



Property Maintenance for a Healthy Home

***Acknowledgement:** This document was developed by ERT Associates and ICF Consulting for the Asthma Regional Council. Some information in this guide was taken from “Read This Before You Turn Over A Unit,” a pamphlet developed by Building Science Corporation. This guide supplements and provides additional tools to the information in that pamphlet. Special appreciation is provided to Affordable Comfort, Inc for its input.*

This guide introduces property maintenance practices, particularly for multi-family housing properties, which improves or maintains a healthy home environment. After a brief overview, tools and resources are provided to assist property owners and managers, maintenance staff supervisors, and affordable housing program staff implement these maintenance practices.

Benefits of Good Maintenance Practices

All buildings require maintenance. Doing it right can benefit both the owner/manager and the residents.

- **Increase Durability.** Homes with health risks to occupants often have conditions that can accelerate wear and tear on systems (e.g., heating and cooling) and cause structural damage (e.g., wood rot, mold).
- **Reduce Cost.** Replacing or fixing systems and components cost money. Small problems that are not corrected quickly can cause expensive problems in the future (e.g., small water leaks can cause big mold and rotting problems).
- **Improve Resident Health.** Home conditions can both cause and trigger asthma and allergies. How a unit is turned over and maintained has significant effects on the control of asthma triggers and other indoor and outdoor contaminants.
- **Reduce Liability.** A failure to adequately address lead-based paint hazards, excess mold or moisture, and other environmental hazards is increasingly the subject of legal action. Adopting maintenance practices that address potential health hazards can reduce the likelihood of lawsuits and code violations.

Eight Steps to a Healthy Home

There are eight steps to a healthy home. Conduct maintenance to achieve each step.

1. **Dry.** Water is a precondition for mold, insects, rodents, and dust mites all of which are linked with asthma. Water is also the most important factor affecting durability of a home and maintenance costs.

2. **Cleanable.** It is inevitable that a home will have some dust. The goal of a healthy home is to minimize dust brought into the home and to make it easier to clean and remove dust and allergens.
3. **Well Ventilated.** Ventilation provides a mechanism to remove air contaminants and reduce dust allergens.
4. **Lead Safe.** In homes built before 1978, deteriorating lead-based paint creates lead hazards in the dust and soil.
5. **Combustion Product Free.** Combustion products such as carbon monoxide can cause severe health problems.
6. **Toxic Chemical Free.** Toxic cleaning compounds, pesticides, oil- or alkyd-based paints and solvents can lead to poor indoor air quality.
7. **Pest Free.** Pests can cause allergic reactions associated with asthma. Pest problems also encourage the use of pesticides. Controlling water, holes, and providing tight food storage help minimize pests.
8. **Comfortable.** Uncomfortable homes can make people take action that makes a home unhealthy. For example, a resident without working air-conditioning may open a window, allowing pollen to enter the home.

Opportunities to Identify Problems and Perform Maintenance

In a multi-family housing property, there are usually several types of opportunities to examine a unit for conditions that need attention and to perform maintenance.

- **Resident request.** When a resident notifies the manager of a maintenance problem with the unit, such as a leaking water pipe, an appliance that is not working properly, or a pest problem.
- **Unit turnover.** When cleaning and preparing a unit for a new resident.
- **Upgrades or replacement.** When the manager is upgrading or replacing an appliance or feature in several units at the same time, such as installing several new window unit air conditioners.
- **Code Inspection.** When a local code inspector is in a unit looking for code violations.

When inside the housing unit during these opportunities, identify and correct maintenance problems taking into consideration the eight steps described above. This will result in a healthier home for the residents and will have long-term benefits for the property owners and manager.

Residents Have a Role in Good Maintenance

Since the property manager only has access to a unit on limited occasions, the residents also have a role to play in maintaining a healthy home environment. Encourage residents to:

- **Report maintenance problems immediately.** You can't fix it, if you don't know there is a problem. Make sure to be responsive to maintenance complaints.

- **Use walk off-mats.** Either those provided in common areas, or personal mats inside the unit to collect dust from outside.
- **Use bathroom and kitchen fans.** Fans remove moisture and odors; install quiet and durable fans on timers.
- **Maintain smoke alarms.** Remind residents not to disconnect smoke alarms.
- **Avoid or properly use and store pesticides and toxic chemicals.**

Tools and Resources

Use these tools and resources to help your program or property incorporate maintenance practices that will lead to healthier homes.

- **Checklist:** Use this checklist when you turn over a unit, or add items from this to an existing checklist to ensure you consider all eight steps to a healthy home.
- **Maintenance Solution.** Use this chart to consider appropriate options for fixing a problem, or to ensure that you have identified the root cause of a problem, not just a symptom.
- **Sample Work Orders.** Sample work order and specifications for window maintenance and lead-based paint hazards can help ensure that these common maintenance activities are performed effectively.
- **Resource List.** Other resource with healthy homes information and materials.

Healthy Homes Maintenance Checklist

Name of Inspector: _____ Date: _____

Property Name and Address: _____

1. Moisture

Check these locations for water stains and wet spots:

	Checked	Problem Detected
• Under windows and doors, including sliding doors	_____	_____
• Under sinks and dishwasher	_____	_____
• Around toilets, tubs, and showers	_____	_____
• Around washing machine connections	_____	_____
• In crawl spaces and attic	_____	_____
• On baseboards touching basements/floors	_____	_____
• Near missing or moldy exterior siding	_____	_____

Actions Taken: _____

Also check for:

	Checked	Problem Detected
• Wet or moldy paper products stored below grade	_____	_____
• Moisture attracting storage shelves – particle board	_____	_____
• No insulation on cold water pipes (leads to condensation)	_____	_____
• Clogged gutters and downspouts	_____	_____
• Washing machine hose connections not fully intact	_____	_____
• Dryer vents to exterior not present or not functional	_____	_____
• Dryer pan under refrigerator soiled or moldy	_____	_____

Actions Taken: _____

2. Cleanable Surfaces

Check for dust, debris, mold, and conditions that make it difficult to effectively clean a surface:

	Checked	Problem Detected
• Dust and debris from repairs has been removed	_____	_____
• Unit has system to remove tracked-in dust (e.g., walk-off mat, grate)	_____	_____
• Carpet is not old, worn, or dusty	_____	_____
• Crawl spaces and attic are clear of debris	_____	_____
• Damage to tile surfaces, floor coverings, and wood floors with gaps that make it difficult to clean, or which collect dust	_____	_____

Actions Taken: _____

3. Ventilation

Check for adequate ventilation:

	Checked	Problem Detected
• HVAC filter is proper size and efficiency	_____	_____
• HVAC filter replaced within six months, rated At least MERV 9	_____	_____
• Fans in bath and kitchen work and exhaust outside	_____	_____
• Exhaust ducts are clear	_____	_____
• Good air flow to all rooms	_____	_____

Actions Taken: _____

4. Lead Safe

In homes built before 1978, check for conditions that pose a likely hazard if lead-based paint is present:

	Checked	Problem Detected
• Deteriorating and peeling paint, especially around windows and friction surfaces	_____	_____
• Damage to painted surfaces	_____	_____

Actions Taken: _____

5. Combustion Safety

Check for hazards related to combustion safety:

	Checked	Problem Detected
• All gas and oil fired appliances received maintenance check within the last six months	_____	_____
• Exhaust ducts and flues are clear	_____	_____
• Smoke alarms work properly	_____	_____
• Carbon monoxide detector(s) working properly	_____	_____

Actions Taken: _____

6. Pests

Check for the presence of insects and rodents:

	Checked	Problem Detected
• Evidence of insects or rodent droppings	_____	_____
• Holes for insect or rodent entry into the building	_____	_____

Actions Taken: _____

7. Toxic Chemicals

Check for toxic chemicals:

	Checked	Problem Detected
• Toxic chemicals stored in the unit (e.g., pesticides, oil- or alkyd-based paints, and solvents)	_____	_____
• Old chemical cleaners under sink or in storage	_____	_____
• Chemical odors in the unit	_____	_____

Actions Taken: _____

8. Comfort

Check for amenities contributing to comfort:

	Checked	Problem Detected
• Working blinds to shield the interior from sunlight	_____	_____
• Working screen/storm windows	_____	_____
• Working windows	_____	_____
• Working heating and air-conditioning	_____	_____

Actions Taken: _____

Sample Work Order

Window Maintenance

Approximate labor time:

3 hours (not including set-up or final cleanup)

Material list

- Inside stop and compression track
- or*
- Inside stop with weatherstripping
- Glazing and glazing points
- Glass as necessary
- Sash chain
- Linseed oil sealer, linseed oil primer and latex topcoat
- Wood filler
- Epoxy, epoxy primer
- Caulk and backer rod
- Wood glue and syringe

- Remove inside stop and lower parting bead
- Bring sash to dust room
- Remove damaged glass
- Remove weak glazing
- Remove exterior paint and loose interior paint
- Glue, pin, and/or epoxy corners as necessary
- Finish sand
- (Pre prime if necessary)
- Prime
- Reglaze into bed of glazing
- Double top coat

- Wet scrap and sand exterior jamb and top sash
- Close-up, seal, and block up top sash
- Caulk, fill, and epoxy jamb and still as necessary
- Remove damaged all paint
- Prepare inside stool (remove paint from nose)
- Pre prime, prime, double topcoat
- Attach bottom sash to counterweights
- Reinstall sash in compression track
- or*
- Install weatherstripped inside stop
- Install sash lock and window lift

Work Criteria, Site Set-up, Sample Specification and Work Order

Specifications are designed for low and moderate income housing. Choices should be weighted against current market practices and prices. Costs may rise above the market but this increase must be small and the extra effort justifiable. For example "it will last three times as long" or "making your rental property mold and lead safe will help protect you from litigation."

1. Protecting the occupants - masking, containment, isolation and occupancy
2. Protecting the workers -health and safety (particularly respiratory protection)
3. Site set up- clean up, work area / occupant separation, dust room, scheduling in occupied units etc.

Each work protocol will be chosen taking into account five criteria (somewhat in the order of priority):

1. Immediate and long-term occupant health and safety
2. Life cycle cost of installation or repair including projected energy-saving and maintenance costs
3. Up-front labor and material cost
4. Green and sustainable?
5. Historic preservation

This is a sample specification and work order using a double-window as an example. To lower cost this spec fixes the top sash in-place. The top sash is usually already painted shut. Making it operative is relatively expensive. It is recommended at least one sash on each floor be made operative for effective ventilation. (This may include the installation of an effective window fan).

Double Hung Wood Window Maintenance Specification

- Remove and discard inside stop.
- Remove and discard parting bead below top sash.
- Remove and number bottom sash (pin counterweight chain so it remains accessible)

Sash prep in dust room

- Remove and retain hardware.
- If needed remove glass and scrape rabbet clean
- Remove paint on exterior face of sash. Start with a hand scraper (mist surface as you work) to remove bulk of loose paint, locate and remove nails.
- The remaining paint can be removed with a planer or random orbital sander attached to a high efficiency vacuum.
- On exterior face of sash remove most of paint. Sound interior paint can be sanded but its probably worth it to remove interior paint as well
- If there is no rot- fill corner joints with using glue syringe
- If there is minor damage at corners - run glued through stiles into rail
- If there is sever rot at corners – open joint, remove rot to bright wood (use die grinder) Fill with epoxy system designed for doors and windows (use primer not consolodent system)
- Do not compress. A sheet of plywood with edge guides set to the exact size of the sashes helps maintain consistent to the sash. (Cutting off the plywood's corners allows you to work where the rail and stile meet.
- Sand once glue, and/or epoxy is cured
- Where glass is removed, reinstall it in a bed of elastomeric glazing compound.
- Secure glass with glazier points.
- Glaze and let cure overnight.
- Where wood face is severely weathered remove damaged surface and pre prime sash with boiled linseed oil cut %50 with paint thinner plus 1 bottle of mildewcide per gallon
- Prime using a top-grade linseed oil based primer
- Top coat sash using a compatible latex topcoat. Let cure overnight.
- Apply second coat. Let cure overnight.
- Reinstall sash-lift hardware on bottom rail of bottom sash.

Exterior Jamb and top sash

- Mechanically strip most paint on the exterior jamb sill and top fixed-in-place top sash. Use hand scrapers (power tools may be used if attached to a high efficiency vacuum). If rotary tool is used, take care not to tear wood grain.
- Using die-grinder, remove decayed, soft and weathered wood, from jamb and sill.

- Using a high-grade exterior wood filler or epoxy system fill missing wood to flush. Let cure overnight, then sand.
- Where necessary, replace counterweight compartment access panel.
- Where necessary, open access panels to reattach existing or install replacement sash chain on counter weights. Use correct test copper sash chain.
- Mechanically strip all paint from inside stool. This may include planning the stool nose to make it lead free.

Sash installation

- If top sash is operable (not painted shut) push up tight against backer rod inserted on top rail and fix in place with brass round head screws through horns of top sash or blocks of wood pressed tight against bottom edge of top sash stiles. Make sure screw heads remain clearly visible.
- Press 3/8" Soft Rod backer rod into edge gaps of top sash using screen spine gasket roller.
- Check bottom sash's contact with meeting rail of top sash and contact with sill. Install high quality bulb weatherstripping as necessary.
- Reinstall pre painted parting bead
- Reinstall bottom sash on counterweight system.
- Install new inside stop routed to containing nylon-pile weatherstripping. (Use spacers between stop and sash to assure ease in opening and closing). Or install bottom sash in vinyl compression track. (may need to cut double track in half) This works with, not instead of, the weatherstripping
- Install new sash lock and window lifts.
- Adjust as necessary.

Source: Community Resources, July 31/02

Essential Maintenance Practices for Property Owners

Developed by The Alliance to End Childhood Lead Poisoning. Available at the AECLP web site:
<http://www.aeclp.org/>

In 1995 a broad-based national task force chartered by Congress reached almost unanimous consensus on recommendations for controlling lead-based paint hazards in private housing. As part of its comprehensive recommendations, *Putting the Pieces Together: Controlling Lead Hazards in the Nation's Housing* (July 1995), the Task Force on Lead-Based Paint Hazard Reduction and Financing called for the following six Essential Maintenance Practices by owners of pre-1978 rental properties that may contain lead-based paint. These Essential Maintenance Practices are relatively inexpensive initial steps property owners need to take to reduce the chances that hazards will develop, avoid the inadvertent creation of hazards, and provide an early warning system to alert owners to deteriorating paint. Copies of *Putting the Pieces Together: Controlling Lead Hazards in the Nation's Housing* can be obtained by visiting the U.S. Department of Housing and Urban Development's website at: <http://www.hud.gov/lea/leadwnlo.html> or by calling 800-424-LEAD.

It is important to understand that Essential Maintenance Practices are a "floor" not a "ceiling," as these practices were not designed to control lead hazards in units that are judged to be higher risk based on their age or condition (e.g., construction before 1950, extensive deteriorated paint, deferred maintenance, etc.). Following Essential Maintenance Practices, owners of multi-family rental properties and those that may pose higher risks because of age, condition, or other factors should consider having a certified risk assessor develop a Lead Hazard Control Plan. (Practice #4 below relates to the lead hazard notification and disclosure requirements which took effect in the fall of 1996 pursuant to federal regulations.)

Essential Maintenance Practices for Property Owners

1. Use safe work practices during work that disturbs paint that may contain lead to avoid creating lead-based paint hazards.

- Do not use unsafe paint removal practices, including:
 - Open flame burning;
 - Power sanding or sandblasting (unless a special vacuum attachment is used to contain dust);
 - Water blasting; and
 - Dry scraping more than a *de minimis* surface area (for example, more than one square foot per room).
- Use good work practices and take precautions to prevent the spread of lead dust (for example, limit access to the work area only to workers; cover the work area with six mil polyethylene plastic or equivalent; protect workers; protect occupants' belongings by covering or removing from the work area; wet painted surfaces before disturbing; and wet debris before sweeping).
- Perform specialized cleaning of the work area upon completion of work using methods

designed to remove lead-contaminated dust.

2. Perform visual examinations for deteriorating paint (unless the paint is found not to be LBP):

- At unit turnover; *and*
- Every 12 months (unless the tenant refuses entry).

3. Promptly and safely repair deteriorated paint and the cause of the deterioration. If more than a *de minimis* amount of paint (for example, more than one square foot per room) has deteriorated (unless the paint is found not to be LBP):

- Follow Essential Maintenance Practice #1 (above) when repairing the surface.
- Diagnose and correct any physical conditions causing the paint deterioration (for example, structural and moisture problems causing substrate failure or conditions causing painted surfaces to be crushed).
- When there is extensive paint deterioration (for example, more than five square feet per room), the procedures for dust testing after Standard Treatments apply.

4. Provide generic LBP hazard information to tenants per Title X including the EPA-developed educational pamphlet and any information available about LBP or LBP hazards specific to the unit.

5. Post written notice to tenants asking tenants to report deteriorating paint and informing them whom to contact. Promptly respond to tenants' reports and correct deteriorating paint, with accelerated response in units occupied by a child under age six or a pregnant woman – and in no case longer than 30 days. Do not retaliate against tenants who report deteriorating paint.

6. Train maintenance staff. At a minimum, maintenance supervisors need to complete a one-day training course based on the HUD/EPA operations and maintenance/interim control activities curriculum. The maintenance supervisor must ensure that workers either take the one-day training course or have a clear understanding of LBP hazards, unsafe practices, occupant protection, and dust cleanup methods by such means as on-the-job training and video instruction. The maintenance supervisor needs to provide adequate oversight of workers who have not taken the training course.

Resource List

A Brief Guide to Mold, Moisture and Your Home, US EPA, 2002.

Website: <http://www.epa.gov/iaq/molds/images/moldguide.pdf>

CHEC HealthHouse, Children's Health Environment Coalition, 2002.

Website: <http://www.chechnet.org/healthhouse/houserules/ventilate.asp>

A Consumer Home Inspection Kit, Freddie Mac, Washington, DC, 1999.

Website: <http://www.freddiemac.com/sell/consumerkit/english/kitrepro.htm>

Farm-A-Syst, Home-A-Syst: Help Yourself to a Healthy Home, USDA Cooperative Research & Education and Extension Service, University of Wisconsin, 2003.

Website: <http://www.uwex.edu/homeasyst>

Healthy Home Materials, University of Wisconsin Extension Service.

Website: <http://www1.uwex.edu/healthyhome/tool/main.cfm>

Healthy House Renovation Planner, Canada Mortgage & Housing Corporation (CMHC), Ottawa, Ontario, 1999, \$34.95 (Canadian).

Website: http://www.cmhc-schl.gc.ca/en/burema/repi/hehorepl/hehorepl_002.cfm

Healthy Indoor Air for America's Homes, U.S. Environmental Protection Agency; U.S. Department of Agriculture, Cooperative State Research, Education & Extension Service; and University of Montana, 2002.

Website: <http://www.montana.edu/wwwcxair>

Help Yourself to a Healthy House, U.S. Department of Housing and Urban Development, 2002.

Website: <http://www.hud.gov/offices/lead/healthyhomes/healthyhomebook.pdf>

Home Environmental Safety Information, National Multifamily Council, Washington, DC.

Website: <http://www.nmhc.org>

Homeowner's Inspection Checklist, CMHC, 2000, \$19.95 (Canadian).

Website: http://www.cmhc-schl.gc.ca/en/burema/repi/repi_002.cfm

Mold In Houses Checklist, Affordable Comfort, Inc, 2002.

Website: <http://www.affordablecomfort.org/html/mold-chk.html>

Read this – Before you Turn Over a Unit, Asthma Regional Coordinating Council of New England, Westford, MA 2001.

Website: http://buildingscience.com/resources/mold/Turn_Over.pdf

Read This – Before You Move In, Asthma Regional Coordinating Council of New England, Westford, MA 2001.

Website: http://buildingscience.com/resources/mold/Move_In.pdf