

Take a Deep Breath

Indoor

Air Quality



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Good Indoor Air Quality (IAQ) is essential to minimizing allergies and asthma, both of which can be the result of poor IAQ. The American Lung Association has determined that asthma and allergies have increased over 74% in the last twenty or more years due in part to inadequate building codes and improper building practices. A proper understanding of building science will prevent respiratory problems and at the same time improve overall building performance, increase energy efficiency and reduce maintenance.

Components/Methods for Construction

Don't use materials that will off-gas Volatile Organic Chemicals (VOCs) in your house/building. Many commonly used products used for wall, roof and floor sheathing off-gas for a very long time. Others do it quickly. Plywood is done off-gassing in thirty days while OSB (Oriented Strand Board) sheathing can take years.

Seal the garage connection. Concentrated carbon monoxide can kill you, but even at low concentrations it will make you very sick. In winter you start your car, back out, and close the door. The CO can leak into the house for the next four to eight hours. No Kidding!

Seal the slab and footing to prevent radon. All buildings—both new and old—need mechanical ventilation. See Dilution below.

Every building that does not have radon venting or a sealed slab could very likely have radon at dangerous levels. So yes, every building should be tested.

Keep it Dry Minimizing moisture will minimize mold growth. At 44% relative humidity mold will become active. Mold is everywhere, we cannot avoid it, but we can prevent it from growing by starving it of food and water. Pests such as dust mites also

thrive in moist areas and it's their feces that can cause allergies and asthma. Proper exterior drainage and drainage plain away from the building is also essential. A 5% slope is the minimum. I know NW Colorado is a dry climate, but I have grown mold here.

Keep it clean Dust can cause allergic reactions that trigger asthma attacks. You must be able to clean around everything. Dust mites thrive if there is food, so don't feed them. Solid surface flooring is the only choice. Carpeting is absolutely the worst floor covering especially on concrete floors below grade level. Area rugs can be cleaned professionally or just hung outside where the sun will kill the bacteria.

Ventilate "Build tight, Ventilate right." This takes some planning in both new and retro construction. On the exterior of the building an appropriate drainage plain keeps the water on the outside of the building and maintains an air barrier. Spot ventilation: bathrooms, kitchens and laundry. Excessive Moisture = Bad. Spot venting uses an exhaust fan located in each room specifically sized for the room and task necessary to evacuate either bad air or moisture. This can be done with one



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centrally located fan or many smaller ones. Dilution (whole house ventilation) and Filtration: Clean Air = Good. A Heat Recovery Ventilator (HRV) or Energy Recovery Ventilator (ERV) will exchange interior air for fresh outdoor air; it preheats the fresh air as it exhausts the stale indoor air. These are sized according to the cubic feet of air in the building. Depending on your system, air filtration is a plus.

Pressure Air pressures created by wind and stack effect are inevitable; taking control of them is essential to IAQ. If we control the amount and/or size of the holes in a building we can control the pressure differences. Vapor barriers are essential in controlling vapor transfer which is a cause and effect of pressure imbalance.

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Toxic Chemicals Containers of cleaning compounds, pesticides, paints and solvents are capable of releasing toxins into the air, which can irritate the respiratory system. These items must be isolated in a sealed cabinet or a ventilated storage facility away from the air-intake to the building.

Each home or building, new or retro, presents unique opportunities. The foregoing are merely guidelines or recommendations. Your specific project should be researched and analyzed by a trained building professional who understands the specific applications of all building materials. Know your products but know the correct installation procedures even better.

Stack effect is the movement of air into and out of buildings and within them through chimneys, flue gas stacks, vent pipes or other containers, and is driven by buoyancy. Buoyancy occurs due to a difference in indoor-to-outdoor air density resulting from temperature and moisture differences. The result is either a positive or negative *buoyancy force*. The greater the thermal difference and the height of the structure, the greater the buoyancy force, and thus the *stack effect*. The *stack effect* is also referred to as the "chimney effect", and it helps drive natural ventilation and infiltration.