



**Gord Cooke**

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# De-Mystifying Indoor Air Quality

What causes IAQ problems and what can you do about it?

**"**C an you test the air in my home?"  
That's the call I get from builders who are looking for certification or validation that the homes they are building

provide a healthy indoor environment. Since there is no definitive quantitative measure for air quality that would satisfy all potential occupants, I tell them that rather than spend thousands of dollars on testing, they should invest in cost-effective construction details, material, and equipment options that have proven to ensure the healthiest possible indoor air quality.

Most people tie "air quality" issues to the outside—air pollution from cars and factories or smog, haze, and ozone; however, the Environmental Protection Agency reports that a growing body of scientific evidence suggests that inside air can actually be more seriously polluted than outdoor air in even the largest and most industrialized cities.

I like to think of it this way: The air in homes originally came from outside, then we breathed in it, cooked in it, and showered in it without really doing anything substantial to improve it.

Also consider:

- We spend more time—as much as 90% of it—indoors all year round. That means nine out of every 10 breaths is of indoor air—much of it from our homes.

- We introduce pollutants into houses via furnishings, cleaning chemicals, and personal hygiene products. There are 4,000 to 6,000 chemicals that may be found in our houses. Plants and pets are also sources of dust, moisture, and odors.

- Our interest in better comfort, lower noise, and greater security reduces the use of windows for natural ventilation.

Compounding these ever-increasing levels of indoor air pollutants is the fact that our homes are tighter than ever as we strive to build energy-efficient structures. Still, air tightness of buildings is not the main reason for increased indoor air quality

concerns; in fact, controlling air leakage is an important element of air quality control because it keeps out unwanted outdoor pollutants such as pollen and fine dust particles and allows HVAC systems to better control the flow of filtered, conditioned air.

## **SIMPLE STRATEGIES**

Fortunately there are simple things that we can do to ensure the healthiest possible air in homes. Most of these fall into one of four important strategies:

### **1. Remove Pollutant Sources.**

- Manage water to avoid mold and dampness. Plan drainage, flashing, grading, capillary breaks, and air sealing to avoid water intrusion.

- Use low- or zero-VOC paints and finishes and choose hard-surface, prefinished flooring.

- Specify solid wood products or, if using engineered wood products such as OSB, MDF, and particleboard, specify products that are tested to show they have low-VOC emissions.

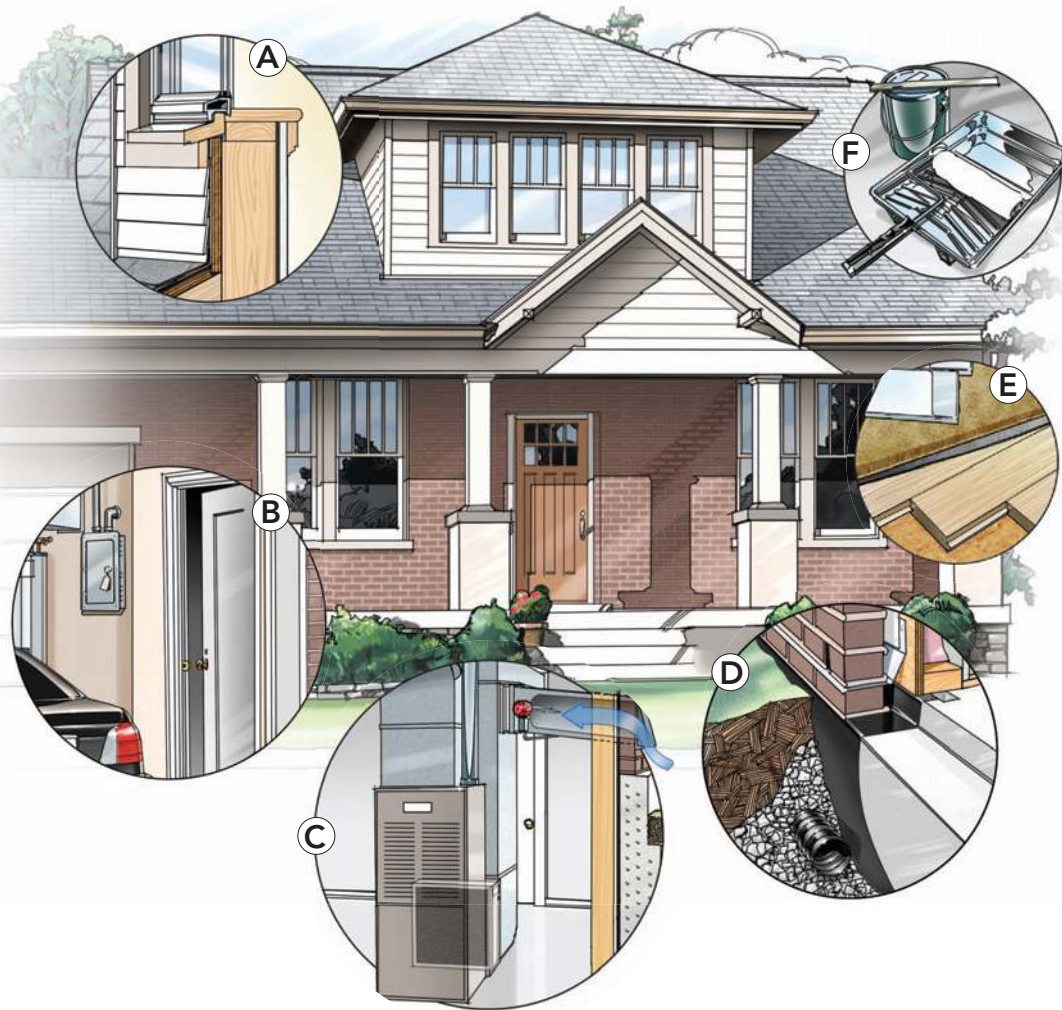
### **2. Seal Out Pollutants.**

- Ensure a very thorough air seal between a house and an attached garage.

- Seal the edges of exposed particleboard cabinetry or trim with a low-VOC acrylic sealer.

- Create an "oasis" for occupants who suffer from respiratory problems, asthma, or allergies. This might entail creating a very "clean" bedroom with its own fresh, filtered air supply.

**3. Ventilate the Space.** All houses need more fresh air. While encouraging homeowners to open windows regularly is helpful, all projects should include provisions for mechanical ventilation. This could be as simple as installing good, quiet, efficient bath fans or a fresh intake into the main air handler return that are controlled by a timer to ensure extended hours of operation each day. The advanced solution is heat- and energy-recovery ventilation technology. These devices include one fan that exhausts stale air and another fan that delivers fresh air to a home. The waste energy from the exhaust air is used to preheat the incoming air in the winter and precool it in the summer.



**FIGURE 1:** FOCUS ON DETAILS

- A Control moisture to prevent mold.
- B Isolate garage from living areas.
- C Install fresh air ventilation and filtration.
- D Keep water away from foundation.
- E Use low-VOC building materials.
- F Use low-VOC paints and finishes.

- Thorough, consistent water management details to ensure buildings don't get wet and that if they do get wet they are able to dry within 48 hours to avoid mold and rot.
- Properly sized HVAC systems to ensure consistent temperatures and humidity levels.
- Effective, efficient ventilation systems that bring in just the right amount of fresh, filtered air.
- Control of unwanted air leakage from outside to reduce dust and pollen entry.
- Effective insulation and better, warmer windows to avoid condensation on surfaces.
- Air handlers with filters with better filtration effectiveness—MERV 8 or better.

**EDUCATE YOUR CUSTOMERS**

To ensure your IAQ steps are effective, it's vital to teach residents simple strategies for maintaining healthy indoor air. Here are a few best practices to pass on:

- Never allow smoking indoors.
- Choose hard-surface flooring; clean floors thoroughly at least once a week.
- Limit the use of chemical cleaners, and choose unscented cleaning and personal hygiene products.
- Keep pets and plants out of sleeping areas.
- Manage indoor humidity and odors by using bathroom and kitchen fans regularly.

By implementing these details and specifications, as well as passing along a few consumer guidelines, building professionals can assure clients they are providing the potential for a healthy indoor environment. As hinted in the introduction, this does not mean you can guarantee air quality or prevent all indoor air quality problems. I like to remind my clients that I am a housing professional and not a health professional. Lifestyle choices and the personal health of occupants is beyond our control but to the extent that indoor air is an important input to our bodies, we can help ensure that air is as clean as possible.

**4. Filter the Air.** Choose better filters for the central air handler. The new MERV (Minimum Efficiency Reporting Value) filter effectiveness measurement scale under ASHRAE Standard 52.2 offers ratings from 1 to 20, with 1 being a simple, fiberglass furnace filter and 20 being a HEPA filter. A good pleated filter with a MERV rating between 8 and 12 is very helpful in removing fine dust from inside air.

These four steps are listed in order of effectiveness. Start with removal strategies first before spending too much time or effort on filtration.

The strategies are recognized and rewarded by certification programs such as LEED for Homes, the ANSI National Green Building Standard, and the new EPA Indoor airPLUS program.

Specification checklists from programs such as these provide a great starting point for building professionals wishing to ensure their clients are provided with the healthiest possible air. At a minimum, appropriate details always include:

- Direct- or power-vented combustion appliances to ensure the safe, effective venting of combustion products directly outside.

**Resources**

For more information, check out these Web sites:

**Energy & Environmental Building Alliance:**  
[www.eeba.org](http://www.eeba.org)

**EPA:**  
[www.epa.gov/indoorairplus](http://www.epa.gov/indoorairplus)

**LEED for Homes:**  
[www.usgbc.org](http://www.usgbc.org)

**NAHB:**  
[www.nahbgreen.org](http://www.nahbgreen.org)