



2017 - 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.

Air Contaminant Guidelines			
Contaminant	Concentration	VOC Contaminants ^a	Concentration
asbestos fibers	0.01 fibers/cc	acetaldehyde	140 $\mu\text{g}/\text{m}^3$
carbon dioxide	1,000 ppm	benzene	3 $\mu\text{g}/\text{m}^3$
carbon monoxide	9 ppm, < 2 ppm over outdoors	carbon tetrachloride	40 $\mu\text{g}/\text{m}^3$
glass/mineral fibers	0.01 fibers/cc	dichlorobenzene	800 $\mu\text{g}/\text{m}^3$
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	9 $\mu\text{g}/\text{m}^3$
nitrogen dioxide	57 $\mu\text{g}/\text{m}^3$	n-hexane	7,000 $\mu\text{g}/\text{m}^3$
ozone	0.07 ppm	isopropanol	7,000 $\mu\text{g}/\text{m}^3$
particulate matter PM ₁₀ / PM _{2.5}	20 / 12 $\mu\text{g}/\text{m}^3$	tetrachloroethylene	35 $\mu\text{g}/\text{m}^3$
radon	4 pCi/L	toluene	300 $\mu\text{g}/\text{m}^3$
sulfur dioxide	105 $\mu\text{g}/\text{m}^3$	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/m³; mg/m³ = (1000) * $\mu\text{g}/\text{m}^3$

Thermal Comfort Guidelines			
Temperature (°F)	70-74	Vertical Difference (°F)	5.4
Humidity (%)	30-60	Temperature Cycling (°F)	± 2
Air Speed (fpm)	30 - 160	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

Surface Contaminant Guidelines	
Mold Growth - Visible	No visible growth
Carpet Dust - Agitated airborne	1,000 $\mu\text{g}/\text{m}^3$
Glass/Mineral Fibers	13 fibers/in ² < 500 μm , 4 fibers/in ² > 500 μm
Lead - Interior floors - Interior horizontal window surface	50 $\mu\text{g}/\text{ft}^2$ 250 $\mu\text{g}/\text{ft}^2$

Outside Air Ventilation Standards/Codes		
	California Title 24 – Building Code ASHRAE 62-2013	California Title 24 – Energy Code
Offices	5 cfm/occ + 0.06 cfm/ft ²	15 cfm/occ or 0.15 cfm/ft ² whichever is greater
School Classrooms (ages 5 and up)	10 cfm/occ + 0.12 cfm/ft ²	15 cfm/occ or 0.15 cfm/ft ² whichever is greater
Residential	0.03 cfm/ft ² + 7.5 cfm * (# BR + 1)	Refers to California Title 24 – Building Code
<p>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.</p>		

Air Pressure Guidelines	
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	

Ventilation Operations/Maintenance Guidelines	
Air filtration ^a	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.IEE-SF.com> or call us at 415/567-7700.