2-Trichloroethane	0.5	0.06						
2-Hexanone(MBK)	1.5	0.05		0.2	0.4		0.1	
Tetrachloroethene	0.5	0.04	0.3	0.2	0.09	0.2	0.08	0.08
Dibromochloromethane	0.5	0.06	0.02		0.01			
1,2-Dibromoethane	0.5	0.06						
Chlorobenzene	0.5	0.04						
Ethylbenzene	0.5	0.05	0.7	0.8	0.6	0.8	0.4	0.3
Xylene (para & meta)	1.0	0.10	2.3	2.2	1.9	2.6	1.2	1
Xylene (Ortho)	0.5	0.05	0.9	0.9	0.8	1	0.5	0.4
Styrene	0.5	0.05	1.4	0.7	0.8	0.4	0.9	0.2
Bromoform	0.5	0.05			0.01			
1,1,2,2-Tetrachloroethane	0.5	0.08						
4-Ethyltoluene	0.5	0.06	0.8	0.8	0.6	0.9	0.4	0.3
1,3,5-Trimethylbenzene	0.5	0.05	0.2	0.2		0.3	0.1	0.09
1,2,4-Trimethylbenzene	0.5	0.08	0.8	0.7	0.6	0.9	0.4	0.3
1,3-Dichlorobenzene	0.5	0.06						
1,4-Dichlorobenzene	0.5	0.05	0.09	0.1	0.09		0.07	0.04
Benzyl chloride	0.5	0.06						
1,2-Dichlorobenzene	0.5	0.10			0.01			
1,2,4-Trichlorobenzene	1.0	0.10						
Hexachloro-1,3-butadiene	0.5	0.30	0.03	0.02				

Dominguez Elementary School - Outdoor VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/26/08	12/1/08	12/2/08	12/3/08	12/4/08	12/5/08
Propylene	1.0	0.04		4.6	1.5		1.4	2.6
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	1	0.5	0.5		0.4	0.6
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03	0.02	0.01	0.02	0.05	0.04	0.05
Chloromethane	0.5	0.08	0.6	0.5	0.5	0.5	0.7	0.5
Vinyl chloride	0.5	0.04				0.06		
Bromomethane	0.5	0.05	0.03	0.07		0.07	0.04	
Ethanol	1.5	0.30	21	14	6.4	7	11	13
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.4		0.2	0.2	0.2	0.4
Isopropyl alcohol(2-Propanol)	1.5	0.03	4.8	1.4	1.1	0.6	1.7	1.5
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.07	0.07		0.1	0.07	0.08
Acetone	3.0	0.08	15	18	20	13	17	19
Carbon disulfide	1.0	0.04	0.03	0.03		0.08	0.07	0.1
Methylene chloride	1.5	0.04	0.2	0.4	0.1	0.3	0.4	0.5
Methyl-tert-butyl ether(MTBE)	0.5	0.05					0.04	
trans-1,2-Dichloroethene	0.5	0.04					0.03	
n-Hexane	0.5	0.03	0.2	1.4	0.3	0.3	0.3	0.5
1,-Dichloroethane	0.5	0.04					0.03	
Vinyl acetate	0.5	0.05					0.06	
2-Butanone(MEK)	1.5	0.07	1.6	2.5	5.4	2.3	4.4	1.5
cis-1,2-Dichloroethene	0.5	0.05					0.03	
Ethyl acetate	0.5	0.07					0.2	0.2
Chloroform	0.5	0.03		0.06		0.08	0.05	0.08
Tetrahydrofuran	0.5	0.07						
1,1,1-Trichloroethane	0.5	0.04					0.03	
Cyclohexane	0.5	0.04		0.7		0.2	0.2	0.3
Carbon tetrachloride	0.5	0.04	0.07	0.07	0.07	0.1	0.07	0.06
n-Heptane	0.5	0.04	0.3			0.2	0.2	0.4
1,2-Dichlroethane	0.5	0.02					0.05	
Benzene	0.5	0.02	0.3	1.2	0.2	0.4	0.3	0.8
Trichloroethene	0.5	0.04	0.03	0.05		0.06	0.09	0.05
1,2-Dichloropropane	0.5	0.05					0.04	
Bromodichloromethane	0.5	0.04				0.04	0.04	
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.08	0.08	0.1	0.1	0.2	0.09
cis-1,3-Dichloropropene	0.5	0.04					0.03	
Toluene	0.5	0.05	0.9	4.2	0.6	0.9	1.2	2.4
trans-1,3-Dichloropropene	0.5	0.04				0.03	0.03	0.03
1,1,2-Trichloroethane	0.5	0.06					0.04	
2-Hexanone(MBK)	1.5	0.05	0.3	0.2	0.4	0.3	0.9	0.1
Tetrachloroethene	0.5	0.04	0.02	0.09		0.07	0.07	0.09
Dibromochloromethane	0.5	0.06				0.04	0.02	
1,2-Dibromoethane	0.5	0.06					0.03	
Chlorobenzene	0.5	0.04					0.04	0.03
Ethylbenzene	0.5	0.05	0.2	0.6	0.08	0.2	0.2	0.3
Xylene (para & meta)	1.0	0.10	0.4	1.9	0.2	0.4	0.6	1
Xylene (Ortho)	0.5	0.05	0.2	0.8	0.1	0.2	0.3	0.4
Styrene	0.5	0.05	0.09	0.8	0.06	0.1	0.1	1
Bromoform	0.5	0.05					0.02	
1,1,2,2-Tetrachloroethane	0.5	0.08				0.06	0.06	0.04
4-Ethyltoluene	0.5	0.06	0.2	0.6	0.08	0.1	0.2	0.3
1,3,5-Trimethylbenzene	0.5	0.05	0.05	0.1	0.02	0.06		0.1
1,2,4-Trimethylbenzene	0.5	0.08	0.2	0.6	0.08	0.1	0.2	0.3
1,3-Dichlorobenzene	0.5	0.06				0.04	0.04	0.03
1,4-Dichlorobenzene	0.5	0.05	0.05	0.06		0.05	0.05	0.04
Benzyl chloride	0.5	0.06				0.04	0.05	
1,2-Dichlorobenzene	0.5	0.10	0.02			0.04	0.04	0.03
1,2,4-Trichlorobenzene	1.0	0.10	0.2			0.07	0.06	0.04
Hexachloro-1,3-butadiene	0.5	0.30	0.04			0.05	0.05	0.04

Dominguez Elementary School - Outdoor VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			12/8/08	12/9/08	12/10/08	12/11/08	12/12/08	12/15/08
Propylene	1.0	0.04	1.2		1.6	2.3	2.6	1.1
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.5	0.6	0.5	0.4	0.4	0.4
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03	0.03	0.03	0.03	0.02	0.03	
Chloromethane	0.5	0.08	0.4	0.04	0.4	0.5	0.4	0.5
Vinyl chloride	0.5	0.04						
Bromomethane	0.5	0.05						
Ethanol	1.5	0.30	3.1	13	6.3	9.4	9.1	14
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.3	0.3	0.3			0.2
Isopropyl alcohol(2-Propanol)	1.5	0.03	0.7	3.3	1	1.6		4.6
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.08	0.08	0.08	0.05	0.06	0.05
Acetone	3.0	0.08	4.3	23	9.8	13	11	8
Carbon disulfide	1.0	0.04	0.03	0.05	0.04	0.04	0.04	0.01
Methylene chloride	1.5	0.04	0.2	0.5	0.3	0.5	0.5	
Methyl-tert-butyl ether(MTBE)	0.5	0.05						
trans-1,2-Dichloroethene	0.5	0.04						
n-Hexane	0.5	0.03	0.2	0.8	0.2	0.7	0.8	0.2
1,-Dichloroethane	0.5	0.04						
Vinyl acetate	0.5	0.05						
2-Butanone(MEK)	1.5	0.07	0.4	1.3	0.8	1.8	1.5	0.8
cis-1,2-Dichloroethene	0.5	0.05						
Ethyl acetate	0.5	0.07		0.4		0.1	0.2	
Chloroform	0.5	0.03	0.04	0.07				
Tetrahydrofuran	0.5	0.07		1.4				
1,1,1-Trichloroethane	0.5	0.04						
Cyclohexane	0.5	0.04	0.1	0.5	0.2	0.3	0.4	0.1
Carbon tetrachloride	0.5	0.04	0.08	0.07	0.07	0.05	0.06	0.06
n-Heptane	0.5	0.04	0.1	0.5		0.4	0.4	0.2
1,2-Dichlroethane	0.5	0.02						
Benzene	0.5	0.02	0.3	1.5	0.4	0.6	0.7	0.3
Trichloroethene	0.5	0.04	0.02	0.05	0.02	0.03	0.03	0.02
1,2-Dichloropropane	0.5	0.05						
Bromodichloromethane	0.5	0.04						
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.04	0.1	0.05	0.08	0.2	
cis-1,3-Dichloropropene	0.5	0.04						
Toluene	0.5	0.05	0.7	4.5	1.3	2.2	2.2	0.8
trans-1,3-Dichloropropene	0.5	0.04						
1,1,2-Trichloroethane	0.5	0.06						
2-Hexanone(MBK)	1.5	0.05	0.03		0.1	0.3	0.3	0.1
Tetrachloroethene	0.5	0.04	0.03	0.1	0.04	0.08	0.08	0.04
Dibromochloromethane	0.5	0.06						
1,2-Dibromoethane	0.5	0.06						
Chlorobenzene	0.5	0.04	0.01					
Ethylbenzene	0.5	0.05	0.1	0.6	0.2	0.4	0.4	0.2
Xylene (para & meta)	1.0	0.10	0.3	2.1	0.6	1.1	1.2	0.5
Xylene (Ortho)	0.5	0.05	0.1	0.8	0.2	0.4	0.4	0.2
Styrene	0.5	0.05	0.05	1.7	0.5	0.2	0.3	0.1
Bromoform	0.5	0.05						
1,1,2,2-Tetrachloroethane	0.5	0.08					0.06	
4-Ethyltoluene	0.5	0.06	0.1	0.6	0.2	0.3	0.4	0.2
1,3,5-Trimethylbenzene	0.5	0.05	0.03	0.2	0.05	0.09	0.1	0.05
1,2,4-Trimethylbenzene	0.5	0.08	0.1	0.6	0.2	0.3	0.4	0.2
1,3-Dichlorobenzene	0.5	0.06	0.01				0.03	
1,4-Dichlorobenzene	0.5	0.05	0.02	0.04	0.01	0.04	0.05	0.02
Benzyl chloride	0.5	0.06		0.02				
1,2-Dichlorobenzene	0.5	0.10	0.01			0.01	0.03	
1,2,4-Trichlorobenzene	1.0	0.10	0.02		0.02	0.05	0.08	0.03
Hexachloro-1,3-butadiene	0.5	0.30				0.02		

Dominguez Elementary School - Outdoor VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)			
			12/16/08	12/17/08	12/18/08	12/19/08
Propylene	1.0	0.04	2.4		1.4	2.6
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.4	0.4	0.4	0.4
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03				
Chloromethane	0.5	0.08	0.5	0.5	0.4	0.4
Vinyl chloride	0.5	0.04				
Bromomethane	0.5	0.05				
Ethanol	1.5	0.30	7.6	1.7	4.3	8.4
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.2	0.2	0.2	0.2
Isopropyl alcohol(2-Propanol)	1.5	0.03	1.7			1.4
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.06	0.05		
Acetone	3.0	0.08	10	1.2	6.8	13
Carbon disulfide	1.0	0.04			0.02	
Methylene chloride	1.5	0.04	0.3	0.08	0.1	0.3
Methyl-tert-butyl ether(MTBE)	0.5	0.05				
trans-1,2-Dichloroethene	0.5	0.04				
n-Hexane	0.5	0.03	0.3	0.03	0.2	0.3
1,-Dichloroethane	0.5	0.04				
Vinyl acetate	0.5	0.05				
2-Butanone(MEK)	1.5	0.07	0.9	0.1	1.1	1.3
cis-1,2-Dichloroethene	0.5	0.05				
Ethyl acetate	0.5	0.07				
Chloroform	0.5	0.03				
Tetrahydrofuran	0.5	0.07				
1,1,1-Trichloroethane	0.5	0.04				
Cyclohexane	0.5	0.04	0.2		0.1	0.2
Carbon tetrachloride	0.5	0.04	0.06	0.05	0.05	0.05
n-Heptane	0.5	0.04	0.5			0.4
1,2-Dichlroethane	0.5	0.02				
Benzene	0.5	0.02	0.5	0.1	0.3	0.6
Trichloroethene	0.5	0.04	0.02			0.02
1,2-Dichloropropane	0.5	0.05				
Bromodichloromethane	0.5	0.04				
4-Methyl-2-pentanone(MIBK)	0.5	0.06				
cis-1,3-Dichloropropene	0.5	0.04				
Toluene	0.5	0.05	1.4	0.2	0.8	1.8
trans-1,3-Dichloropropene	0.5	0.04				
1,1,2-Trichloroethane	0.5	0.06				
2-Hexanone(MBK)	1.5	0.05	0.1		0.2	0.3
Tetrachloroethene	0.5	0.04	0.06			0.04
Dibromochloromethane	0.5	0.06				
1,2-Dibromoethane	0.5	0.06				
Chlorobenzene	0.5	0.04				
Ethylbenzene	0.5	0.05	0.2	0.03	0.1	0.3
Xylene (para & meta)	1.0	0.10	0.7	0.09	0.4	0.9
Xylene (Ortho)	0.5	0.05	0.3	0.04	0.2	0.4
Styrene	0.5	0.05	0.2		0.04	0.7
Bromoform	0.5	0.05				
1,1,2,2-Tetrachloroethane	0.5	0.08				
4-Ethyltoluene	0.5	0.06	0.2	0.03	0.1	0.3
1,3,5-Trimethylbenzene	0.5	0.05		0.01	0.04	0.08
1,2,4-Trimethylbenzene	0.5	0.08	0.2	0.03	0.1	0.3
1,3-Dichlorobenzene	0.5	0.06				
1,4-Dichlorobenzene	0.5	0.05	0.01		0.01	0.02
Benzyl chloride	0.5	0.06				
1,2-Dichlorobenzene	0.5	0.10				
1,2,4-Trichlorobenzene	1.0	0.10				
Hexachloro-1,3-butadiene	0.5	0.30				

Dominguez Elementary School - Outdoor VOC data

TENTATIVELY IDENTIFIED COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/18/08	11/19/08	11/20/08	11/21/08	11/24/08	11/25/08
2,2,3,3-Tetramethyl butane	N/A	N/A						
2,2,4-Trimethyl pentane	N/A	N/A						
2,2-Dimethyl hexane	N/A	N/A	2.1	2.1	2.1	2.5		
2,3-Dimethyl pentane	N/A	N/A	1.4	1.2	1	1.5		
2,4-Dimethyl hexane	N/A	N/A						
2-Methyl butane	N/A	N/A	7.8	7.9	9.2	9	4.2	3.6
2-Methyl hexane	N/A	N/A	1.2			1.2		
2-Methyl pentane	N/A	N/A	3.2	3.3	3.5	3.9	1.6	1.3
2-Pentene	N/A	N/A						
3-Methyl hexane	N/A	N/A	1.5	1.2	1.1	1.5		
3-Methyl pentane	N/A	N/A	1.7	1.8	2	2.1		
Acetaldehyde	N/A	N/A		1.6	2.1		1.8	
Butanal	N/A	N/A						
Butane	N/A	N/A	5.5	6.8	8.6	6.5	3.5	2.9
Difluorochloromethane	N/A	N/A				5.6		
Heptanal	N/A	N/A						
Hexamethyl cyclotrisiloxane	N/A	N/A					2.6	
Isobutane	N/A	N/A	4.4	5.1	4.5	4.6	3.1	2.6
Limonene	N/A	N/A						
Methyl cyclohexane	N/A	N/A						
Methyl cyclopentane	N/A	N/A	1.4	1.5	1.8	1.8		
Octamethyl cyclotrisiloxane	N/A	N/A						
Pentane	N/A	N/A	3.5	3.7		4.1	2.3	
Trimethyl silanol	N/A	N/A						

Dominguez Elementary School - Outdoor VOC data

TENTATIVELY IDENTIFIED COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/26/08	12/1/08	12/2/08	12/3/08	12/4/08	12/5/08
2,2,3,3-Tetramethyl butane	N/A	N/A						
2,2,4-Trimethyl pentane	N/A	N/A						1.2
2,2-Dimethyl hexane	N/A	N/A						
2,3-Dimethyl pentane	N/A	N/A		1				
2,4-Dimethyl hexane	N/A	N/A						
2-Methyl butane	N/A	N/A	2.6	8.8	1.8	2.2	1.8	3.2
2-Methyl hexane	N/A	N/A						
2-Methyl pentane	N/A	N/A		3.3				1.6
2-Pentene	N/A	N/A						
3-Methyl hexane	N/A	N/A		1.1				
3-Methyl pentane	N/A	N/A		2				
Acetaldehyde	N/A	N/A	2	2.1	4	2.8	2.4	1
Butanal	N/A	N/A			1.3	1.1	1.7	
Butane	N/A	N/A	2.4	8.6	2.6	2.4	1.6	2.4
Difluorochloromethane	N/A	N/A	2.6					
Heptanal	N/A	N/A	1.1					
Hexamethyl cyclotrisiloxane	N/A	N/A			2.3			
Isobutane	N/A	N/A	2.4	5.8	1.7		1.2	1.9
Limonene	N/A	N/A						
Methyl cyclohexane	N/A	N/A		1				
Methyl cyclopentane	N/A	N/A		2.2				
Octamethyl cyclotrisiloxane	N/A	N/A			1.1			
Pentane	N/A	N/A		4.8				
Trimethyl silanol	N/A	N/A						

Dominguez Elementary School - Outdoor VOC data

TENTATIVELY IDENTIFIED COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			12/8/08	12/9/08	12/10/08	12/11/08	12/12/08	12/15/08
2,2,3,3-Tetramethyl butane	N/A	N/A				1.1	1.2	
2,2,4-Trimethyl pentane	N/A	N/A		1.9				
2,2-Dimethyl hexane	N/A	N/A						
2,3-Dimethyl pentane	N/A	N/A						
2,4-Dimethyl hexane	N/A	N/A						
2-Methyl butane	N/A	N/A	1.2	4.8	1.5	4	3.9	
2-Methyl hexane	N/A	N/A		1.1				
2-Methyl pentane	N/A	N/A				2.5	2.6	
2-Pentene	N/A	N/A		1.4				
3-Methyl hexane	N/A	N/A		1.4				
3-Methyl pentane	N/A	N/A				1.4	1.5	
Acetaldehyde	N/A	N/A						
Butanal	N/A	N/A						
Butane	N/A	N/A		3.5	1	2.5	2.6	
Difluorochloromethane	N/A	N/A						
Heptanal	N/A	N/A						
Hexamethyl cyclotrisiloxane	N/A	N/A						
Isobutane	N/A	N/A		2.1		1.4	1.4	
Limonene	N/A	N/A						
Methyl cyclohexane	N/A	N/A						
Methyl cyclopentane	N/A	N/A		1.5		1.2	1.2	
Octamethyl cyclotrisiloxane	N/A	N/A						
Pentane	N/A	N/A				1.7	1.7	
Trimethyl silanol	N/A	N/A						

Dominguez Elementary School - Outdoor VOC data

TENTATIVELY IDENTIFIED COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)			
			12/16/08	12/17/08	12/18/08	12/19/08
2,2,3,3-Tetramethyl butane	N/A	N/A				
2,2,4-Trimethyl pentane	N/A	N/A				
2,2-Dimethyl hexane	N/A	N/A				
2,3-Dimethyl pentane	N/A	N/A				
2,4-Dimethyl hexane	N/A	N/A				1.1
2-Methyl butane	N/A	N/A	1.3			1.5
2-Methyl hexane	N/A	N/A				
2-Methyl pentane	N/A	N/A	1.1			
2-Pentene	N/A	N/A				
3-Methyl hexane	N/A	N/A				
3-Methyl pentane	N/A	N/A				
Acetaldehyde	N/A	N/A				
Butanal	N/A	N/A				
Butane	N/A	N/A				1.1
Difluorochloromethane	N/A	N/A				
Heptanal	N/A	N/A				
Hexamethyl cyclotrisiloxane	N/A	N/A				
Isobutane	N/A	N/A				
Limonene	N/A	N/A				
Methyl cyclohexane	N/A	N/A				
Methyl cyclopentane	N/A	N/A				
Octamethyl cyclotrisiloxane	N/A	N/A				
Pentane	N/A	N/A				
Trimethyl silanol	N/A	N/A	1.4			

Dominguez Elementary School - Room 7 (DZ-7) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/18/08	11/19/08	11/20/08	11/21/08	11/24/08	11/25/08
Propylene	1.0	0.04	9.5	4.4	3.4	5.9	5.3	2.8
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.7	0.6	0.6	0.6	0.7	0.5
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03			0.01		0.02	0.02
Chloromethane	0.5	0.08	0.8	0.9	0.7	0.8	0.6	0.92
Bromomethane	0.5	0.05			0.02	0.02		0.02
Ethanol	1.5	0.30	140	310	480	380	59	480
Freon 11(Trichlorofluoromethane)	0.5	0.04			0.3			
Isopropyl alcohol(2-Propanol)	1.5	0.03	14	35	39	31	6.9	32
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.08	0.08	0.06	0.06	0.06	0.06
Acetone	3.0	0.08	37	44	22	35	16	33
1,1-Dichloroethene	0.5	0.03						
Carbon disulfide	1.0	0.04	0.08	0.08	0.08	0.07	0.06	0.1
Methylene chloride	1.5	0.04	1.8	1	0.6	2.2	0.7	0.5
n-Hexane	0.5	0.03	2.2	1	0.9	1.8	0.8	0.5
2-Butanone(MEK)	1.5	0.07	2.5	2.3	1.4	2.5	1.2	2.7
Ethyl acetate	0.5	0.07	1	0.7	0.3	0.5	0.3	0.3
Chloroform	0.5	0.03	0.1	0.07	0.06	0.1	0.06	0.05
Tetrahydrofuran	0.5	0.07	1.7	0.4	0.2	0.6	0.4	0.4
1,1,1-Trichloroethane	0.5	0.04			0.02			
Cyclohexane	0.5	0.04	1.5	0.8	0.5	3.3	0.5	0.4
Carbon tetrachloride	0.5	0.04	0.07	0.07	0.07	0.07	0.06	0.06
n-Heptane	0.5	0.04	2.6	1.9		1.1	0.8	
Benzene	0.5	0.02	2.1	1	0.8	1.6	1	0.6
Trichloroethene	0.5	0.04	0.05	0.05	0.04	0.06	0.03	0.06
Bromodichloromethane	0.5	0.04						
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.4	0.4	0.4	4	0.2	0.9
cis-1,3-Dichloropropene	0.5	0.04						
Toluene	0.5	0.05	8.3	4.2	2.8	7.2	4.5	3.2
trans-1,3-Dichloropropene	0.5	0.04						
1,1,2-Trichloroethane	0.5	0.06						
2-Hexanone(MBK)	1.5	0.05			0.1	0.2	0.2	0.5
Tetrachloroethene	0.5	0.04	0.3	0.1	0.08	0.4	0.1	0.1
Chlorobenzene	0.5	0.04						
Ethylbenzene	0.5	0.05	1.1	0.6	0.5	1.1	0.7	0.5
Xylene (para & meta)	1.0	0.10	3.9	1.8	1.5	3.7	2.3	1.4
Xylene (Ortho)	0.5	0.05	1.4	0.7	0.7	1.4	0.8	0.6
Styrene	0.5	0.05	1.3	0.5	0.4	0.7	0.4	0.6
1,1,2,2-Tetrachloroethane	0.5	0.08						
4-Ethyltoluene	0.5	0.06	1.3	0.7	0.6	1.2	0.7	0.5
1,3,5-Trimethylbenzene	0.5	0.05	0.4	0.2		0.4	0.2	0.2
1,2,4-Trimethylbenzene	0.5	0.08	1.4	0.8	0.6	1.3	0.7	0.6
1,3-Dichlorobenzene	0.5	0.06						
1,4-Dichlorobenzene	0.5	0.05	0.5	0.7	0.5	0.7	0.2	0.8
1,2-Dichlorobenzene	0.5	0.10						
1,2,4-Trichlorobenzene	1.0	0.10						
Hexachloro-1,3-butadiene	0.5	0.30		0.02				

Dominguez Elementary School - Room 7 (DZ-7) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/26/08	12/1/08	12/2/08	12/3/08	12/4/08	12/5/08
Propylene	1.0	0.04	1.1	3				
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.5	0.4	0.5	0.4	3.6	1.4
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03	0.02			0.03	0.04	0.05
Chloromethane	0.5	0.08	0.9	0.7	0.8	1	0.7	0.7
Bromomethane	0.5	0.05	0.02	0.04				
Ethanol	1.5	0.30	130	32	40	160	49	49
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.2			0.1	0.7	0.3
Isopropyl alcohol(2-Propanol)	1.5	0.03	16	3.9	6.6	5.9	2.5	7.6
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.06			0.05	0.05	
Acetone	3.0	0.08	17	19	6.8	10	12	9
1,1-Dichloroethene	0.5	0.03					0.02	
Carbon disulfide	1.0	0.04	0.04	0.02	0.02	0.08	0.07	0.09
Methylene chloride	1.5	0.04	0.2	0.2	0.2	0.2	0.2	0.4
n-Hexane	0.5	0.03	0.2	0.4	0.07	0.1	0.1	0.2
2-Butanone(MEK)	1.5	0.07	0.5	3.3	0.2	1.4	1.4	0.4
Ethyl acetate	0.5	0.07	0.3					
Chloroform	0.5	0.03				0.04	0.04	
Tetrahydrofuran	0.5	0.07						
1,1,1-Trichloroethane	0.5	0.04						
Cyclohexane	0.5	0.04	0.2	0.2	0.06	0.08	0.1	0.1
Carbon tetrachloride	0.5	0.04	0.06			0.04	0.04	0.03
n-Heptane	0.5	0.04				0.4		0.3
Benzene	0.5	0.02	0.3	0.3	0.05	0.1	0.1	0.2
Trichloroethene	0.5	0.04	0.02			0.03	0.03	0.04
Bromodichloromethane	0.5	0.04						
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.2	0.1	0.4	0.1	0.1	0.1
cis-1,3-Dichloropropene	0.5	0.04						0.02
Toluene	0.5	0.05	1.3	0.9	0.1	0.2	0.3	0.7
trans-1,3-Dichloropropene	0.5	0.04				0.02	0.02	
1,1,2-Trichloroethane	0.5	0.06					0.03	
2-Hexanone(MBK)	1.5	0.05		0.2		0.2	0.2	
Tetrachloroethene	0.5	0.04	0.03	0.02		0.03	0.04	0.05
Chlorobenzene	0.5	0.04				0.03	0.03	0.03
Ethylbenzene	0.5	0.05	0.2	0.1	0.03	0.06	0.08	0.1
Xylene (para & meta)	1.0	0.10	0.6	0.4	0.06	0.1	0.2	0.3
Xylene (Ortho)	0.5	0.05	0.3	0.2	0.03	0.07	0.08	0.2
Styrene	0.5	0.05	0.2	0.1	0.02	0.04	0.05	0.1
1,1,2,2-Tetrachloroethane	0.5	0.08					0.03	0.03
4-Ethyltoluene	0.5	0.06	0.3	0.2	0.04	0.05	0.1	0.2
1,3,5-Trimethylbenzene	0.5	0.05	0.08	0.04	0.01	0.03	0.05	0.07
1,2,4-Trimethylbenzene	0.5	0.08	0.3	0.2	0.04	0.05	0.1	0.2
1,3-Dichlorobenzene	0.5	0.06				0.03	0.03	0.03
1,4-Dichlorobenzene	0.5	0.05	0.8	0.1	0.08	0.06	0.06	0.05
1,2-Dichlorobenzene	0.5	0.10	0.02			0.03	0.03	0.03
1,2,4-Trichlorobenzene	1.0	0.10				0.04	0.04	0.04
Hexachloro-1,3-butadiene	0.5	0.30	0.03			0.03	0.04	0.03

Dominguez Elementary School - Room 7 (DZ-7) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			12/8/08	12/9/08	12/10/08	12/11/08	12/12/08	12/15/08
Propylene	1.0	0.04		1.8	1.7			
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	1	6.3	0.6	0.8	0.5	0.5
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03	0.03	0.02				
Chloromethane	0.5	0.08	0.7	0.6		0.6	0.5	0.6
Bromomethane	0.5	0.05						
Ethanol	1.5	0.30	22	26	35	34	68	27
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.3	1.1	0.3	0.2	0.2	0.2
Isopropyl alcohol(2-Propanol)	1.5	0.03	3.6	3.7	4.6	3.6	14	3.6
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.03	0.03	0.03	0.02		
Acetone	3.0	0.08	11	14	9.1	9.2	20	10
1,1-Dichloroethene	0.5	0.03	0.3					
Carbon disulfide	1.0	0.04	0.07	0.05	0.04	0.04	0.02	0.02
Methylene chloride	1.5	0.04	0.3	0.5	0.3	0.4	0.6	0.3
n-Hexane	0.5	0.03	0.08	0.1	0.09	0.1	0.2	0.09
2-Butanone(MEK)	1.5	0.07	1	1.3	0.2	0.6	0.7	0.5
Ethyl acetate	0.5	0.07					0.1	
Chloroform	0.5	0.03						0.02
Tetrahydrofuran	0.5	0.07						
1,1,1-Trichloroethane	0.5	0.04						
Cyclohexane	0.5	0.04	0.06	0.1	0.1	0.1	0.3	0.06
Carbon tetrachloride	0.5	0.04	0.03	0.03	0.03			0.02
n-Heptane	0.5	0.04			0.1	0.5		
Benzene	0.5	0.02	0.1	0.2	0.1	0.2	0.1	0.1
Trichloroethene	0.5	0.04	0.02	0.02				
Bromodichloromethane	0.5	0.04			0.01			
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.04	0.08	0.03		3	0.07
cis-1,3-Dichloropropene	0.5	0.04						
Toluene	0.5	0.05	0.3	0.5	0.4	0.7	0.4	0.4
trans-1,3-Dichloropropene	0.5	0.04						
1,1,2-Trichloroethane	0.5	0.06						
2-Hexanone(MBK)	1.5	0.05	0.1	0.2			0.08	0.07
Tetrachloroethene	0.5	0.04	0.02	0.04	0.02	0.02		
Chlorobenzene	0.5	0.04	0.01					
Ethylbenzene	0.5	0.05	0.05	0.08	0.06	0.1	0.07	0.07
Xylene (para & meta)	1.0	0.10	0.1	0.2	0.2	0.3	0.2	0.2
Xylene (Ortho)	0.5	0.05	0.06	0.1	0.08	0.1	0.08	0.1
Styrene	0.5	0.05	0.02	0.07	0.1	0.08	0.05	0.06
1,1,2,2-Tetrachloroethane	0.5	0.08						
4-Ethyltoluene	0.5	0.06	0.05	0.08	0.07	0.1	0.07	0.1
1,3,5-Trimethylbenzene	0.5	0.05	0.02	0.03	0.03	0.05		0.04
1,2,4-Trimethylbenzene	0.5	0.08	0.05	0.08	0.07	0.2	0.07	0.1
1,3-Dichlorobenzene	0.5	0.06	0.01	0.01				
1,4-Dichlorobenzene	0.5	0.05	0.04	0.05	0.02	0.02	0.01	0.07
1,2-Dichlorobenzene	0.5	0.10	0.01	0.01				
1,2,4-Trichlorobenzene	1.0	0.10	0.02	0.02	0.02			0.03
Hexachloro-1,3-butadiene	0.5	0.30	0.02	0.02	0.01			

Dominguez Elementary School - Room 7 (DZ-7) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)			
			12/16/08	12/17/08	12/18/08	12/19/08
Propylene	1.0	0.04		1		1.5
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.4	0.4	0.4	0.4
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03				
Chloromethane	0.5	0.08	0.6	0.5	0.5	0.6
Bromomethane	0.5	0.05				
Ethanol	1.5	0.30	110	54	110	56
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.2	0.2	0.2	0.2
Isopropyl alcohol(2-Propanol)	1.5	0.03	5.4	4.6	5.6	3.6
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.02	0.04	0.02	
Acetone	3.0	0.08	7.9	6.5	11	14
1,1-Dichloroethene	0.5	0.03				
Carbon disulfide	1.0	0.04	0.06	0.01	0.03	
Methylene chloride	1.5	0.04	0.4	0.2	0.2	0.3
n-Hexane	0.5	0.03		0.1	0.09	0.1
2-Butanone(MEK)	1.5	0.07		0.4	0.8	0.8
Ethyl acetate	0.5	0.07		0.4	0.8	
Chloroform	0.5	0.03				
Tetrahydrofuran	0.5	0.07				
1,1,1-Trichloroethane	0.5	0.04				
Cyclohexane	0.5	0.04	0.08		0.1	0.1
Carbon tetrachloride	0.5	0.04		0.04	0.02	
n-Heptane	0.5	0.04			0.3	
Benzene	0.5	0.02	0.2	0.2	0.1	0.2
Trichloroethene	0.5	0.04				
Bromodichloromethane	0.5	0.04				
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.05	0.05	0.04	
cis-1,3-Dichloropropene	0.5	0.04				
Toluene	0.5	0.05	0.5	0.6	1.5	0.9
trans-1,3-Dichloropropene	0.5	0.04				
1,1,2-Trichloroethane	0.5	0.06				
2-Hexanone(MBK)	1.5	0.05				
Tetrachloroethene	0.5	0.04		0.02		
Chlorobenzene	0.5	0.04				
Ethylbenzene	0.5	0.05	0.09	0.1	0.05	0.1
Xylene (para & meta)	1.0	0.10	0.3	0.3	0.2	0.4
Xylene (Ortho)	0.5	0.05	0.4	0.1	0.06	0.2
Styrene	0.5	0.05	0.07	0.07	0.02	0.2
1,1,2,2-Tetrachloroethane	0.5	0.08				
4-Ethyltoluene	0.5	0.06	0.2	0.1	0.06	0.2
1,3,5-Trimethylbenzene	0.5	0.05	0.06	0.04	0.02	0.05
1,2,4-Trimethylbenzene	0.5	0.08	0.2	0.1	0.06	0.2
1,3-Dichlorobenzene	0.5	0.06	0.02			
1,4-Dichlorobenzene	0.5	0.05	0.05	0.04	0.04	0.04
1,2-Dichlorobenzene	0.5	0.10	0.02			
1,2,4-Trichlorobenzene	1.0	0.10	0.04			
Hexachloro-1,3-butadiene	0.5	0.30				

Dominguez Elementary School - Room 7 (DZ-7) VOC data

			VOC concentration (ppbv)					
TENTATIVELY IDENTIFIED COMPOUNDS	**Reporting Limit (ppbv)**	**Method Detection limit (ppbv)**	**11/18/08**	**11/19/08**	**11/20/08**	**11/21/08**	**11/24/08**	**11/25/08**
.alpha.-Pinene	N/A	N/A						
1,3-Pentadiene	N/A	N/A						
1-Butanol	N/A	N/A						2.9
1R-.alpha.-Pinene	N/A	N/A						
2,2,3,3-Tetramethyl butane	N/A	N/A		1.8	1.5		1.7	
2,2,4-Trimethyl pentane	N/A	N/A	4					
2,2-Dimethyl hexane	N/A	N/A				2.9		
2,3-Dimethyl pentane	N/A	N/A	2.7			1.9	1.2	
2,4-bis(trimethylsiloxane) Benzaldehyde	N/A	N/A			28			
2-Methyl butane	N/A	N/A	16	6.9	6	12	7.3	4.4
2-Methyl hexane	N/A	N/A	2.1					
2-Methyl pentane	N/A	N/A	6.4	2.8	2.4	4.9	2.8	
2-Methyl-1,3-butadiene	N/A	N/A		3.2	1.3	2.6		2.5
3-Methyl hexane	N/A	N/A	2.5			2	1.2	
3-Methyl pentane	N/A	N/A	3.5	1.5	1.4	2.6	1.5	
4-Ethyl-2,2,6,6-tetramethyl heptane	N/A	N/A						1.8
Acetaldehyde	N/A	N/A		1.6	1.3		1.5	3.1
Benzaldehyde	N/A	N/A	2.1	2	2.4	2.5	1.9	
Butanal	N/A	N/A						
Butane	N/A	N/A	11	5.3	5.4	8.4	5.3	3.6
Butyl ester acetic acid	N/A	N/A	8.8					
Decanal	N/A	N/A						
Difluorochloromethane	N/A	N/A						
D-Limonene	N/A	N/A	1.7	5.5	1.5	2.6		
Heptanal	N/A	N/A						
Hexamethyl cyclotrisiloxane	N/A	N/A					1	
Hexanal	N/A	N/A		1.2				1.8
Isobutane	N/A	N/A	7	3.3	12	5	3.8	2.2
Methyl cyclopentane	N/A	N/A	3	1.3	1.3	2.3	1.3	
Nonanal	N/A	N/A		1.2				2.3
Ocatanal	N/A	N/A						1.8
Octamethyl cyclotrisiloxane	N/A	N/A			68			
Pentane	N/A	N/A	6.1	3.1		5.4	3.1	2.8
Tridecane	N/A	N/A						

Dominguez Elementary School - Room 7 (DZ-7) VOC data

			VOC concentration (ppbv)					
TENTATIVELY IDENTIFIED COMPOUNDS	**Reporting Limit (ppbv)**	**Method Detection limit (ppbv)**	**11/26/08**	**12/1/08**	**12/2/08**	**12/3/08**	**12/4/08**	**12/5/08**
.alpha.-Pinene	N/A	N/A	1.2					
1,3-Pentadiene	N/A	N/A	2.2					
1-Butanol	N/A	N/A	1.8					
1R-.alpha.-Pinene	N/A	N/A						
2,2,3,3-Tetramethyl butane	N/A	N/A						
2,2,4-Trimethyl pentane	N/A	N/A						
2,2-Dimethyl hexane	N/A	N/A						
2,3-Dimethyl pentane	N/A	N/A						
2,4-bis(trimethylsiloxane) Benzaldehyde	N/A	N/A						
2-Methyl butane	N/A	N/A	2.6	2.8		2.1		1.3
2-Methyl hexane	N/A	N/A						
2-Methyl pentane	N/A	N/A						
2-Methyl-1,3-butadiene	N/A	N/A						
3-Methyl hexane	N/A	N/A						
3-Methyl pentane	N/A	N/A						
4-Ethyl-2,2,6,6-tetramethyl heptane	N/A	N/A						
Acetaldehyde	N/A	N/A		2.7		2.7	1.5	
Benzaldehyde	N/A	N/A						
Butanal	N/A	N/A				1.1	1	
Butane	N/A	N/A	2	3.4	1.8	1.9	1.1	1.6
Butyl ester acetic acid	N/A	N/A						
Decanal	N/A	N/A						
Difluorochloromethane	N/A	N/A			1.5			
D-Limonene	N/A	N/A	37					
Heptanal	N/A	N/A						
Hexamethyl cyclotrisiloxane	N/A	N/A						
Hexanal	N/A	N/A						
Isobutane	N/A	N/A	1.7	2.6	1.9	1.6	1.3	1.8
Methyl cyclopentane	N/A	N/A						
Nonanal	N/A	N/A	1.1					
Ocatanal	N/A	N/A						
Octamethyl cyclotrisiloxane	N/A	N/A		1				
Pentane	N/A	N/A		1.5				
Tridecane	N/A	N/A	1.1					

Dominguez Elementary School - Room 7 (DZ-7) VOC data

			VOC concentration (ppbv)					
TENTATIVELY IDENTIFIED COMPOUNDS	**Reporting Limit (ppbv)**	**Method Detection limit (ppbv)**	**12/8/08**	**12/9/08**	**12/10/08**	**12/11/08**	**12/12/08**	**12/15/08**
.alpha.-Pinene	N/A	N/A						
1,3-Pentadiene	N/A	N/A						
1-Butanol	N/A	N/A						
1R-.alpha.-Pinene	N/A	N/A		1.9	4.1			
2,2,3,3-Tetramethyl butane	N/A	N/A						
2,2,4-Trimethyl pentane	N/A	N/A						
2,2-Dimethyl hexane	N/A	N/A		2.4				
2,3-Dimethyl pentane	N/A	N/A						
2,4-bis(trimethylsiloxane) Benzaldehyde	N/A	N/A						
2-Methyl butane	N/A	N/A					1.1	
2-Methyl hexane	N/A	N/A						
2-Methyl pentane	N/A	N/A						
2-Methyl-1,3-butadiene	N/A	N/A						
3-Methyl hexane	N/A	N/A			4.3			
3-Methyl pentane	N/A	N/A						
4-Ethyl-2,2,6,6-tetramethyl heptane	N/A	N/A						
Acetaldehyde	N/A	N/A						
Benzaldehyde	N/A	N/A		2.4				
Butanal	N/A	N/A		2				
Butane	N/A	N/A				1	1.8	
Butyl ester acetic acid	N/A	N/A						
Decanal	N/A	N/A		1.9				
Difluorochloromethane	N/A	N/A					1.9	
D-Limonene	N/A	N/A						
Heptanal	N/A	N/A		1.9				
Hexamethyl cyclotrisiloxane	N/A	N/A						
Hexanal	N/A	N/A						
Isobutane	N/A	N/A				1.3	1.3	
Methyl cyclopentane	N/A	N/A						
Nonanal	N/A	N/A						
Ocatanal	N/A	N/A		1.8				
Octamethyl cyclotrisiloxane	N/A	N/A						
Pentane	N/A	N/A						
Tridecane	N/A	N/A						

Dominguez Elementary School - Room 7 (DZ-7) VOC data

TENTATIVELY IDENTIFIED COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)			
			12/16/08	12/17/08	12/18/08	12/19/08
.alpha.-Pinene	N/A	N/A				
1,3-Pentadiene	N/A	N/A				
1-Butanol	N/A	N/A				
1R-.alpha.-Pinene	N/A	N/A				
2,2,3,3-Tetramethyl butane	N/A	N/A				
2,2,4-Trimethyl pentane	N/A	N/A				
2,2-Dimethyl hexane	N/A	N/A				
2,3-Dimethyl pentane	N/A	N/A				
2,4-bis(trimethylsiloxane) Benzaldehyde	N/A	N/A				
2-Methyl butane	N/A	N/A				
2-Methyl hexane	N/A	N/A				
2-Methyl pentane	N/A	N/A				
2-Methyl-1,3-butadiene	N/A	N/A				
3-Methyl hexane	N/A	N/A				
3-Methyl pentane	N/A	N/A				
4-Ethyl-2,2,6,6-tetramethyl heptane	N/A	N/A				
Acetaldehyde	N/A	N/A				
Benzaldehyde	N/A	N/A				
Butanal	N/A	N/A				
Butane	N/A	N/A				1.2
Butyl ester acetic acid	N/A	N/A				
Decanal	N/A	N/A				
Difluorochloromethane	N/A	N/A				
D-Limonene	N/A	N/A				
Heptanal	N/A	N/A				
Hexamethyl cyclotrisiloxane	N/A	N/A				
Hexanal	N/A	N/A				
Isobutane	N/A	N/A				1
Methyl cyclopentane	N/A	N/A				
Nonanal	N/A	N/A				
Ocatanal	N/A	N/A				
Octamethyl cyclotrisiloxane	N/A	N/A				
Pentane	N/A	N/A				
Tridecane	N/A	N/A				

Dominguez Elementary School - Room 9 (DZ-9) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/18/08	11/19/08	11/20/08	11/21/08	11/24/08	11/25/08
Propylene	1.0	0.04			4.1		4.4	2.8
Freon 12 (Dichlorodifluoromethane)	0.5	0.04		0.6	0.6		0.6	0.5
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03			0.02	0.02	0.02	0.02
Chloromethane	0.5	0.08	0.7	0.7	0.7	0.7	0.8	0.8
Vinyl chloride	0.5	0.04						
Bromomethane	0.5	0.05			0.05			0.02
Ethanol	1.5	0.30	200	580	150	120	520	180
Freon 11(Trichlorofluoromethane)	0.5	0.04			0.3			0.2
Isopropyl alcohol(2-Propanol)	1.5	0.03	17	160	20	92	270	200
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06		0.06	0.06	0.06	0.06	0.06
Acetone	3.0	0.08	25	27	17	27	31	26
Carbon disulfide	1.0	0.04	0.09	0.06	0.04	0.09	0.05	0.04
Methylene chloride	1.5	0.04	1.2	1	0.6	1.4	0.6	0.4
n-Hexane	0.5	0.03	1.1	1.3	1.4	1.2	0.7	0.5
2-Butanone(MEK)	1.5	0.07	1.8	2.2	2.5	2.3	2.3	2.5
cis-1,2-Dichloroethene	0.5	0.05						
Ethyl acetate	0.5	0.07	1.6	0.7	0.3	0.8	0.4	0.3
Chloroform	0.5	0.03	0.08	0.07	0.07	0.09	0.05	0.05
Tetrahydrofuran	0.5	0.07	0.5	0.2	0.1	0.4	0.3	0.2
1,1,1-Trichloroethane	0.5	0.04			0.02	0.02		
Cyclohexane	0.5	0.04	0.8	1.7	0.8	1.7	0.5	0.3
Carbon tetrachloride	0.5	0.04	0.07	0.07	0.07	0.07	0.06	0.06
n-Heptane	0.5	0.04	1.2	4.7	0.9	0.9	0.6	
Benzene	0.5	0.02	1.2	1.1	1.1	1.3	0.8	0.6
Trichloroethene	0.5	0.04	0.09	0.07	0.05	0.06	0.03	0.06
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.5	1.3	0.3	0.4	0.4	0.4
cis-1,3-Dichloropropene	0.5	0.04						
Toluene	0.5	0.05	5.4	5.1	4.3	6.4	3.8	3
trans-1,3-Dichloropropene	0.5	0.04						
2-Hexanone(MBK)	1.5	0.05		0.1	0.2	0.2	0.4	0.4
Tetrachloroethene	0.5	0.04	0.3	0.2	0.1	0.2	0.1	0.09
Dibromochloromethane	0.5	0.06						
Chlorobenzene	0.5	0.04						
Ethylbenzene	0.5	0.05	0.7	0.7	0.6	0.9	0.5	0.4
Xylene (para & meta)	1.0	0.10	2.4	2	1.8	2.9	1.7	1.1
Xylene (Ortho)	0.5	0.05	0.9	0.9	0.7	1.1	0.7	0.5
Styrene	0.5	0.05	1.1	0.6	0.6	0.5	1.1	0.4
1,1,2,2-Tetrachloroethane	0.5	0.08						
4-Ethyltoluene	0.5	0.06	0.8	0.7	0.6	0.9	0.6	0.4
1,3,5-Trimethylbenzene	0.5	0.05	0.2	0.2		0.3	0.2	0.1
1,2,4-Trimethylbenzene	0.5	0.08	0.9	0.7	0.6	1	0.7	0.5
1,3-Dichlorobenzene	0.5	0.06						
1,4-Dichlorobenzene	0.5	0.05	0.08	0.09	0.09	0.1	0.1	0.08
1,2-Dichlorobenzene	0.5	0.10						
1,2,4-Trichlorobenzene	1.0	0.10						
Hexachloro-1,3-butadiene	0.5	0.30		0.03				0.03

Dominguez Elementary School - Room 9 (DZ-9) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/26/08	12/1/08	12/2/08	12/3/08	12/4/08	12/5/08
Propylene	1.0	0.04	0.9	4	1.1	0.7	1.1	2.6
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.5	0.5	0.4	0.4	0.5	0.6
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03	0.02		0.02	0.04	0.05	0.05
Chloromethane	0.5	0.08	0.7	0.7	0.6	0.8	0.6	0.6
Vinyl chloride	0.5	0.04				0.04		
Bromomethane	0.5	0.05		0.05		0.05		
Ethanol	1.5	0.30	110	210	82	59	61	84
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.2		0.2	0.3	0.3	0.4
Isopropyl alcohol(2-Propanol)	1.5	0.03	41	15	5.4	8.7	4.2	39
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.06	0.06	0.07	0.09	0.08	0.1
Acetone	3.0	0.08	13	23	16	7.8	23	16
Carbon disulfide	1.0	0.04	0.03	0.04	0.05	0.07	0.09	0.1
Methylene chloride	1.5	0.04	0.2	0.4	0.1	0.2	0.4	0.5
n-Hexane	0.5	0.03	0.2	1.4	0.2	0.2	0.3	0.5
2-Butanone(MEK)	1.5	0.07	0.4	2.2	2.8	0.8	4	1
cis-1,2-Dichloroethene	0.5	0.05				0.02		
Ethyl acetate	0.5	0.07	0.4	0.3				0.2
Chloroform	0.5	0.03		0.06				0.08
Tetrahydrofuran	0.5	0.07		0.4				
1,1,1-Trichloroethane	0.5	0.04						
Cyclohexane	0.5	0.04	0.1	0.7	0.1	0.1	0.2	0.4
Carbon tetrachloride	0.5	0.04	0.06	0.07	0.07	0.08	0.07	0.07
n-Heptane	0.5	0.04			0.6		0.2	0.4
Benzene	0.5	0.02	0.2	1.2	0.2	0.2	0.4	0.9
Trichloroethene	0.5	0.04	0.02	0.04		0.03	0.07	0.05
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.1	0.2	0.2	0.2	0.2	0.08
cis-1,3-Dichloropropene	0.5	0.04				0.02		0.02
Toluene	0.5	0.05	1.2	4.9	0.8	0.6	1.2	2.6
trans-1,3-Dichloropropene	0.5	0.04				0.02	0.02	
2-Hexanone(MBK)	1.5	0.05		0.1	0.3		0.4	
Tetrachloroethene	0.5	0.04	0.02	0.06		0.05	0.07	0.1
Dibromochloromethane	0.5	0.06					0.02	0.02
Chlorobenzene	0.5	0.04						0.03
Ethylbenzene	0.5	0.05	0.2	0.6	0.09	0.1	0.2	0.4
Xylene (para & meta)	1.0	0.10	0.4	1.9	0.2	0.3	0.4	1.1
Xylene (Ortho)	0.5	0.05	0.2	0.8	0.1	0.2	0.2	0.4
Styrene	0.5	0.05	0.1	0.9	0.07	0.08	0.09	0.9
1,1,2,2-Tetrachloroethane	0.5	0.08						0.04
4-Ethyltoluene	0.5	0.06	0.2	0.7	0.1	0.2	0.2	0.4
1,3,5-Trimethylbenzene	0.5	0.05	0.05	0.2	0.03	0.09	0.06	0.1
1,2,4-Trimethylbenzene	0.5	0.08	0.2	0.7	0.1	0.3	0.2	0.4
1,3-Dichlorobenzene	0.5	0.06				0.03	0.03	0.03
1,4-Dichlorobenzene	0.5	0.05	0.06	0.1	0.03	0.04	0.04	0.05
1,2-Dichlorobenzene	0.5	0.10	0.02			0.03	0.03	0.03
1,2,4-Trichlorobenzene	1.0	0.10				0.04	0.04	0.03
Hexachloro-1,3-butadiene	0.5	0.30	0.03			0.03	0.03	0.03

Dominguez Elementary School - Room 9 (DZ-9) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			12/8/08	12/9/08	12/10/08	12/11/08	12/12/08	12/15/08
Propylene	1.0	0.04			1.4	4.9	2.6	1.1
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.5	0.6	0.5	0.7	0.4	0.4
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03	0.03	0.03	0.03			
Chloromethane	0.5	0.08	0.5	0.5	0.4	0.5	0.4	0.5
Vinyl chloride	0.5	0.04						
Bromomethane	0.5	0.05						
Ethanol	1.5	0.30	68	30	110	68	21	110
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.3	0.3		0.4	0.2	0.2
Isopropyl alcohol(2-Propanol)	1.5	0.03	4.9	43	53	6.2	36	20
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.09	0.09	0.08	0.06	0.06	0.05
Acetone	3.0	0.08	14	15	15	25	17	12
Carbon disulfide	1.0	0.04	0.03	0.05	0.05	0.03		
Methylene chloride	1.5	0.04	0.3	0.6	0.2	0.8	0.6	0.2
n-Hexane	0.5	0.03	0.2	0.5	0.6	0.9	0.6	0.2
2-Butanone(MEK)	1.5	0.07	1.7	0.9	1.2	2	2.4	1.3
cis-1,2-Dichloroethene	0.5	0.05						
Ethyl acetate	0.5	0.07	0.1	0.3		0.3	0.2	
Chloroform	0.5	0.03	0.06	0.06		0.07		
Tetrahydrofuran	0.5	0.07		0.7				
1,1,1-Trichloroethane	0.5	0.04						
Cyclohexane	0.5	0.04	0.2	0.3	1.1	0.6	0.4	0.2
Carbon tetrachloride	0.5	0.04	0.08	0.08	0.07	0.06	0.06	0.05
n-Heptane	0.5	0.04		0.5	1.6	0.8	0.6	0.6
Benzene	0.5	0.02	0.3	0.8	0.4	1.1	0.6	0.3
Trichloroethene	0.5	0.04	0.02	0.04	0.02	0.06	0.02	0.02
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.08	0.1	0.3	0.1	0.1	0.2
cis-1,3-Dichloropropene	0.5	0.04						
Toluene	0.5	0.05	1	2.2	1.4	4.4	2.3	0.8
trans-1,3-Dichloropropene	0.5	0.04						
2-Hexanone(MBK)	1.5	0.05	0.1		0.2	0.1	0.4	0.2
Tetrachloroethene	0.5	0.04	0.03	0.08	0.04	0.1	0.09	0.03
Dibromochloromethane	0.5	0.06						
Chlorobenzene	0.5	0.04						
Ethylbenzene	0.5	0.05	0.1	0.3	0.2	0.6	0.3	0.1
Xylene (para & meta)	1.0	0.10	0.4	1	0.8	1.9	1.1	0.4
Xylene (Ortho)	0.5	0.05	0.2	0.4	0.2	0.7	0.4	0.2
Styrene	0.5	0.05	0.07	0.4	0.6	0.7	0.3	0.1
1,1,2,2-Tetrachloroethane	0.5	0.08						
4-Ethyltoluene	0.5	0.06	0.1	0.3	0.2	0.6	0.3	0.1
1,3,5-Trimethylbenzene	0.5	0.05	0.04	0.1	0.06	0.2	0.1	0.05
1,2,4-Trimethylbenzene	0.5	0.08	0.1	0.3	0.2	0.6	0.4	0.2
1,3-Dichlorobenzene	0.5	0.06	0.01	0.01				
1,4-Dichlorobenzene	0.5	0.05	0.02	0.02	0.02	0.04	0.03	0.02
1,2-Dichlorobenzene	0.5	0.10	0.01	0.01		0.02	0.01	
1,2,4-Trichlorobenzene	1.0	0.10	0.02	0.02	0.02	0.04	0.04	0.03
Hexachloro-1,3-butadiene	0.5	0.30		0.01	0.01	0.02		

Dominguez Elementary School - Room 9 (DZ-9) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)			
			12/16/08	12/17/08	12/18/08	12/19/08
Propylene	1.0	0.04		0.4	1.7	2.6
Freon 12 (Dichlorodifluoromethane)	0.5	0.04		0.4	0.4	0.4
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03		0.02		
Chloromethane	0.5	0.08	0.4	0.5	0.4	0.4
Vinyl chloride	0.5	0.04				
Bromomethane	0.5	0.05				
Ethanol	1.5	0.30	54	76	52	40
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.2	0.2	0.2	0.2
Isopropyl alcohol(2-Propanol)	1.5	0.03	2.4	2.7	9.6	31
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06		0.05	0.05	0.05
Acetone	3.0	0.08	19	5.8	9.9	16
Carbon disulfide	1.0	0.04	0.02	0.01	0.02	0.03
Methylene chloride	1.5	0.04	0.4	0.1	0.1	0.3
n-Hexane	0.5	0.03	0.3	0.1	0.3	0.4
2-Butanone(MEK)	1.5	0.07	2	0.2	0.9	1
cis-1,2-Dichloroethene	0.5	0.05				
Ethyl acetate	0.5	0.07		0.5		
Chloroform	0.5	0.03				
Tetrahydrofuran	0.5	0.07				
1,1,1-Trichloroethane	0.5	0.04				
Cyclohexane	0.5	0.04	0.3	0.2	0.3	0.3
Carbon tetrachloride	0.5	0.04	0.05	0.06	0.05	0.05
n-Heptane	0.5	0.04	3.7	3.9	1.3	1.4
Benzene	0.5	0.02	0.6	0.1		0.6
Trichloroethene	0.5	0.04		0.02		0.02
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.1	0.05	0.1	0.06
cis-1,3-Dichloropropene	0.5	0.04				
Toluene	0.5	0.05	1.7	0.4	6.5	2
trans-1,3-Dichloropropene	0.5	0.04				
2-Hexanone(MBK)	1.5	0.05			0.3	
Tetrachloroethene	0.5	0.04	0.06	0.02		0.04
Dibromochloromethane	0.5	0.06				
Chlorobenzene	0.5	0.04				
Ethylbenzene	0.5	0.05	0.2	0.05	0.2	0.3
Xylene (para & meta)	1.0	0.10	0.8	0.2	0.6	1
Xylene (Ortho)	0.5	0.05	0.3	0.08	0.3	0.4
Styrene	0.5	0.05	0.25	0.03	0.06	0.8
1,1,2,2-Tetrachloroethane	0.5	0.08				
4-Ethyltoluene	0.5	0.06	0.3	0.06	0.2	0.3
1,3,5-Trimethylbenzene	0.5	0.05	0.09	0.02	0.3	0.09
1,2,4-Trimethylbenzene	0.5	0.08	0.2	0.07	0.2	0.3
1,3-Dichlorobenzene	0.5	0.06				
1,4-Dichlorobenzene	0.5	0.05	0.02	0.02	0.02	0.03
1,2-Dichlorobenzene	0.5	0.10				
1,2,4-Trichlorobenzene	1.0	0.10				0.02
Hexachloro-1,3-butadiene	0.5	0.30				

Dominguez Elementary School - Room 9 (DZ-9) VOC data

TENTATIVELY IDENTIFIED COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/18/08	11/19/08	11/20/08	11/21/08	11/24/08	11/25/08
4-Bromofluorobenzene	N/A	N/A	9.84	10.13	10.69	11.36	11.97	11.86
1,3-Dimethyl cyclohexane	N/A	N/A						
1,3-Pentadiene	N/A	N/A	1.4					
1,4-Pentadiene	N/A	N/A						1.4
1-Butanol	N/A	N/A			1.2			1.9
1-Dodecene	N/A	N/A						
1S-.alpha.-Pinene	N/A	N/A						1.5
2,2,3,3-Tetramethyl butane	N/A	N/A			2.1			
2,2,4,6,6-Pentamethyl heptane	N/A	N/A		9.4		5.3		13
2,2,4-Trimethyl pentane	N/A	N/A	2.3	2.1			1.2	
2,2-Dimethyl hexane	N/A	N/A				2.4		
2,3,3-Trimethyl pentane	N/A	N/A						
2,3-Dimethyl pentane	N/A	N/A	1.5		1.1			
2-Methyl butane	N/A	N/A	8.2	7.4	9	8.9	5.3	3.8
2-Methyl hexane	N/A	N/A	1.3	1.4				
2-Methyl pentane	N/A	N/A	3.5	3.3	3.6	3.7	2	1.5
2-Methyl-1,3-butadiene	N/A	N/A	1.6				1.5	
3-Methyl butanal	N/A	N/A						
3-Methyl hexane	N/A	N/A	1.5	1.5	1.3	1.5		
3-Methyl pentane	N/A	N/A	1.9	1.8	2.1	2		
Acetaldehyde	N/A	N/A			1.6		2.4	2.4
Benzaldehyde	N/A	N/A				1.9	2	3
Butanal	N/A	N/A						
Butane	N/A	N/A	5.9	6.1	8.3	6.7	4.3	3.1
Difluorochloromethane	N/A	N/A	26	3.6		19		
D-Limonene	N/A	N/A	1.1			1.7		1.9
Heptanal	N/A	N/A						
Hexamethyl cyclotrisiloxane	N/A	N/A						
Hexanal	N/A	N/A						
Isobutane	N/A	N/A	4.6	4	5.1	4.6	3.5	2.2
Methyl cyclohexane	N/A	N/A			1.1			
Methyl cyclopentane	N/A	N/A	1.6	1.6	1.9	1.7		
Nonanal	N/A	N/A					2	2
Ocatanal	N/A	N/A					2	
Octamethyl cyclotrisiloxane	N/A	N/A					10	16
Octane	N/A	N/A						
Pentane	N/A	N/A	3.6	4		4.1	3	
trans-1,4-Dimethyl cyclohexane	N/A	N/A						

Dominguez Elementary School - Room 9 (DZ-9) VOC data

			VOC concentration (ppbv)					
TENTATIVELY IDENTIFIED COMPOUNDS	**Reporting Limit (ppbv)**	**Method Detection limit (ppbv)**	**11/26/08**	**12/1/08**	**12/2/08**	**12/3/08**	**12/4/08**	**12/5/08**
4-Bromofluorobenzene	N/A	N/A	11.53	9.44	9.66	8.08	9.07	8.76
1,3-Dimethyl cyclohexane	N/A	N/A						
1,3-Pentadiene	N/A	N/A						
1,4-Pentadiene	N/A	N/A						
1-Butanol	N/A	N/A						
1-Dodecene	N/A	N/A			1			
1S-.alpha.-Pinene	N/A	N/A						
2,2,3,3-Tetramethyl butane	N/A	N/A						1.3
2,2,4,6,6-Pentamethyl heptane	N/A	N/A	1.1					
2,2,4-Trimethyl pentane	N/A	N/A						
2,2-Dimethyl hexane	N/A	N/A						
2,3,3-Trimethyl pentane	N/A	N/A						
2,3-Dimethyl pentane	N/A	N/A						
2-Methyl butane	N/A	N/A	2	8.5	2.1	1.3	1.9	3.5
2-Methyl hexane	N/A	N/A						
2-Methyl pentane	N/A	N/A		3.1				1.9
2-Methyl-1,3-butadiene	N/A	N/A		1.6				
3-Methyl butanal	N/A	N/A			1		1.1	
3-Methyl hexane	N/A	N/A						
3-Methyl pentane	N/A	N/A		1.9				
Acetaldehyde	N/A	N/A		1.6	2.6	1.2	3	
Benzaldehyde	N/A	N/A		1.4				
Butanal	N/A	N/A			1.1		2	
Butane	N/A	N/A	1.6	8.1	2.9	1.7	1.8	2.6
Difluorochloromethane	N/A	N/A						
D-Limonene	N/A	N/A	2.2					
Heptanal	N/A	N/A			1.1			
Hexamethyl cyclotrisiloxane	N/A	N/A		2.5				
Hexanal	N/A	N/A			1			
Isobutane	N/A	N/A	1.6	5.5	2.1	7	1.4	2.1
Methyl cyclohexane	N/A	N/A						
Methyl cyclopentane	N/A	N/A		2				
Nonanal	N/A	N/A			1.6			
Ocatanal	N/A	N/A			1.3			
Octamethyl cyclotrisiloxane	N/A	N/A	1.3	3.4				
Octane	N/A	N/A						
Pentane	N/A	N/A		4.8				
trans-1,4-Dimethyl cyclohexane	N/A	N/A						

Dominguez Elementary School - Room 9 (DZ-9) VOC data

TENTATIVELY IDENTIFIED COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			12/8/08	12/9/08	12/10/08	12/11/08	12/12/08	12/15/08
4-Bromofluorobenzene	N/A	N/A	8.61	8.41	8.22	9.55	9.52	10.21
1,3-Dimethyl cyclohexane	N/A	N/A						
1,3-Pentadiene	N/A	N/A						
1,4-Pentadiene	N/A	N/A						
1-Butanol	N/A	N/A			1.9			
1-Dodecene	N/A	N/A						
1S-.alpha.-Pinene	N/A	N/A						
2,2,3,3-Tetramethyl butane	N/A	N/A		1		1.9	1.1	
2,2,4,6,6-Pentamethyl heptane	N/A	N/A						
2,2,4-Trimethyl pentane	N/A	N/A						
2,2-Dimethyl hexane	N/A	N/A						
2,3,3-Trimethyl pentane	N/A	N/A						
2,3-Dimethyl pentane	N/A	N/A				1.6		
2-Methyl butane	N/A	N/A	1.2	2.7	1.4	4.5	3.2	
2-Methyl hexane	N/A	N/A			1.6	1.2		
2-Methyl pentane	N/A	N/A		1.7		3.2		
2-Methyl-1,3-butadiene	N/A	N/A						
3-Methyl butanal	N/A	N/A						
3-Methyl hexane	N/A	N/A			2.4	1.4		
3-Methyl pentane	N/A	N/A				1.8	1.2	
Acetaldehyde	N/A	N/A						
Benzaldehyde	N/A	N/A						
Butanal	N/A	N/A					1.1	
Butane	N/A	N/A	1	2.1	1.2	3.5	2.3	
Difluorochloromethane	N/A	N/A						
D-Limonene	N/A	N/A					2.3	
Heptanal	N/A	N/A						
Hexamethyl cyclotrisiloxane	N/A	N/A						
Hexanal	N/A	N/A						
Isobutane	N/A	N/A		1.3		1.8	1.6	
Methyl cyclohexane	N/A	N/A						
Methyl cyclopentane	N/A	N/A				1.5	1.1	
Nonanal	N/A	N/A						
Ocatanal	N/A	N/A			1.3			
Octamethyl cyclotrisiloxane	N/A	N/A						
Octane	N/A	N/A						
Pentane	N/A	N/A						
trans-1,4-Dimethyl cyclohexane	N/A	N/A						

Dominguez Elementary School - Room 9 (DZ-9) VOC data

			VOC concentration (ppbv)			
TENTATIVELY IDENTIFIED COMPOUNDS	**Reporting Limit (ppbv)**	**Method Detection limit (ppbv)**	**12/16/08**	**12/17/08**	**12/18/08**	**12/19/08**
4-Bromofluorobenzene	N/A	N/A	9.66	9.52	9.74	10.01
1,3-Dimethyl cyclohexane	N/A	N/A			1.8	
1,3-Pentadiene	N/A	N/A				
1,4-Pentadiene	N/A	N/A				
1-Butanol	N/A	N/A				
1-Dodecene	N/A	N/A				
1S-.alpha.-Pinene	N/A	N/A				
2,2,3,3-Tetramethyl butane	N/A	N/A				
2,2,4,6,6-Pentamethyl heptane	N/A	N/A				
2,2,4-Trimethyl pentane	N/A	N/A				
2,2-Dimethyl hexane	N/A	N/A				
2,3,3-Trimethyl pentane	N/A	N/A	1.2			
2,3-Dimethyl pentane	N/A	N/A	1.4	1.1		
2-Methyl butane	N/A	N/A	1.6		1.1	1.5
2-Methyl hexane	N/A	N/A	2.4	2.2		
2-Methyl pentane	N/A	N/A	1.1			1.2
2-Methyl-1,3-butadiene	N/A	N/A				
3-Methyl butanal	N/A	N/A				
3-Methyl hexane	N/A	N/A	5	5.1	1.3	1.5
3-Methyl pentane	N/A	N/A				
Acetaldehyde	N/A	N/A	1.1			
Benzaldehyde	N/A	N/A				
Butanal	N/A	N/A				
Butane	N/A	N/A	1.2		1	1.2
Difluorochloromethane	N/A	N/A				
D-Limonene	N/A	N/A				
Heptanal	N/A	N/A				
Hexamethyl cyclotrisiloxane	N/A	N/A				
Hexanal	N/A	N/A				
Isobutane	N/A	N/A				
Methyl cyclohexane	N/A	N/A				
Methyl cyclopentane	N/A	N/A				
Nonanal	N/A	N/A				
Ocatanal	N/A	N/A				
Octamethyl cyclotrisiloxane	N/A	N/A				
Octane	N/A	N/A			2.7	
Pentane	N/A	N/A				
trans-1,4-Dimethyl cyclohexane	N/A	N/A			1	

Dominguez Elementary School - Room 11 (DZ-11) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/18/08	11/19/08	11/20/08	11/21/08	11/24/08	11/25/08
Propylene	1.0	0.04		5.4	3.7	6	4.5	2.9
Freon 12 (Dichlorodifluoromethane)	0.5	0.04		0.7	0.5	0.7	0.6	0.6
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03			0.01		0.01	0.01
Chloromethane	0.5	0.08	0.9	0.8	0.7	0.8	0.8	0.8
Vinyl chloride	0.5	0.04						
Bromomethane	0.5	0.05			0.04	0.03		0.02
Ethanol	1.5	0.30	530	150	180	170	270	200
Freon 11(Trichlorofluoromethane)	0.5	0.04			0.3			0.2
Isopropyl alcohol(2-Propanol)	1.5	0.03	70	22	15	12	11	16
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06		0.07	0.06	0.06	0.06	0.06
Acetone	3.0	0.08	34	30	20	28	29	21
Carbon disulfide	1.0	0.04	0.08	0.07	0.07	0.05	0.06	0.06
Methylene chloride	1.5	0.04	1.3	1	0.6	1.8	0.6	0.4
n-Hexane	0.5	0.03	1.3	1.1	1.9	1.5	0.6	0.4
2-Butanone(MEK)	1.5	0.07	2.4	2.8	1.8	2.4	2.5	1.9
Ethyl acetate	0.5	0.07	0.9	0.5	0.3	0.5	0.2	0.2
Chloroform	0.5	0.03	0.1	0.08	0.06	0.09	0.05	0.05
Tetrahydrofuran	0.5	0.07	0.7	0.6	0.1	0.5	0.3	0.2
Cyclohexane	0.5	0.04	1	0.7	2.2	9.6	0.5	0.3
Carbon tetrachloride	0.5	0.04	0.07	0.07	0.07	0.07	0.06	0.07
n-Heptane	0.5	0.04	3.6	0.7	1.7	1.1	0.6	
Benzene	0.5	0.02	1.5	1.2	1	1.6	0.8	0.6
Trichloroethene	0.5	0.04	0.07	0.07	0.03	0.07	0.02	0.05
Bromodichloromethane	0.5	0.04						
4-Methyl-2-pentanone(MIBK)	0.5	0.06	42	0.4	0.7	0.5	0.3	0.7
cis-1,3-Dichloropropene	0.5	0.04						
Toluene	0.5	0.05	6.8	4.9	3.3	9.6	3.2	2.4
trans-1,3-Dichloropropene	0.5	0.04						
1,1,2-Trichloroethane	0.5	0.06						
2-Hexanone(MBK)	1.5	0.05		0.2	0.1		0.4	0.2
Tetrachloroethene	0.5	0.04	0.3	0.2	0.08	0.3	0.1	0.09
Chlorobenzene	0.5	0.04						
Ethylbenzene	0.5	0.05	0.9	0.8	0.5	1.7	0.5	0.4
Xylene (para & meta)	1.0	0.10	3.1	2.3	1.7	5.7	1.7	1.2
Xylene (Ortho)	0.5	0.05	1.1	0.9	0.7	1.7	0.7	0.6
Styrene	0.5	0.05	1.5	0.6	0.4	0.7	1.3	0.4
Bromoform	0.5	0.05			0.01			
1,1,2,2-Tetrachloroethane	0.5	0.08						
4-Ethyltoluene	0.5	0.06	1.1	0.8	0.6	1.2	0.6	0.5
1,3,5-Trimethylbenzene	0.5	0.05	0.3	0.2		0.3	0.2	0.1
1,2,4-Trimethylbenzene	0.5	0.08	1.1	0.8	0.6	1.2	0.6	0.5
1,3-Dichlorobenzene	0.5	0.06						
1,4-Dichlorobenzene	0.5	0.05	0.2	0.1	0.09	0.2	0.1	0.08
1,2-Dichlorobenzene	0.5	0.10						
1,2,4-Trichlorobenzene	1.0	0.10						
Hexachloro-1,3-butadiene	0.5	0.30	0.02					

Dominguez Elementary School - Room 11 (DZ-11) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/26/08	12/1/08	12/2/08	12/3/08	12/4/08	12/5/08
Propylene	1.0	0.04	1.2	4.4				2.7
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.5	0.4	0.5	0.4	0.5	0.6
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03	0.01	0.01	0.01	0.04	0.04	0.06
Chloromethane	0.5	0.08	0.8	0.6	0.6	0.9	0.6	0.6
Vinyl chloride	0.5	0.04				0.05		
Bromomethane	0.5	0.05		0.06		0.05		
Ethanol	1.5	0.30	260	100	310	210	63	41
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.2	0.2	0.2	0.2	0.3	0.4
Isopropyl alcohol(2-Propanol)	1.5	0.03	160	52	32	13	4.4	5.4
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.06	0.06	0.06	0.09	0.09	0.1
Acetone	3.0	0.08	26	28	14	17	13	22
Carbon disulfide	1.0	0.04	0.03	0.06		0.07	0.04	0.1
Methylene chloride	1.5	0.04	0.2	0.4	0.2	0.3	0.4	0.6
n-Hexane	0.5	0.03	0.2	1.5	0.3	0.3	0.3	0.6
2-Butanone(MEK)	1.5	0.07	2.1	3.9	1.4	2	1.2	1.6
Ethyl acetate	0.5	0.07	0.2	0.3		0.3	0.2	0.3
Chloroform	0.5	0.03	0.03	0.06		0.06		0.09
Tetrahydrofuran	0.5	0.07						
Cyclohexane	0.5	0.04		0.7		0.2	0.2	0.4
Carbon tetrachloride	0.5	0.04	0.06	0.07	0.07	0.08	0.07	0.07
n-Heptane	0.5	0.04	1.4	1.3			0.2	0.5
Benzene	0.5	0.02	0.2	1.2	0.2	0.4	0.4	0.9
Trichloroethene	0.5	0.04	0.02	0.03		0.04	0.06	0.05
Bromodichloromethane	0.5	0.04				0.03		
4-Methyl-2-pentanone(MIBK)	0.5	0.06	2	0.4	0.1	0.2	0.2	0.2
cis-1,3-Dichloropropene	0.5	0.04				0.02		
Toluene	0.5	0.05	1	4.6	0.8	0.9	1	2.7
trans-1,3-Dichloropropene	0.5	0.04				0.02		0.02
1,1,2-Trichloroethane	0.5	0.06					0.03	
2-Hexanone(MBK)	1.5	0.05	0.2	0.4	0.2	0.2	0.1	0.1
Tetrachloroethene	0.5	0.04	0.03	0.08		0.06	0.07	0.1
Chlorobenzene	0.5	0.04					0.03	0.04
Ethylbenzene	0.5	0.05	0.2	0.6	0.1	0.2	0.2	0.4
Xylene (para & meta)	1.0	0.10	0.5	2	0.3	0.4	0.4	1.2
Xylene (Ortho)	0.5	0.05	0.3	0.9	0.2	0.2	0.2	0.5
Styrene	0.5	0.05	0.1	0.8	0.1	0.1	0.1	0.9
Bromoform	0.5	0.05						
1,1,2,2-Tetrachloroethane	0.5	0.08					0.03	0.04
4-Ethyltoluene	0.5	0.06	0.2	0.7	0.2	0.1	0.2	0.5
1,3,5-Trimethylbenzene	0.5	0.05	0.05	0.2	0.04	0.06	0.06	0.2
1,2,4-Trimethylbenzene	0.5	0.08	0.2	0.8	0.2	0.1	0.2	0.5
1,3-Dichlorobenzene	0.5	0.06				0.03	0.03	0.03
1,4-Dichlorobenzene	0.5	0.05	0.05	0.1	0.03	0.04	0.04	0.06
1,2-Dichlorobenzene	0.5	0.10				0.03	0.03	0.04
1,2,4-Trichlorobenzene	1.0	0.10				0.05	0.03	0.05
Hexachloro-1,3-butadiene	0.5	0.30				0.04	0.03	0.04

Dominguez Elementary School - Room 11 (DZ-11) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			12/8/08	12/9/08	12/10/08	12/11/08	12/12/08	12/15/08
Propylene	1.0	0.04	1				4.7	0.7
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.5	0.5	0.6	0.6	0.6	0.4
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03	0.03	0.02				
Chloromethane	0.5	0.08	0.5	0.5	0.4	0.6	0.5	0.5
Vinyl chloride	0.5	0.04						
Bromomethane	0.5	0.05						
Ethanol	1.5	0.30	18	42	6.4	60	23	99
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.2	0.2	0.2	0.2	0.4	0.2
Isopropyl alcohol(2-Propanol)	1.5	0.03	35	8.4	4.2	7.9	3.2	13
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06	0.04	0.04			0.06	0.03
Acetone	3.0	0.08	14	15	5.9	19	19	15
Carbon disulfide	1.0	0.04	0.03	0.06	0.04	0.02	0.02	
Methylene chloride	1.5	0.04	0.2	0.5	0.2	0.5	0.8	0.3
n-Hexane	0.5	0.03	0.05	0.1	0.07	0.2	0.8	0.1
2-Butanone(MEK)	1.5	0.07	0.8	0.7	0.3	1.4	1.3	
Ethyl acetate	0.5	0.07					0.2	
Chloroform	0.5	0.03						
Tetrahydrofuran	0.5	0.07						
Cyclohexane	0.5	0.04	0.04	0.08		0.2	0.5	0.2
Carbon tetrachloride	0.5	0.04	0.03	0.03			0.06	
n-Heptane	0.5	0.04			0.1	0.2	0.6	
Benzene	0.5	0.02	0.07	0.2	0.2	0.1	1.1	0.06
Trichloroethene	0.5	0.04		0.02			0.06	
Bromodichloromethane	0.5	0.04						
4-Methyl-2-pentanone(MIBK)	0.5	0.06	0.04	0.09				2.9
cis-1,3-Dichloropropene	0.5	0.04						2.9
Toluene	0.5	0.05	0.1	0.4	0.5	0.5	3.8	
trans-1,3-Dichloropropene	0.5	0.04						
1,1,2-Trichloroethane	0.5	0.06						
2-Hexanone(MBK)	1.5	0.05		0.1		0.2		
Tetrachloroethene	0.5	0.04	0.01	0.03	0.02	0.02	0.1	
Chlorobenzene	0.5	0.04	0.01					
Ethylbenzene	0.5	0.05	0.03	0.07	0.07	0.08	0.6	0.03
Xylene (para & meta)	1.0	0.10	0.08	0.2	0.2	0.2	1.7	0.08
Xylene (Ortho)	0.5	0.05	0.04	0.1	0.1	0.1	0.6	0.03
Styrene	0.5	0.05	0.02	0.06	0.2	0.06	0.7	0.02
Bromoform	0.5	0.05						
1,1,2,2-Tetrachloroethane	0.5	0.08		0.03				
4-Ethyltoluene	0.5	0.06	0.04	0.07	0.1	0.08	0.5	0.03
1,3,5-Trimethylbenzene	0.5	0.05	0.02	0.03	0.05	0.03	0.1	0.01
1,2,4-Trimethylbenzene	0.5	0.08	0.04	0.08	0.2	0.08	0.5	0.04
1,3-Dichlorobenzene	0.5	0.06	0.01	0.01				
1,4-Dichlorobenzene	0.5	0.05	0.01	0.02	0.01	0.01	0.04	0.01
1,2-Dichlorobenzene	0.5	0.10						
1,2,4-Trichlorobenzene	1.0	0.10	0.02	0.02	0.02	0.02		0.02
Hexachloro-1,3-butadiene	0.5	0.30	0.01					

Dominguez Elementary School - Room 11 (DZ-11) VOC data

SPECIATED ORGANIC COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)			
			12/16/08	12/17/08	12/18/08	12/19/08
Propylene	1.0	0.04			1.1	1.8
Freon 12 (Dichlorodifluoromethane)	0.5	0.04	0.4	0.4	0.4	0.4
Freon 114(1,2-Dichlorotetrafluoroethan)	0.5	0.03	0.02			
Chloromethane	0.5	0.08	0.5	0.6	0.5	0.5
Vinyl chloride	0.5	0.04				
Bromomethane	0.5	0.05				
Ethanol	1.5	0.30	110	150	58	32
Freon 11(Trichlorofluoromethane)	0.5	0.04	0.2	0.2	0.2	0.1
Isopropyl alcohol(2-Propanol)	1.5	0.03	18	20	10	5.4
Freon 113(1,1,2-Trichlorotrifluoroethan)	0.5	0.06			0.02	
Acetone	3.0	0.08	14	17	19	15
Carbon disulfide	1.0	0.04	0.04	0.01	0.03	
Methylene chloride	1.5	0.04	0.4	0.2	0.2	0.3
n-Hexane	0.5	0.03	0.1			0.05
2-Butanone(MEK)	1.5	0.07	0.3	0.6	1	
Ethyl acetate	0.5	0.07		0.2		
Chloroform	0.5	0.03				
Tetrahydrofuran	0.5	0.07				
Cyclohexane	0.5	0.04	0.1		0.05	
Carbon tetrachloride	0.5	0.04	0.03	0.02	0.02	
n-Heptane	0.5	0.04				
Benzene	0.5	0.02	0.2	0.03	0.05	0.09
Trichloroethene	0.5	0.04	0.02			
Bromodichloromethane	0.5	0.04				
4-Methyl-2-pentanone(MIBK)	0.5	0.06	6.6	3.5	0.2	0.8
cis-1,3-Dichloropropene	0.5	0.04				
Toluene	0.5	0.05	0.6	0.07	0.3	0.2
trans-1,3-Dichloropropene	0.5	0.04				
1,1,2-Trichloroethane	0.5	0.06				
2-Hexanone(MBK)	1.5	0.05		0.08	0.2	
Tetrachloroethene	0.5	0.04	0.03			
Chlorobenzene	0.5	0.04				
Ethylbenzene	0.5	0.05	0.1	0.02	0.03	0.05
Xylene (para & meta)	1.0	0.10	0.4	0.05	0.07	0.2
Xylene (Ortho)	0.5	0.05	0.2		0.04	0.06
Styrene	0.5	0.05	0.06			0.05
Bromoform	0.5	0.05				
1,1,2,2-Tetrachloroethane	0.5	0.08				
4-Ethyltoluene	0.5	0.06	0.2	0.02	0.03	0.05
1,3,5-Trimethylbenzene	0.5	0.05			0.01	0.02
1,2,4-Trimethylbenzene	0.5	0.08	0.2	0.02	0.03	0.05
1,3-Dichlorobenzene	0.5	0.06	0.01			
1,4-Dichlorobenzene	0.5	0.05	0.03			
1,2-Dichlorobenzene	0.5	0.10	0.01			
1,2,4-Trichlorobenzene	1.0	0.10	0.05			
Hexachloro-1,3-butadiene	0.5	0.30				

Dominguez Elementary School - Room 11 (DZ-11) VOC data

TENTATIVELY IDENTIFIED COMPOUNDS	Reporting Limit (ppbv)	Method Detection limit (ppbv)	VOC concentration (ppbv)					
			11/18/08	11/19/08	11/20/08	11/21/08	11/24/08	11/25/08
1,1-Difluoroethane	N/A	N/A						
1-Butanol	N/A	N/A						1.7
1-Dodecene	N/A	N/A						
2,2,3,3-Tetramethyl butane	N/A	N/A			2.1			
2,2,4,6,6-Pentamethyl heptane	N/A	N/A					1.2	
2,2,4-Trimethyl pentane	N/A	N/A	2.8					
2,2-Dimethyl hexane	N/A	N/A		2.1		3		
2,3-Dimethyl pentane	N/A	N/A	1.8	1.3	1.3	1.8		
2-Methyl butane	N/A	N/A	9.2	7.7	8.2	11	4.7	3.8
2-Methyl hexane	N/A	N/A	1.5		1.6	1.4		
2-Methyl pentane	N/A	N/A	4.1	3.2	3.6	4.6	2	1.4
2-Methyl-1,3-butadiene	N/A	N/A	2.6	1.8	1.3	1.7	1.4	1.1
3-Methyl butanal	N/A	N/A						
3-Methyl butane	N/A	N/A						
3-Methyl hexane	N/A	N/A	1.9		1.7	1.8	1.1	
3-Methyl pentane	N/A	N/A	2.1	1.8	2.2	2.5	1.1	
3-Methyl-1,2-butadiene	N/A	N/A						
Acetaldehyde	N/A	N/A	1.3	1.7	1.5		1.9	2.1
Benzaldehyde	N/A	N/A		1.4	1	1.5	1.8	1.6
Butanal	N/A	N/A						
Butane	N/A	N/A	6.4	6.4	7.5	7.9	3.9	3.1
Butyl ester acetic acid	N/A	N/A	8.8					
Difluorochloromethane	N/A	N/A	12					
D-Limonene	N/A	N/A				1.4		
Heptanal	N/A	N/A						
Hexamethyl cyclotrisiloxane	N/A	N/A					3.5	
Hexanal	N/A	N/A						
Isobutane	N/A	N/A	4.6	4.9	4.5	4.7	2.9	2.3
Methyl cyclohexane	N/A	N/A			1.2			
Methyl cyclopentane	N/A	N/A	1.8	1.4	2.3	2		
Naphthalene	N/A	N/A						
Nonanal	N/A	N/A						1.4
Ocatanal	N/A	N/A					1.1	1.3
Octamethyl cyclotrisiloxane	N/A	N/A					5.7	5.3
Pentanal	N/A	N/A						
Pentane	N/A	N/A	4.1	3.7		4.9	2.5	

Dominguez Elementary School - Room 11 (DZ-11) VOC data

			VOC concentration (ppbv)					
TENTATIVELY IDENTIFIED COMPOUNDS	**Reporting Limit (ppbv)**	**Method Detection limit (ppbv)**	**11/26/08**	**12/1/08**	**12/2/08**	**12/3/08**	**12/4/08**	**12/5/08**
1,1-Difluoroethane	N/A	N/A						
1-Butanol	N/A	N/A						
1-Dodecene	N/A	N/A			1			
2,2,3,3-Tetramethyl butane	N/A	N/A		1.6				
2,2,4,6,6-Pentamethyl heptane	N/A	N/A						
2,2,4-Trimethyl pentane	N/A	N/A						1.3
2,2-Dimethyl hexane	N/A	N/A						
2,3-Dimethyl pentane	N/A	N/A						
2-Methyl butane	N/A	N/A	2.1	8.7	2.2	2.1	2	3.9
2-Methyl hexane	N/A	N/A						
2-Methyl pentane	N/A	N/A		3.3				2
2-Methyl-1,3-butadiene	N/A	N/A	1.2					
3-Methyl butanal	N/A	N/A					1.1	
3-Methyl butane	N/A	N/A						1
3-Methyl hexane	N/A	N/A						
3-Methyl pentane	N/A	N/A		2.1				
3-Methyl-1,2-butadiene	N/A	N/A						1.2
Acetaldehyde	N/A	N/A	2.8	2.7	2.1	2.7		
Benzaldehyde	N/A	N/A	1.8	1.6				
Butanal	N/A	N/A			1.6	1.1		
Butane	N/A	N/A	2	8.5	2.6	2.5	1.8	2.9
Butyl ester acetic acid	N/A	N/A						
Difluorochloromethane	N/A	N/A						
D-Limonene	N/A	N/A					2.5	8
Heptanal	N/A	N/A			2.4			
Hexamethyl cyclotrisiloxane	N/A	N/A	3.3		1.2			
Hexanal	N/A	N/A			1.8			
Isobutane	N/A	N/A		5.6	2.3	1.8	1.3	2.6
Methyl cyclohexane	N/A	N/A						
Methyl cyclopentane	N/A	N/A		2.1				
Naphthalene	N/A	N/A						
Nonanal	N/A	N/A		1.7	1.7			
Ocatanal	N/A	N/A		1.6	1.8			
Octamethyl cyclotrisiloxane	N/A	N/A	6.9					
Pentanal	N/A	N/A			1.5			
Pentane	N/A	N/A						

Dominguez Elementary School - Room 11 (DZ-11) VOC data

			VOC concentration (ppbv)					
TENTATIVELY IDENTIFIED COMPOUNDS	**Reporting Limit (ppbv)**	**Method Detection limit (ppbv)**	**12/8/08**	**12/9/08**	**12/10/08**	**12/11/08**	**12/12/08**	**12/15/08**
1,1-Difluoroethane	N/A	N/A				2.6		
1-Butanol	N/A	N/A						
1-Dodecene	N/A	N/A						
2,2,3,3-Tetramethyl butane	N/A	N/A		1			1.8	
2,2,4,6,6-Pentamethyl heptane	N/A	N/A						
2,2,4-Trimethyl pentane	N/A	N/A						
2,2-Dimethyl hexane	N/A	N/A						
2,3-Dimethyl pentane	N/A	N/A						
2-Methyl butane	N/A	N/A		2.7			4.4	
2-Methyl hexane	N/A	N/A					1.1	
2-Methyl pentane	N/A	N/A		1.7			3.2	
2-Methyl-1,3-butadiene	N/A	N/A						
3-Methyl butanal	N/A	N/A						
3-Methyl butane	N/A	N/A						
3-Methyl hexane	N/A	N/A					1.3	
3-Methyl pentane	N/A	N/A					1.7	
3-Methyl-1,2-butadiene	N/A	N/A						
Acetaldehyde	N/A	N/A						
Benzaldehyde	N/A	N/A						
Butanal	N/A	N/A						
Butane	N/A	N/A	1.3	2.1			3.4	1.1
Butyl ester acetic acid	N/A	N/A						
Difluorochloromethane	N/A	N/A						
D-Limonene	N/A	N/A					2.3	
Heptanal	N/A	N/A						
Hexamethyl cyclotrisiloxane	N/A	N/A						
Hexanal	N/A	N/A						
Isobutane	N/A	N/A		1.3	2.4	1.2	1.7	
Methyl cyclohexane	N/A	N/A						
Methyl cyclopentane	N/A	N/A					1.4	
Naphthalene	N/A	N/A						
Nonanal	N/A	N/A						
Ocatanal	N/A	N/A						
Octamethyl cyclotrisiloxane	N/A	N/A						
Pentanal	N/A	N/A						
Pentane	N/A	N/A						

Dominguez Elementary School - Room 11 (DZ-11) VOC data

			VOC concentration (ppbv)			
TENTATIVELY IDENTIFIED COMPOUNDS	**Reporting Limit (ppbv)**	**Method Detection limit (ppbv)**	**12/16/08**	**12/17/08**	**12/18/08**	**12/19/08**
1,1-Difluoroethane	N/A	N/A				
1-Butanol	N/A	N/A				
1-Dodecene	N/A	N/A				
2,2,3,3-Tetramethyl butane	N/A	N/A	1.1			
2,2,4,6,6-Pentamethyl heptane	N/A	N/A				
2,2,4-Trimethyl pentane	N/A	N/A				
2,2-Dimethyl hexane	N/A	N/A				
2,3-Dimethyl pentane	N/A	N/A				
2-Methyl butane	N/A	N/A				
2-Methyl hexane	N/A	N/A				
2-Methyl pentane	N/A	N/A				
2-Methyl-1,3-butadiene	N/A	N/A				
3-Methyl butanal	N/A	N/A				
3-Methyl butane	N/A	N/A				
3-Methyl hexane	N/A	N/A				
3-Methyl pentane	N/A	N/A				
3-Methyl-1,2-butadiene	N/A	N/A				
Acetaldehyde	N/A	N/A				
Benzaldehyde	N/A	N/A				
Butanal	N/A	N/A				
Butane	N/A	N/A	1.1			
Butyl ester acetic acid	N/A	N/A	1.6			
Difluorochloromethane	N/A	N/A				
D-Limonene	N/A	N/A				
Heptanal	N/A	N/A				
Hexamethyl cyclotrisiloxane	N/A	N/A				
Hexanal	N/A	N/A				
Isobutane	N/A	N/A	1.4			
Methyl cyclohexane	N/A	N/A				
Methyl cyclopentane	N/A	N/A				
Naphthalene	N/A	N/A	1.2			
Nonanal	N/A	N/A				
Ocatanal	N/A	N/A				
Octamethyl cyclotrisiloxane	N/A	N/A				
Pentanal	N/A	N/A				
Pentane	N/A	N/A				