

Top 10 Questions To Ask Your Builder

When Building A New Home

Providing a Foundation for Healthier Indoor Environments.



 **HEALTH HOUSE**[®]

Providing a Foundation for Healthier Indoor Environments.

 **AMERICAN LUNG ASSOCIATION**[®]
of the Upper Midwest

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The American Lung Association of the Upper Midwest[®] and its Health House[®] program do not certify the indoor air quality benefits associated with specific products. Indoor air quality is highly dependent on the techniques and materials used during the construction of the building, the maintenance of the house, and the occupants, as well as the products brought in.

1.

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Do you use a capillary break in the construction of new homes?

It is important to require your builder to use a capillary break in the construction of your new home. A capillary break can be in the form of a granular fill, waterproof coating, rigid insulation, a drainage mat or plastic sheeting. It is used under the foundation slab to prevent water from moving up from the soil into the walls and floors.

In homes built without a capillary break water can move from the footings into walls by capillary suction (similar to a sponge), and is transported through the wall by air convection in the block cores. Moisture can diffuse from the walls into the home, becoming the source of moisture-related problems like mold and wood-rot.

Health House® guidelines require capillary breaks at the following locations:

- Exterior surface of below-grade walls
- Beneath slabs
- Between sill plate and foundation materials (where wood and concrete products connect)
- Between footings and the materials they support (e.g., foundation walls or slabs)



2.

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How will you waterproof my foundation to keep water out of the house?

The primary purpose of the foundation is to provide support and structural integrity to the house. Once that is accomplished, your builder must ensure that the foundation will also keep water out. Damp proofing of basements is not totally reliable for preventing bulk water from entering your foundation wall assembly. As discussed in question one, capillary breaks are one way to keep the moisture out of your home. Specific construction techniques and materials can eliminate moisture from entering the foundation.

Each year billions of dollars are spent on moisture-related problems. The typical cost to a homeowner can run thousands of dollars and it may be difficult to effectively remedy a moisture problem after it is discovered. In addition to cost-savings, investing in proper waterproofing techniques during the construction process provides a healthier indoor environment.



Health House® guidelines require the builder to:

- Slope ground surface away from the foundation by a minimum of six inches in ten feet.
- Provide drainage for rainwater and groundwater.
- Prevent condensation on earth-cooled concrete surfaces by insulating the foundation walls and floors.

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What factors will you consider in selecting, locating, and installing windows in my home?

When selecting windows for your new home, you should choose windows with low potential for condensation. To meet the Health House® guidelines, windows must have a U value less than or equal to 0.40 and a solar heat gain factor (SHGF) less than or equal to 0.45, or must be Energy Star® or NFRC labeled. Single pane windows may be used in climates where outdoor temperatures do not go below 45°F for more than two days a year.

The location of windows in your new home is also important. Daylighting is a technique that uses natural light from the sun and the sky and incorporates it into the home via the windows. Using daylight is free and efficient, which translates to lower energy consumption and utility savings.

When using daylighting, be mindful of the seasons. In the summer, the sun's rays are more intense. To avoid over-heating, window coverings or overhangs should be used to shield from the solar gain. In the winter, the sun moves on a different seasonal path creating less warmth. In cold climates you may want to consider locating more windows on the south side of the home to take advantage of the natural solar affect, and locating fewer on the north facing windows.



Windows must be installed correctly to protect moisture-sensitive materials from rainwater intrusion. To meet the Health House® guidelines, head flashing must be installed over the tops of the windows. Shingled drainage paper must be wrapped into the rough openings on the sides and bottom of the window. Pan flashing, which allows water that penetrates the window, or the window installation, to drain outside of the wall assembly and away from the house, must also be used at the bottom of the windows.

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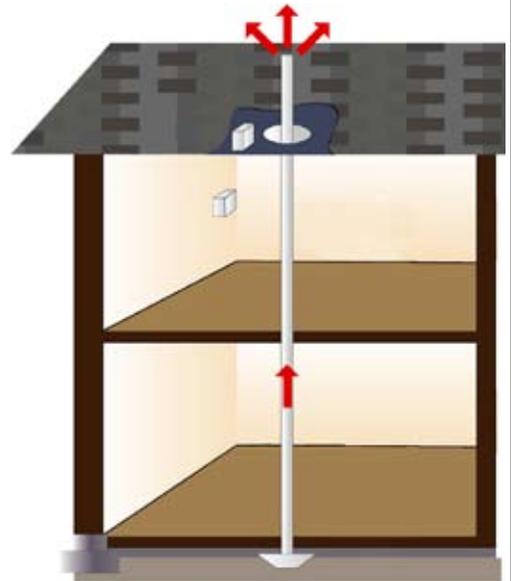
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What do you install in the house to protect my family from radon?

Radon is an odorless, colorless, tasteless gas that is produced by naturally decaying uranium and radium. Uranium and radium are naturally found in soil and rock throughout the world. The amount of radon can vary greatly in every community in the United States, and even in homes in the same neighborhood. Radon gas and its decay products in the air can be breathed into the lungs where they break down further and emit alpha particles. Alpha particles release a small burst of energy, which is absorbed by nearby lung tissue. This results in lung cell damage and can lead to lung cancer.

The Environmental Protection Agency (EPA) estimates that 21,000 lung cancer deaths each year in the United States are attributable to radon, which makes it the second leading cause of lung cancer in the United States, following smoking. Testing is the only way to know if your house has elevated levels of radon.

When building a new home, make sure your builder takes protects your family by following the techniques for Radon Resistant New Construction (RRNC). RRNC should include a sub slab layer of gravel (the gravel below your basement floor) covered with plastic to prevent possible radon gases from entering your home. A vent stack and fan should also be installed during the construction process to safely vent radon and other soil gases above the house. An electrical junction box should also be installed in case an electric venting fan is needed later. It is much less expensive to install the radon protection system while the house is being built than trying to fix it later.



5.

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How will you prevent the dangerous fumes from fuel-fired appliances from reaching my family?

A malfunctioning or poorly vented combustion appliance such as your furnace is a very serious health hazard. Carbon monoxide is a colorless, odorless, tasteless, and toxic gas which is produced as a by-product of combustion processes. When choosing a furnace for your new home, be sure to select a direct vent style. This means all air coming into the appliance comes from the outside, and that exhaust goes directly outside.

You can't see or smell carbon monoxide, but at high levels it can kill. More than 200 people die of carbon monoxide poisoning in the United States every year. The Consumer Products Safety Commission recommends that a carbon monoxide alarm be placed on each level of your home, with a minimum of one near each sleeping area. Carbon monoxide alarms should meet Underwriters Laboratories, Inc. standards, have a long-term warranty, and be easily self-tested and reset to ensure proper operation.



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How will you ensure that my house has proper ventilation?

Ventilation is one of the most critical components to the quality of indoor air. Installing and operating a mechanical ventilation system provides the homeowner with a continuous supply of fresh air. This eliminates reliance on natural weather conditions and leaks in the structure to provide fresh air for the home.

There are three basic ways for mechanical ventilation systems to work: exhaust-only, supply-only, and balance supply and exhaust systems.

Exhaust-only systems can create a strong negative pressure on the home, introducing radon and moisture into the home, so care should be used in determining appropriate applications for these systems.

A **supply-only system** pushes fresh air into the home creating a positive pressure. This forces moisture out of the house and can cause condensation problems inside the wall cavities if used in cold climates with elevated relative humidity. This could be the system of choice in hot humid climates.

A **balanced system** is designed to maintain a neutral pressure inside the home with little pressure difference in the structure. This system will typically recover some of the energy from the exhaust stream as well, and is referred to as a heat recovery ventilation system (HRVS). HRVSs recover any heated or cooled air that is being exhausted and tempers, or cools, the incoming air for energy efficiency.

Another type of mechanical ventilation uses energy recovery. An energy recovery ventilation (ERV) system acts as the lungs for the home providing a continuous supply of fresh, filtered air, while exhausting the stale, contaminated air. In the winter months, the ventilator captures 80% of the heat energy from outgoing air and transfers it to the incoming fresh air before circulating it through the home. This reduces the cost to heat and cool fresh air coming into the home. The ERV system operates on about the same amount of energy as a 100-watt light bulb.

A low-speed continuous ventilation system, with high-speed capability, that will provide a complete air change once every three hours is ideal for indoor air quality. This change rate helps to eliminate any build-up of moisture that can cause mold, mildew and other indoor air quality problems.



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What filtration system do you use in the houses you build?

A great advantage to building your new home is that you have an opportunity to design the filtration system that best meets your needs. Filters are either disposable or reusable and are made from materials such as fiberglass, metal, manmade or natural fibers. Factors that affect filter efficiency include fiber size, fiber density, airflow rate, and particle diameter. Filters that work particularly well are high efficiency filters and electronic filters. A simple method of comparing filter efficiencies is to compare their minimum efficiency reporting value ratings.

Higher MERV ratings indicate a higher efficiency at trapping particles. Health House® guidelines require a minimum MERV rating of 11, or the use of electronic filters.

High efficiency pleated filters have an electrostatic charge that is designed to capture small particles and allergens such as dust, pollen, mold, pet dander and smoke.

These particles can aggravate allergies and asthma, and contribute to dust in your air and on your furniture. It is important to change them on a regular basis.

High Efficiency Particulate Air (HEPA) filters are extended filters that remove sub-micron particles with high efficiency. The filter is composed of very fine sub-micron glass fibers in a matrix of larger fibers. These types of filters are not designed to fit most standard furnaces. They generally need a separate system consisting of a fan and filter. Electronic air cleaners use an electrical field to trap charged particles. Like mechanical filters, they can be installed in central heating and/or cooling system ducts.

When selecting a filter, remember that efficiency will change over time. As filters become loaded with particles, the available openings for air to flow through become smaller. The result is better filtration but less air movement, causing your furnace to work harder to move air through the system. These filters need to be replaced on a regular basis, following manufacturer's instructions, to insure proper airflow. As for electronic air cleaners, they are most efficient when first installed, and lose their efficiency as they get dirty. Regular maintenance and cleaning according to product manufacturer's instructions are required to keep these operating at peak efficiencies.



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What types of furnishes and finishes do you use in your houses?

How you finish and furnish your home can greatly affect the quality of your indoor environment. Making interior selections can be challenging if you are sensitive to the chemicals used in the production and preservation process of materials. Consider selecting products that are environmentally friendly, easy to clean and low in volatile organic compounds (VOC).

PAINT - When choosing paint, consider that all paints release trace amounts of gases that may cause upper respiratory irritation to the occupants for months following application. For this reason, selecting a no or low VOC paint can reduce the amount of chemical emissions introduced into the house environment.

SMOOTH SURFACE FLOORS - The healthiest homes have smooth surfaces, such as tile, linoleum and wood which do not harbor dust and other allergy-causing particles like thicker, denser floor coverings. For resource efficiency, consider installing hardwood harvested from a sustainable source, or look for wood flooring that has been salvaged from an old building or home. Many times, the wood is sold re-sawn and ready to use.

CARPET - Minimal use of carpet is recommended by the Health House® guidelines for comfort and aesthetic reasons.

New carpet can emit VOCs when first installed. For this reason, it is recommended that you purchase your carpet well in advance of the installation. Unroll the carpet in a well-ventilated area for at least 24 hours to allow it to off-gas the VOCs. Once installed, it must be vacuumed frequently as it becomes a collector of dust mites and other allergens. If you do select carpet for your home, choose low pile, and install it with urethane padding. Also, carpet should never be applied to a concrete slab unless provisions for a moisture/vapor retarder or insulation have been incorporated in the slab that will allow the carpet to remain warm and dry.

Carpet products can be used if they meet the following criteria:

- Carpet Rug Institute (CRI) IAQ label
- No wall-to-wall carpet in bathrooms, kitchens, utility rooms, basements or entryways
- Use 100% nylon yarn system, polyester or wool pile
- Greater than or equal to 100 stitches per square inch
- Gauge: 12 or higher
- Nap height: less than 0.5 inch

Correct carpet installation uses the following techniques:

- Use tack strips to lay down carpet (no glues) or a factory supplied non-wet, low VOC adhesive.
- Carpet seams should be permanently and chemically welded.
- Particleboard underlayment or other urea-formaldehyde wood products are not to be used under carpets.
- If a carpet product with any type of vinyl backing is laid over concrete, the slab must be tested to ensure that the moisture content and the alkalinity of the concrete meets the product manufacturer's specifications. (This applies to any flooring applied to concrete.)
- If carpet is installed, a central vacuum system should be installed and vented to the outdoors. (The system can be exhausted to the home's interior if the air is HEPA filtered.)



9.

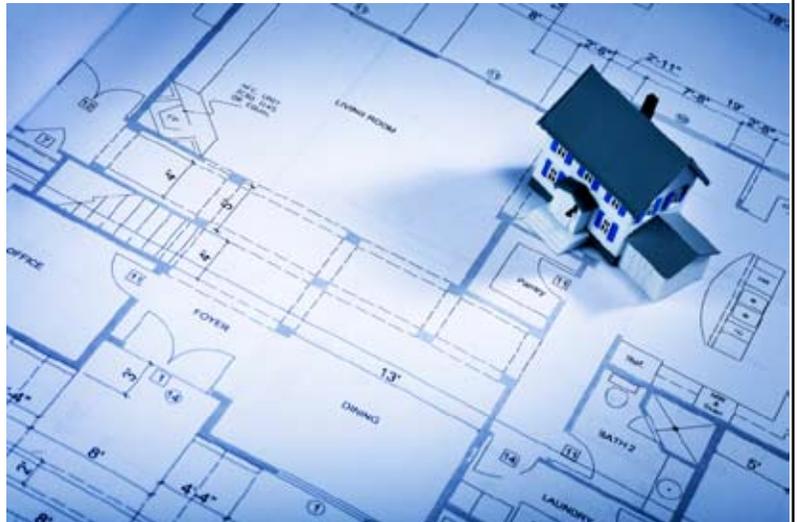
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What techniques do you use that work in concert with tight construction?

A home built to Health House® guidelines is constructed airtight to improve energy efficiency and prevent unplanned moisture movement. Although many stories in the media attribute indoor air quality problems to houses being built too tightly, the reality is that homes need to be as tight as practical. Air leaking into and out of homes has created many of the problems. Moist air leaking out in cold weather can condense on wall and attic surfaces, creating mold growth and in some cases structural decay. This is a direct result of the home not being tight enough. Moist air leaking into a home in hot humid weather can have the same effect on finished surfaces of walls. Air leaking into a home from an attached garage has been shown to be a significant source of Carbon Monoxide in homes.



10.

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Does building a Health House cost more?

Construction of a Health House home costs 3-5% more than traditional construction techniques. However, building to the Health House Guidelines can actually save you money through a reduction in your utility bills, ranging from 30-40% per year. Building to these guidelines can actually increase your monthly cash flow. Because these homes are built to such strict standards, your home qualifies for energy efficient mortgage programs, which can increase your purchasing power.

