

Healthy Home Building Guidelines for Developers and Contractors

The Asthma-Housing Connection: Asthma is a respiratory disease that is provoked by “triggers” in the indoor environment. These triggers can be reduced by good construction and maintenance practices. Common triggers include mold, dust mites, pests. The Boston Urban Asthma Coalition (BUAC) has prepared the following best practices recommendations for Developers and Contractors who would like to build “Healthy” housing. BUAC has identified these practices through literature review and input from members as well as from health and industry experts. Following these recommendations can not guarantee a healthy indoor environment; however, BUAC believes that they will help to minimize potential health-related problems for people with asthma.

To build healthy housing, steps must be taken beyond what is required in the current building code. This paper is divided into two sections: **strongly** recommended and **additional** recommendations.

The following steps are **strongly** recommended:

* The Boston Urban Asthma Coalition recommends that all Developers and Contractors comply with the Environmental Protection Agency’s performance guidelines for energy-efficiency, the ENERGY STAR Homes Program. More information is available at www.energystarhomes.com.*

Control moisture to prevent mold growth

1. Insulate all water piping. *This will reduce condensation.*
2. Do not put plumbing in exterior walls. *It is easier to detect and repair leaks in interior walls.*
3. Provide adequate storage space. *Storage in damp basements can lead to mold growth. If storage space is only available in the basement, provide shelving to keep items off the floor.*
4. Install hot water heaters and clothes washer in rooms with pans, drains and floor coverings that will not absorb water. Install shut-off valves for clothes washers and hot water heaters. *These precautions will minimize damage from leaks.*
5. Apply window and door pan flashing and corner patches over sheathing wrap or building paper at sill. *Flashing helps directs water away from wall cavities and to exterior.*
6. Ensure all exterior claddings and trim are backprimed. *Backpriming helps prevent wood clapboard from absorbing moisture and makes the sheathing wrap or building paper more effective.*
7. Install properly lapped sheathing wrap or building paper between the cladding and wall sheathing. *Sheathing wrap or building paper provides resistance to water that gets behind cladding, and it must be properly lapped to direct water away from the building.* Separating the cladding from the sheathing paper with furring (rain screen), or using a wrinkled or textured sheathing wrap also help.
8. Do not use gypsum board with paper facing – of any color – in moisture prone areas such as bathrooms and basements. Instead use a board with fiberglass- faced gypsum wallboard (such as Dens-armor) or cement board (such as Durock). *Paper facings support mold growth.*
9. Provide adequate drainage for the basement and grade site and install gutters/downspouts to move water away from the home. Crushed stone and/or gravel should be placed under basement slab floors. Avoid construction below the water table as this will necessitate extensive water control and drainage measures. *Effective groundwater management is one of the most important factors in controlling moisture and humidity in the building. Basements are defined as spaces that have the potential to be occupied.*
10. DO NOT put living quarters, or permit occupancy in basements that do not have adequate drainage and water management and site grading. Foundation walls in occupied basements must be properly insulated (see below) *For healthy indoor environments it is critical that residents not be subject to the hazards of damp basements.*
11. Install continuous rigid foam insulation under concrete floor slabs or above concrete floor slabs coupled with a floating floor. Do not use basement ceiling insulation. Instead, insulate basements at their perimeters. Insulate the wall assemblies with semi-vapor permeable foam (e.g., rigid foam). Foundation insulation should not include a polyethylene vapor barrier; 1" or more of extruded

rigid polystyrene foam or 2" of high-density sprayed urethane foam meets the vapor retarder requirement in the code. *This will minimize movement of moisture inside; allow moisture below grade to dry out; help keep space comfortable and reduces condensation. Note there is a discrepancy between how building inspectors enforce this section of the code and what the code requires. If there is a problem, please let us know.*

12. Install a capillary break on top of footing, between footing and perimeter foundation wall. *This helps minimize movement of moisture from the ground to building assemblies.*
13. Provide outlets for window air conditioners in bedrooms and living rooms, and outlets in basements for dehumidifiers. *Air conditioners will decrease the need for open windows and can reduce the indoor humidity level. Dehumidifiers in basements help with moisture control.*

Manage dust

14. Do not install carpet—except where required for safety purposes. Instead use a smooth, easy to clean surface such as wood or natural linoleum. *Carpets can trap dust and moisture and become a breeding ground for mold and dust mites.*
15. Maximize wipeable surfaces. Use semi-gloss paint that can withstand cleaning. Install wipeable window shades. *Smooth cleanable surfaces are easier to clean and will reduce the amount of dust in the home.*

Ventilate home to keep it free of combustion products and toxins

16. Provide continuous mechanical background ventilation (supply or exhaust) at a rate of 7.5 CFM per person plus 0.1 CFM per square feet of living space (as indicated in ASHRAE standard 62.2). This can be accomplished through a bathroom fan with proper timer or speed controls. *Mechanical background ventilation is essential to assure adequate fresh air and dilution of general indoor contaminants.*
17. Install quiet bath and kitchen fans (less than 1 sone) directly vented to the outdoors. In addition, provide exhaust venting to the outdoors for other moisture-generating appliances including dryers. *Point source exhaust is needed to remove moisture and harmful fumes from known sources such as cooking, washing and combustion appliances. (Building code requires dryers to be vented outdoors.)*
18. Paint walls with water based paints with low volatile organic compounds (VOC's) and complete all painting before occupants move in. *VOC's are harmful to health and should be minimized.*

Additional recommendations:

19. Keep bushes and trees at least 3 feet from the home. *Bushes and trees near a home provide food, a living place, and sheltered passage for pests such as mice, ants and roaches.*
20. Install a high efficiency heating system and forced air systems with sufficient air filtration. *Air systems can contribute to airborne dust if proper filtration techniques are not incorporated.*
21. Install Energy Star qualified windows. *Energy efficient windows have lower condensation potential than less energy efficient windows.*
22. Reduce fossil fuel emissions by installing energy efficient HVAC equipment, lighting and appliances. *In addition to reducing energy costs, energy efficient equipment can help to reduce summer cooling loads.*
23. Install an electric oven/range instead of gas. If a gas range is installed, be sure to vent it to the outside. *This will reduce potential harmful nitrogen dioxide and carbon monoxide emissions.*
24. Install a walk off system at principal entrances by allowing space for a mat or shared lobby with space for a doormat. *2/3 of indoor dust is tracked in from the outside.*

Adapted from Asthma Regional Council's Building Guidance for Healthy Homes and the Boston Public Health Commission's Affordable Health House Design Guidelines and developed in collaboration with Greater Four Corners Action Coalition and Dorchester Housing Action Team.

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