

Health Protections and Opportunities During Energy Upgrades

Health Protections (Don't Make it Worse)	Low-Cost Health Improvements	Added Opportunities for Health Improvements
Keep it Dry		
<ul style="list-style-type: none"> ➤ Repair leaks to areas that will be insulated. If the moisture issues can be solved by remedies in the Low-Cost Health Improvements column, proceed in conjunction with the moisture interventions. ➤ If the moisture issues cannot be solved by the repairs in Minimum Health Improvements, then: <ul style="list-style-type: none"> ○ If the moisture issue will lead to or aggravate high indoor humidity problems: do not air seal, replace atmospherically vented equipment with high efficiency units or otherwise lower the air infiltration rate. For example, homes that have significant condensation/humidity problems (e.g., condensation on multiple windows, condensation in attics or significant moisture/mold whose remediation is beyond the scope of items in the Minimum column would fall into this category). ○ If there are plumbing leaks or 	<ul style="list-style-type: none"> ➤ Wet attics: <ul style="list-style-type: none"> ○ Repair minor roof leaks prior to attic insulation or air sealing. ○ Prevent condensation or ice dam problems by air sealing between the ceiling between the house and attic. ○ Address indoor humidity sources that are causing attic condensation (see humidity source remedies below) ➤ Exterior water: <ul style="list-style-type: none"> ○ Prior to insulating basement or crawl space walls near wet areas address surface water pooling by the foundation by repairing, modifying or replacing gutters and down spouts; or through grading and subsurface drainage at critical locations (e.g. localized drain and grading beneath valleys) ➤ Interior humidity or condensation: <ul style="list-style-type: none"> ○ Cover exposed earth in basement or crawlspaces with vapor barrier material. ○ Provide dehumidification to address high humidity and condensation problems (e.g. adding whole house ventilation to meet ASHRAE 62.2 	<p>Address more significant moisture damage, condensation, rainwater and plumbing leaks.. Some examples:</p> <ul style="list-style-type: none"> ○ If roofing is at the end of its life add significantly more insulation to the exterior of the roof as part of the reroofing job. ○ If basements or crawlspaces have serious liquid water problems, install exterior or interior drainage along with insulation and air barrier systems on the exterior or interior of the foundation walls. ○ If carpet was wet and smells musty, replace. If carpet is installed, use Green Label Plus carpet or smooth and cleanable flooring.

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<p>rainwater leaks in wall cavities or attics or ceiling cavities whose repair is beyond the Minimum column level, do not insulate these areas using porous insulation. The leaky/moldy areas can be altered to allow them to dry faster and make them more resistant to mold growth.</p>	<p>Appendix C, improving the dehumidification performance of the air conditioning system or adding an Energystar rated dehumidifier to the basement, crawlspace or air conditioning system).</p> <ul style="list-style-type: none"> ○ Warm cold surfaces by adding vapor barriers and insulation between the cold surfaces and the warm-humid air to prevent condensation ○ Install or repair exterior exhausted Energy Star bath fans to address bathroom fans. <p>➤ Add pan and header flashing to all window & exterior door replacements.</p> <p>➤</p>	
Keep it Ventilated		
<p>➤ Install additional ventilation measures necessary to meet ASHRAE 62.2 requirements, using Appendix C – Existing Buildings to account for existing fans and windows.</p>	<p>➤ Replace or install exterior vented bath fans meeting ASHRAE 62.2.</p> <p>➤ Existing or newly installed central forced-air HVAC system(s) have minimum MERV 8 filter, no filter bypass, & no ozone generators.</p> <p>➤ Ensure that all clothes dryers exhaust to the outside.</p>	<p>➤ Retrofit/commission to meet whole house ventilation standards of ASHRAE Std 62.2, Appendix C (existing homes)</p> <p>➤ If gas range, install exterior venting range hood.</p>

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Avoid Contaminants		
<ul style="list-style-type: none"> ➤ Test for radon pre and post work to ensure work does not increase radon levels above 4 pCi/L. If work increases levels above 4 pCi/L install radon control system meeting ASTM 2121 criterion. 	<ul style="list-style-type: none"> ➤ Install air-tight sump covers. ➤ Cover exposed ground, including basement floors and crawl spaces per Section 1.2 of EPA Indoor airPlus ➤ If an existing radon control system is not working (levels > 4 pCi/L), repair system. 	<ul style="list-style-type: none"> ➤ If radon levels exceed 4 pCi/L, install radon control system meeting ASTM 2121.
<ul style="list-style-type: none"> ➤ Comply with EPA's Lead, Renovation, Repair and Painting Program Rule (i.e., work disturbing >6ft² interior paint or 20ft² exterior paint use a Certified Renovator & follow lead-safe work practices). 	<ul style="list-style-type: none"> ➤ Follow lead safe work practices for all projects in pre-1978 homes that disturb potential lead-based paint. 	<ul style="list-style-type: none"> ➤ Repair deteriorated paint in pre-1978 with lead safe work practices and conduct dust clearance testing with certified lead professionals.
<ul style="list-style-type: none"> ➤ Follow BPI Energy Audit Section 7 to assess carbon monoxide (CO) exposures. ➤ Air seal attached garages to prevent entry of CO and volatile substances into living areas (e.g., weatherstrip doors, seal penetrations, seal rim joists, seal duct work and air handlers in the garage). Specify CO alarms in homes with attached garages. (BPI 8.3) 	<ul style="list-style-type: none"> ➤ Install CO alarms outside sleeping areas. ➤ All newly installed heating/cooling or hot water combustion equipment is sealed combustion. ➤ Remove unvented gas or kerosene space heaters. ➤ Provide warnings to occupants using vent-free fireplaces that such systems are not designed for primary heating. 	<p>If HVAC units are in the garage, look for opportunities to relocate outside of the garage.</p>
<ul style="list-style-type: none"> ➤ Do not disturb vermiculite or asbestos containing insulation or materials. 	<ul style="list-style-type: none"> ➤ If asbestos is damage, repair or remove following applicable standards. ➤ Recommend removal of ozone generating air purifiers. 	<ul style="list-style-type: none"> ➤ New pressed wood products, specify compliance with California Air Resources Board's low-formaldehyde standards ➤ If replacing flooring use low VOC

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	<ul style="list-style-type: none"> ➤ Ensure certified low-VOC or no-VOC interior paints/finishes and flooring are used when such activities occur. ➤ Remove ozone generating air purifiers. 	options as specified by EPA Indoor Air Plus or LEED for Homes.
	<ul style="list-style-type: none"> ➤ Recommend No Smoking indoors and adoption in multi family housing of Smoke Free policy. 	<ul style="list-style-type: none"> ➤ Adopt Smoke Free policy in multi family housing.
	Keep it Clean	
	<ul style="list-style-type: none"> ➤ Install walk off mats or grates. ➤ Provide sealable garbage cans. 	<ul style="list-style-type: none"> ➤ Remove and replace worn carpets with low VOC resilient flooring.
Keep it Pest Free		
	<ul style="list-style-type: none"> ➤ Patch exterior holes using pest resistant materials (e.g. copper mesh or caulk. Apply boric acid or gels in holes for roach issues. 	<ul style="list-style-type: none"> ➤ Install air-tight sump covers (also addresses radon).
Keep it Safe		
	<ul style="list-style-type: none"> ➤ Test/install working smoke alarms. ➤ Install LED nightlights. ➤ Remove rugs and other trip hazards. ➤ Replace knob and tube wiring. ➤ Safety store harmful household chemicals (e.g., remove from accessible locations) 	<ul style="list-style-type: none"> ➤ Install fire extinguishers. ➤ Install banisters, grab bars, ensure good lighting for stairs to minimize trip and fall hazards in homes with elderly or at risk occupants ➤ If young children present, childproof.
Maintain the Home		
	<ul style="list-style-type: none"> ➤ Educate residents about preventing indoor environmental problems. 	