

## 2009 - Indoor Air Quality Fact Sheet

This IAQ Fact Sheet contains our recommended guidelines for non-industrial spaces such as offices, residences, schools and hospitals. These guidelines represent recommendations from selected State, Federal and professional organizations and are intended to minimize the potential for discomfort and adverse health effects. Because of the diversity in individual perceptions and susceptibilities, acceptable comfort and health may not always be achieved for all individuals at all times when meeting these guidelines.

<b>Air Contaminant Guidelines</b>			
Contaminant	Concentration	Contaminant (01350-VOCs) <sup>a</sup>	Concentration
asbestos fibers	0.01 fibers/cc	acetaldehyde	140 $\mu\text{g}/\text{m}^3$
carbon dioxide	1,000 ppm	benzene	60 $\mu\text{g}/\text{m}^3$
carbon monoxide	9 ppm and < 2 ppm over outdoors	carbon tetrachloride	40 $\mu\text{g}/\text{m}^3$
glass/mineral fibers	0.01 fibers/cc	dichlorobenzene	800 $\mu\text{g}/\text{m}^3$
fungi (mold spores)	< outdoors on a genera basis	ethylene glycol monoethyl ether	70 $\mu\text{g}/\text{m}^3$
lead	1.5 $\mu\text{g}/\text{m}^3$	formaldehyde	33 $\mu\text{g}/\text{m}^3$
nitrogen dioxide	100 $\mu\text{g}/\text{m}^3$	n-hexane	7,000 $\mu\text{g}/\text{m}^3$
ozone	0.05 ppm	isopropanol	7,000 $\mu\text{g}/\text{m}^3$
particulate matter PM <sub>10</sub>	50 $\mu\text{g}/\text{m}^3$	tetrachloroethylene	35 $\mu\text{g}/\text{m}^3$
radon	4 pCi/L	toluene	300 $\mu\text{g}/\text{m}^3$
total volatile organic compounds (TVOC)	500 $\mu\text{g}/\text{m}^3$	xylene	700 $\mu\text{g}/\text{m}^3$

a.) California architectural reference specification, Section 01350, Special environmental requirements, 11 of 79 compounds.

ppm = (24.45 / mol. wt) \* mg/m<sup>3</sup>; mg/m<sup>3</sup> = (1000) \*  $\mu\text{g}/\text{m}^3$

<b>Thermal Comfort Guidelines</b>			
Temperature (°F)	70-74	Vertical Difference (°F)	5
Humidity (%)	30-60	Temperature Cycling (°F)	± 2
Air Speed (fpm)	30	Temperature Drift (°F/hr)	2/0.25, 3/0.5, 4/1, 5/2, 6/4

°C = (°F - 32)/1.8; m/s = fpm x 196.8

<b>Surface Contaminant Guidelines</b>	
Fungal Growth - Visible	No visible growth
Carpet Dust - Agitated airborne	1,000 $\mu\text{g}/\text{m}^3$
Glass/Mineral Fibers	10 fibers/ $\text{cm}^2$
Lead - Interior floors - Interior horizontal window surface	50 $\mu\text{g}/\text{ft}^2$ 250 $\mu\text{g}/\text{ft}^2$

<b>Outside Air Ventilation Standards/Codes</b>		
	ASHRAE 62-2007	California Title 24
Offices	5 cfm/occ + 0.06 cfm/ $\text{ft}^2$	15 cfm/occ or 0.15 cfm/ $\text{ft}^2$ whichever is greater
School Classrooms (ages 5 and up)	10 cfm/occ + 0.12 cfm/ $\text{ft}^2$	15 cfm/occ or 0.15 cfm/ $\text{ft}^2$ whichever is greater
Hospital Patient Room	25 cfm/occ	15 cfm/occ or 0.15 cfm/ $\text{ft}^2$ whichever is greater
Residential	0.01 cfm/ $\text{ft}^2$ + 7.5 cfm * (# BR + 1)	0.02 cfm/ $\text{ft}^2$ + 7.5 cfm * (# BR + 1)

Note: In California, Cal-OSHA 5142, requires the ventilation system to be operated when the building is occupied and to provide at least the minimum design rate of outside air.

<b>Air Pressure Guidelines</b>	
Indoors to outdoors	+ 3 to +7 pascals
Special use areas to adjacent areas (e.g. restrooms, janitor closets, parking garages etc.)	Minimum of negative 3 pascals to adjacent spaces and exhaust air to outside.

inches of water = pascals/249.1

<b>Ventilation Operations/Maintenance Guidelines</b>	
Air filtration <sup>a</sup>	Minimum - MERV 8 Recommended – MERV 11
Outside air intake	Locate intake high, dry, and away from building exhausts and sewer vents
Cooling coil condensate pan	Maintain pan clean with no pooling water, and a properly trapped drain line

a.) ASHRAE Standard 52.2 Minimum Efficiency Reporting Value (MERV)

Remember the four P's: **P**ollutant, **P**athway, **P**ressure and **P**eople. All four of these **P**'s are necessary for an indoor air quality problem. Removal of any one of these will mitigate the problem.

For more information on our IAQ Diagnostic Services or Healthy Building Design Services, please see our web page at <http://www.tee-sf.com> or call us at 415/567-7700.