

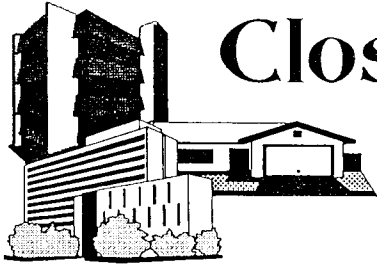
Closing Your Florida Home

South Florida
is unique
in the United States.
No other place offers
warm temperatures
AND
high humidity
AND
the need for
special knowledge
for part-time
residents.

*Protecting
Your
Housing
Investment*

FACS

University of Florida/IFAS
Sarasota County Extension
<http://sarasota.extension.ufl.edu>



Closing Your Florida Home Checklist

The following list is designed to assist you in preparing to close your home for the season. Some procedures may apply to your situation, others may not. Use this list as a guide to check off those tasks of greatest concern to you. The rationale for the procedures listed below are explained in the following pages.

THREE WEEKS PRIOR TO LEAVING

- Make an appointment to have air conditioning system serviced (this should be done once a year).
- Have air conditioning service professional calibrate humidistat.
- Call telephone company to temporarily suspend service during your absence.
- Review homeowners insurance policy and update, if necessary.
- Determine what method(s) you will use to control relative humidity inside your home and/or control fungal growth.
- Seek a trusted friend or relative to check on your home or act in your behalf.
- Arrange for landscaping maintenance.
- Arrange to close shutters and/or prepare home in the event of a hurricane threat.
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TWO WEEKS PRIOR TO LEAVING

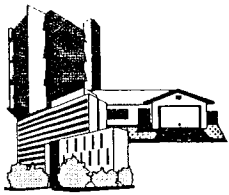
- Purchase timers for lamps, radio or other appliances.
- Arrange to forward mail.
- Arrange for cancellation of newspapers, magazines.
- Run air conditioning on humidistat settings to test reliability. It should run *at least* two hours out of every 24.
- Purchase desiccants, if needed.
- Begin cleaning with fungicidal products to remove existing fungal spores.
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ONE WEEK PRIOR TO LEAVING

- 🏠 Clean refrigerator and freezer. Eat food on hand.
- 🏠 Check operation of dehumidifier, if you choose to use one.
 - 🏠 Place in central location.
 - 🏠 Secure continuous drain.
- 🏠 Vacuum upholstered furnishings to rid of mold spores.
- 🏠 Remove interior plants and exterior plants in pots and containers.
- 🏠 Eat food in the food cabinets or plan to give away or discard. Do not keep herbs such as parsley, oregano, basil, etc. You may, however, keep spices such as cinnamon, curry, nutmeg, etc. and all canned products.
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- 🏠

ON THE DAY OF DEPARTURE

- 🏠 Empty refrigerator and freezer; disconnect and leave door slightly ajar.
- 🏠 Run 1 dozen ice cubes and 2 or 3 tablespoons baking soda in the garbage disposal to clean blades.
- 🏠 Empty dishwasher.
- 🏠 Set timers on lights.
- 🏠 Drain and disconnect water heater.
- 🏠 Strip bedding.
- 🏠 Cover drains with stopper and duct tape.
- 🏠 Cover and seal toilets.
- 🏠 If using chemical mildew inhibitors, cover air passages with 2 ml thick plastic.
- 🏠 Check air conditioning for accurate settings.
- 🏠 Set off insect "*bombs*" or "*foggers*", if desired.
- 🏠 Set burglar alarm.
- 🏠 Lock doors and secure exterior.
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Avoid Mildew Keep It Clean And Dry

Normal weather patterns in Florida include afternoon rains that keep humidity high. Humidity causes mildew to thrive outside; spores are being produced by the zillions. Even if the indoor mildew spore level was low this spring, spores from outside come in on our clothing and hair. Every time windows or doors are opened, in come more spores. Some people are allergic to mildew spores; these allergies are sometimes triggered by continual exposure the spores. With mildew spores always ready to grow in our homes, what protection is needed to stop mildew from growing and spreading? The watch words are **CLEAN** and **DRY**.

CLEAN

Mildew must have nutrients to grow. The sources of mildew nutrients are many. Any food spills on carpets, smears on door sills from sticky or oily fingers, soap build-up on shower walls, dirt on clothes, dust on air conditioner filters, the drain pan under a refrigerator, even the air conditioning ducts that channel air to each room can be hot spots for mildew to grow. The first step in avoiding mildew is to plan a program to keep surfaces clean - a regular routine. How often specific cleaning jobs need to be done may be different for each family, depending on the family's lifestyle. Here are some general guidelines in your anti-mildew campaign.

- ◆ Don't let bathrooms become mildew gardens. That means regular cleaning *before* mildew is visible. By the time mildew is visible, it has produced enough spores to contaminate your whole house. The air conditioning will transplant these spores to other areas of the house.
- ◆ Change air conditioner filters frequently. Once a month may be frequently enough for many households, but, if there are children or pets in the family, check more frequently.
- ◆ Check the drip pan under your frost-free refrigerator and freezer. Dust and dampness there can produce enough mildew and spores to contaminate all the air in your home.
- ◆ Wipe up spills as they occur. Clean carpet spills and spots quickly and thoroughly. Mildew thrives in the cozy carpet pile. Vacuum regularly. Dust and dirt, good mildew nutrients, are harder to remove after they work into the pile.
- ◆ Wash off finger marks on door sills. Even a slight oily residue on wooden, metal or plastic chair arms where hands touch can get slimy with mildew under severe conditions.
- ◆ Don't let dirty laundry pile up. Soiled clothes and towels, mildew quickly when conditions are right.
- ◆ Don't put sweaty clothes into closets. The small amount of moisture they hold will make your closet smell stale and musty.
- ◆ Once shoes have been worn, they are "*conditioned*" to grow mildew. Perspiration, plus the composition of leather in shoes or belts, is yummy for mildew. Let sweaty shoes dry before putting them away in your closet.

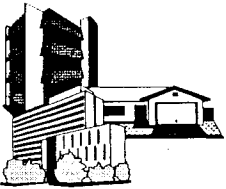
DRY

Mildew needs moisture to grow. The big question is, "*How can you keep a home in warm, humid Florida dry?*" Air conditioning removes moisture from air, but if moisture comes into a house faster than air conditioning can remove it, mildew will show up and it will spread. Air conditioning can usually remove the moisture produced inside a home through cooking, cleaning, bathing and other water-related activities. The moisture we need to be most concerned about in Florida's warm and humid climate comes into a house from outside in one of several ways. Here are several guidelines to cut down or prevent moisture from coming into a home.

- ◆ Every time people open outside doors to come and go, moisture moves inside. People must be free to come and go, but it will help reduce moisture if they open and close doors promptly.
- ◆ Air enters homes through cracks and crevices. Look around windows and doors. If you can see daylight anywhere, that is an invitation to moisture you can stop with weatherstripping. See your friendly hardware store for the right type of weatherstripping for your window or door types.
- ◆ Hold a lighted match in front of each electrical outlet. If the flame flickers, moist air can leak in. There are inserts to put behind cover plates to control air and moisture leakage.
- ◆ A fireplace has a large opening that air and moisture can come through. Make sure the damper (and glass doors, if present) are closed.
- ◆ Check the air conditioning and ducts in your garage. Are there cracks in joints where garage air and moisture can get into the system? Use duct tape and/or caulking, depending on the type and location of the crack. Moisture coming into the air conditioning system through joints and cracks in duct work are often the biggest source of moisture where severe mildew problems are found.
- ◆ Bath and kitchen exhaust fans remove moisture and odors from those rooms. That's good. But, they also create a negative pressure in a house that pulls warm, humid outside air into other parts of the house. That's not so good. Usually a bath fan can remove most of the excess moisture put into the air during showering or bathing in about 10 minutes. Wet towels and wet walls will continue to put moisture into a bathroom for hours, but long fan operation can bring in more moisture than it removes. To reduce moisture that wet walls and towels contribute to your home over the next few hours, use a squeegee or the towel you dried with to wipe down wet shower walls. Then, put towels on a rack in the garage or on the porch.
- ◆ Finally. When the temperature of outside air drops to the low 70's during the late evening, should air conditioning be turned off and windows opened to save energy? The answer is **NO**, not in Florida. That outside air is saturated and will bring a lot of moisture. When air conditioning is turned on again the next day, it will have to work harder to remove the excess moisture. During this period, moisture will be high enough to invite mildew.
- ◆ Controlling the temperature. Since mildew thrives at temperatures between 77°F. and 86°F., summer conditions will encourage mildew growth. Air conditioning will reduce the interior temperature of homes, but the temperature may not be uniformly low enough to stop mildew growth if the air is fairly humid. Areas within cabinets and closets or behind draperies may be warmer, and humidity will be trapped unless the doors are lowered or left ajar.

- ◆ Controlling moisture in the air. Since a high relative humidity is required for mildew growth, we need to understand what RH is and how it is related to temperature. Technically, RH is the ratio of the partial pressure of the actual water vapor in the air to the pressure of totally saturated air at the same temperature. Warm air can hold more moisture than cool air. For example, air at 80°F. can hold twice as much moisture as air at 60°F. If air in a house at 60°F. and saturated with moisture (100% RH) is heated to 80°F. without a change in moisture, the RH would then be about 50%. Both situations would prevent mildew growth: 60°F. is too cool for fast mildew growth even at 100% RH, and 50% RH would be too dry at 80°F.

Keeping your home mildew-safe during warm, humid weather requires a routine that is not difficult, but requires team effort. Call a family council. What can each person do to help keep your home clean and dry to avoid the hard work of cleaning mildew, the costs of repairing and repainting after mildew damage to a home and its furnishings and the bad effects of long-term exposure to mildew spores?



How To Prevent and Remove Mildew

Mildew is a persistent problem in warm, humid climates and in many parts of the country where the humidity level is high during summer months. Mildew can also be a problem during the winter months when conditions are just right. To prevent mildew and eliminate it after it has formed, an understanding of what mildew is, what causes it to develop, and how it can be stopped and kept from returning is necessary. Although there are many varieties of mildew with many variations in growth and appearance, the information that follows is generally true for most mildew types.

MILDEW – THE PROBLEM

What is mildew? Mildew is a mold. A mold such as mildew can decompose cellulose and lignin, therefore ruining paper and cellulosic fabrics that are not protected. Wood, paint, glue and leather may be attacked by mildew also. Mildew mold secretes an enzyme that decomposes organic matter and uses it for growth and reproduction. High humidity is required to hydrate mildew cells and materials on which they can grow. Mildew is unsightly, produces an unpleasant odor, and often acts as an allergen that can create health problems.

What is necessary for mildew to grow? Mildew spores, or seedlike forms of mildew, exist almost everywhere. They will not grow and spread, however, unless certain conditions are met. There are many varieties of mildew, but generally the following conditions contribute to mildew growth:

- ◆ Molds thrive on organic materials such as paper, leather, natural fibers or surfaces coated with the slightest amount of organic matter such as food or soil.
- ◆ The optimal growth temperature range for molds is 77°F. to 88°F. (20°C. to 30°C.), though some growth may occur anywhere between 32°F. to 95°F. (0°C. to 35°C.).
- ◆ Mildew requires moisture. The optimal growth range for mildew is 70 to 93% relative humidity (RH). RH would have to be below 62% to stop all chances for mold growth, although RH below 70% inhibits most mold growth. A lower RH delays spore germination of molds, reduces the rate of mold growth, and lowers the number of cells produced.

- ◆ Molds are aerobic. That is, they require oxygen for growth.
- ◆ Light is not required for mold growth. Mold growth can continue indefinitely without light.
- ◆ Mold growth is promoted by a slightly acid condition.
- ◆ Mold growth is inhibited by a variety of fungicides such as chlorinated phenols, copper naphthenate or oleate. Coal tar creosote can be used on wood surfaces where paint is not to be used or where odor or appearance would not be objectionable. Ultra-violet radiation can kill mildew. Exposure to sunlight has been a mildew remedy since pre-air conditioning days.

Mold growth is slow to start and can take several months or seasons to get established. After growth begins, however, it is very rapid.

Identifying Mildew ◆ ◆ ◆

Mildew on textiles, books and other household materials will often be recognized by an unpleasant musty odor as well as by discoloration. Dirt on some hard surfaces such as paint, tile or wood resembles the discoloration caused by mildew. To distinguish between dirt and the discoloration produced by mildew, put a few drops of household chlorine bleaching solution on the discolored surface. Mildew will be bleached within a minute or two, but most dirt will not bleach.

Stains on the exterior surface of buildings that appear below the shade line are usually a type of algae rather than mildew. However, algae often responds to the same types of removal treatment as mildew. In warm, humid environments, treatment of mildew outside a home will need to be repeated from time to time.

MANAGING MOISTURE IN THE HOME

An ounce of prevention is worth a pound of cure, and with mildew problems, this is especially true. Water vapor moves quickly from a high humidity area to a low humidity area. Think about how rapidly condensation forms on a jar taken from a refrigerator.

Moisture can become trapped in enclosed areas when humidity is sometimes high. In such areas, plastic wrap is not recommended for storing mildew-sensitive materials. Louvered doors and wire closet shelving help promote circulation of air. You may have observed mildew growing behind large pieces of furniture that are placed too close to a wall. Where there is a potential moisture problem, solid closet doors and drawers should be left ajar to encourage air circulation. If a closet, cabinet or drawer space reaches the point of smelling musty, it and its contents should be cleaned and thoroughly dried.

Indoor Moisture Production ◆ ◆ ◆

Moisture accumulates inside a home from normal household activities: breathing, bathing, cooking and cleaning. A family of four at home for 12 hours a day can produce about 6 pints of water as moisture by respiration. Each shower or bath would add another half pint of water directly to the air, and moisture left in the shower stall and on towels would add even more. Cooking might add another two or three pints. Washing clothes, dishes and floors would also add more moisture. Ways to reduce some of the moisture from these sources can come from common sense, such as cooking with covers on pans.

Managing Moisture from Outside ♦ ♦ ♦

The environment in Florida and many coastal areas of the country is nearly always humid and much of the year quite warm. The temperature and humidity levels of outside air are high enough to cause mildew to flourish outside under leaves and in shady places. When this warm, humid air enters a house, it has the capacity to support mildew growth indoors as well. For example, if 85°F. air outside with 60% or higher RH enters a house and is cooled by walls and furnishings without air conditioning to 80°F., the RH will be 70% or higher. These conditions are right for mildew growth indoors, too. Lowering the temperatures *only* will further increase the relative humidity. Ventilation during warm, humid periods, even at night or early morning when outside temperatures are low, can lead to mildew conditions.

Vapor pressure. Vapor pressure moves moisture through cracks, down the fireplace chimney and through doors and windows when they are open. Vapor pressure can move moisture through many materials. Once moisture gets into a house, it continues moving into closets, cabinets and drawers. Once moisture is diffused into wood or other materials, it is very difficult to drive out.

Ventilation. The function of ventilation in inhibiting mildew growth is to replace moist indoor air with dry air. Open windows and doors or exhaust fans can serve this purpose *if the outside air holds less moisture than the inside air.*

When trying to control moisture during the air conditioning season, windows and doors probably should not be opened at night unless the nighttime low temperature is at least 15°F. lower than the air conditioning thermostat setting. The dew point temperature should be below 55°F. or 60°F. As much as 7 or 8 pints of excess moisture can be brought into a house every hour. An air conditioner would have to work much harder the following day to remove the moisture.

In a home, moisture also gets into closets, cabinets and drawers during humid, non-air conditioning periods. The moisture is released very slowly when room air dries out.

Infiltration of air. A new, tightly constructed house can be expected to have some leaks around windows, doors, vents and other joints that will permit ½ air change per hour. On a humid, summer day as much as 20 gallons of moisture can come into a house through infiltration. Older homes sometimes have as many as 2 air changes per hour. In colder climates, weatherstripping is suggested to reduce the infiltration of cold air. In warm, humid climates, where air conditioning is used much of the year, weatherstripping is suggested to reduce the infiltration of moisture, even more than to keep out heat in the summer or to keep it in during the winter.

Air Treatment ♦ ♦ ♦

Air Conditioners. Air conditioners remove moisture from the air as the air is cooled. Air is blown over cooling coils, and since cool air can't hold as much moisture, some of this moisture condenses on the coils and runs to a drain. The heat absorbed from the air by the air conditioner is carried by a refrigerant to coils outside the house where the heat is released.

Since most air conditioners are designed to cool more than to dehumidify, many do not dehumidify effectively enough in Florida during humid periods, which last from May through October. The longer an air conditioner is operated, the greater the amount of moisture that will be removed. An air conditioner unit too large for the area it cools might not operate long enough to remove enough moisture. Even though the home is cool, enough moisture can remain to produce mildew in areas with little air movement. Unfortunately, energy efficient air conditioners may not reduce humidity effectively enough for homes in warm, humid climates.

When air conditioning during humid weather, do not set the air conditioner fan to run continuously. This will cause moisture just removed by the cooling coils to be put back into the air, therefore, keeping the air more humid.

Dehumidifiers. Where no air conditioning is provided, a dehumidifier can be used if properly sized for the area. When using a dehumidifier, windows and doors must be kept closed. A dehumidifier collects moisture from the air in much the same manner as an air conditioner does. However, a dehumidifier has both the heating and cooling coils inside, so there is little temperature change in the air, and moisture removed is either collected in a container that must be emptied periodically or through a hose that runs into a drain. Collector pans can become a place for mold/mildew to grow if not cleaned and cared for properly.

Heating. In some closets or basements that are damp and cool, mildew growth may be inhibited by adding heat. As the air warms, its capacity to hold moisture increases. For example, air at 75°F. and 75% RH can be heated to 85°F. and the humidity will be less than 60%, low enough to slow mildew growth. If the problem area is large, such as a basement, an electric space heater can be used. **NOTE: Gas and kerosene heaters add considerable moisture, so cannot be recommended for this purpose.** A low wattage light bulb can do the job in the closet. Place the light bulb away from clothing or anything else that might ignite. Strip heaters designed especially for use in closets are available. For safety purposes, follow instructions very carefully.

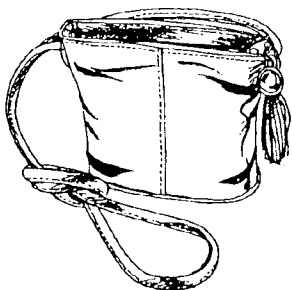
Desiccants. In small, enclosed areas, where temperature and humidity cannot be controlled by air conditioning or dehumidification, desiccants can be used. Desiccants are materials such as silica gel or alumina that absorb up to half of their weight in moisture. Place an open container on the floor or a shelf of a closet that can be tightly closed. Once a desiccant becomes saturated it can still feel dry, but will remove no more moisture. To be used again, these desiccants must be heated in a vented oven at 300°F. for several hours. They will then be dry and can be cooled and replaced in the closet to continue removing moisture.

Calcium chloride granules are also desiccants and can be used to remove excess moisture from an enclosed area. Granular calcium chloride can absorb and hold moisture equal to several times its weight. As it absorbs moisture, it liquifies and cannot be reused. The granules should be placed on a screen over a container that can catch the liquid as it forms. Calcium chloride will damage fabrics if it comes in contact with them. Calcium chloride is sometimes combined with other materials to keep it from liquefying as it absorbs moisture. Follow package instructions when using.

◆ ◆ ◆ TAKE ACTION ◆ ◆ ◆

Once mildew appears, it should be removed as soon as possible and precautions should be taken to prevent its return by keeping humidity levels low. The following chart contains instructions for dealing with mildew problems on commonly affected surfaces.

Item	To Remove Mildew	To Prevent Mildew Growth
Clothing and Textiles	<p>Begin as soon as mildew is discovered. Brush off outdoors. Sun and air clothes before laundering or dry cleaning. To remove mildew stains that remain, try one of the following. Test fabrics for colorfastness first.</p> <ol style="list-style-type: none"> 1. Moisten stain with a mixture of lemon juice and salt. Lay textiles in sun to bleach. Rinse thoroughly. 2. Mix 1 to 2 tablespoons of a powdered non-chlorine bleach containing sodium perborate or potassium monopersulfate with one pint of water. Use the water temperature recommended for the fabric or color. Sponge or soak the stain. Let stand 30 minutes or longer; then rinse well. Old stains may need to soak overnight. 3. Mix 2 tablespoons of liquid chlorine bleach with 1 quart warm water. Sponge or soak stain for 5 to 15 minutes and then rinse. Do not use chlorine bleach on silk, wool or spandex fibers. 	<p>Keep fabrics dry. Never let damp or wet clothes lie around. Dry or wash them. Spread out damp towels and washclothes to air-dry. Stretch out wet shower curtains. Dry washed clothes quickly.</p> <p>Clean clothing before storing. Soiled clothes are more likely to mildew than clean ones. Do not leave starch in clothes for long storage periods, since molds feed on starch. Air the clothes in closets by opening doors and shifting them to provide air space around them.</p> <p>Commercial mildew inhibitors are available in hardware and paint stores. In severe cases, these inhibitors may prove to be effective. Since strong chemicals are used, read the label instructions carefully to see what the inhibitors can do and how they can be used safely.</p>
Leather Goods	<p>After testing for colorfastness, wipe leather with a cloth moistened with diluted alcohol* (1 cup denatured alcohol to 1 cup water). Dry where the air is circulating. If mildew remains, wash quickly with thick suds made from a mild soap or detergent, or saddle soap. Wipe with a damp cloth and dry in air. Polish leather shoes, etc., with a good wax dressing.</p> <p>After removing mildew, air or sun the leather product thoroughly.</p> <p>*Test for colorfastness before using the alcohol/water sponge.</p>	<p>Store shoes in a dry, well-ventilated place. Buy a commercial mildew inhibitor spray and use it regularly as directed.</p> <p>Apply a thin coat of wax dressing to cleaned leather goods. Some waxes have antifungicidal ingredients. (These may discolor white or light colored leathers.)</p> <p>Never put away damp leather shoes, or other damp leather items. If one piece becomes mildewed, remove it from the other until cleaned.</p>



Item**To Remove Mildew****To Prevent Mildew Growth**

Paper
and
Books

If books or paper are damp, dry in a breezy place. Take outside and brush off any loose mold with a clean, dry cloth.

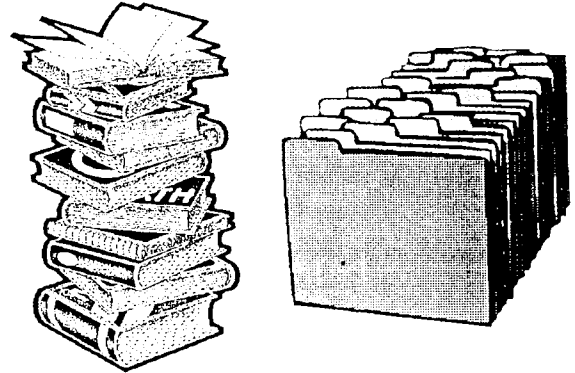
Remove stains by wiping gently with a cloth that was soaked with suds and wrung out. Rinse with clear water. After removing the stain, pat the area dry with a soft, dry cloth. For stubborn stains, a chlorine bleach and water solution can be used. Rinse with clear water on a cloth and dry with a soft cloth as above. Try not to set paper, and do not scrub.

Spread pages of books fanwise to dry in an airy place. If still damp, sprinkle cornstarch between leaves to dry. Leave on several hours, then brush.

For damp wallpaper, heat or air condition the room to thoroughly dry plaster and paper.

Air circulation and heat help keep books and paper dry. Use a small light bulb or hang a mildew inhibitor or desiccant inside an enclosed bookcase.

Sprays containing fungicides can be used. If books are not kept in dry shelves or boxes, re-spray frequently.



Upholstery,
Mattresses
and
Rugs

Vacuum or dust off mildew. Be sure to dispose of vacuum bag, as it will contain mildew spores. Dry the item in the sun if possible. If mildew remains, sponge with a cloth moistened with 1 cup denatured alcohol or rubbing alcohol* mixed with 1 cup water. Dry thoroughly.

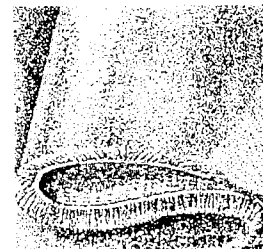
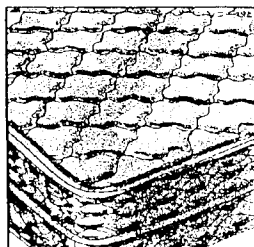
Rugs and carpets that show mildew should be shampooed and dried as quickly as possible. Sunning is a big help. Sometimes the cause of mildew on carpets is moisture from the floor or padding underneath. If this is the case, the carpet should be removed and the cause of the moisture determined and corrected.

***Test for colorfastness before using the alcohol/water sponge.**

Periodically dust and air your mattresses and upholstery and inspect for mildew. Spray with a fungicide aerosol spray that gives mildew protection.

Sunlight is a mildew inhibitor. A good **sunning** is an excellent idea for mattresses, rugs and upholstery whenever possible.

Upholstered furniture, drapery fabrics and carpets are often treated at the factory with fluorocarbons that repel water. These fabrics will stay drier and inhibit mildew growth.



Item	To Remove Mildew	To Prevent Mildew Growth
Painted Surfaces	<p>Inside — Scrub mildewed paint or plaster with a solution of ¼ cup household bleach to 1 gallon water. Rinse with clean water and allow to dry thoroughly before painting or papering.</p> <p>For wooden* furniture — Remove mildew with vacuum cleaner. Clean with a soft cloth dipped in a mild detergent and water solution and wrung almost dry. Work with a small area at a time, rinsing with a cloth dipped in clean water and wrung almost dry. Dry each area thoroughly before going on to the next area. Mildew often feeds on the dirt and greasy film that accumulates on furniture. If a white film develops after this cleaning, wax buildup has probably occurred. Use a furniture cleaner to remove the layers of wax. Finally, re-apply a thin coat of paste wax.</p> <p>For wood* walls — Scrub wood with a mixture of 4 to 6 tablespoons washing soda to 1 gallon water. Do a small area at a time. Rinse with clear water and dry quickly. If mildew still appears, use a mixture of 4 to 6 tablespoons trisodium phosphate and 2 tablespoons household ammonia per gallon of water. Be sure to test for colorfastness. Never mix ammonia and bleach. It produces a deadly gas.</p> <p>Outside — Scrub mildewed paint with ⅔ cup trisodium phosphate**, ⅓ cup detergent, 1 quart household bleach and 3 quarts warm water. When clean, rinse thoroughly with clear water. Then, treat the surface with a commercial fungicide. Repaint with a mildew-resistant paint.</p> <p>For a roof cleaner, use ⅔ cup of trisodium phosphate to ⅓ cup of detergent, 1 quart of chlorine bleach and 3 quarts of warm water. Work in small areas so scrubbing and rinsing can be done before the mixture dries.***</p>	<p>Select a paint that has a mildewcide added to it by the manufacturer.</p> <p>Paint can be even more mildew resistant by adding additional commercial mildewcide, which is available at local paint stores. Be sure to follow instructions on the product label.</p> <p>Use heat and air circulation to keep clean wood dry.</p> <p>Keep furniture clean. Dust and soils in the air from food cooking and automobiles settle on furniture. These provide food for mildew.</p> <p>Oil-based paints mildew more readily than water-based paints, while soft paints mildew much more easily than hard paints. Flat paints mildew more easily than glossy paints.</p> <p>Latex paints can be applied to damp surfaces. They permit moisture below to evaporate, and withstand mildew. Alkyd paints can withstand scrubbing (to remove mildew) better than latex, but must be applied to perfectly dry surfaces. Alkyd paints are also better on any surface where water may collect.</p> <p>Paint with zinc oxide inhibits mold growth more than paints with titanium pigments.</p> <p>Get rid of damp soil or heavy vegetation near walls outside. Rearrange plantings so that there is good air circulation between them and the house. Make sure cement blocks or wood walls are sealed to prevent moisture buildup.</p>

Item	To Remove Mildew	To Prevent Mildew Growth
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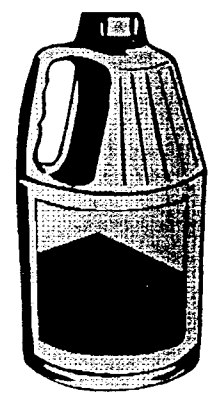
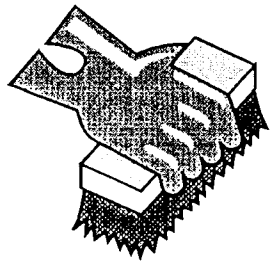
Painted Surfaces (continued)

When cleaning with chlorine bleach, use rubber gloves. Avoid contact with skin and eyes or prolonged breathing of the vapors. Remember to protect plants from these chemical mixtures.

*Water will damage wood if allowed to stay on it. Always test the cleaner before using. work with small areas that can be rinsed and dried before moving on.

**Trisodium phosphate is available in paint or hardware stores.

***Chlorine bleach damages some roofing materials. Test before using.



Unpainted Wood

Decks and Wood Shingles — Scrub surfaces with a solution of 1 quart of bleach to 3 quarts of water. Rinse thoroughly. Commercial cleaners are also available. Read directions carefully to know what the cleaners will do, how to use them and what precautions should be taken.

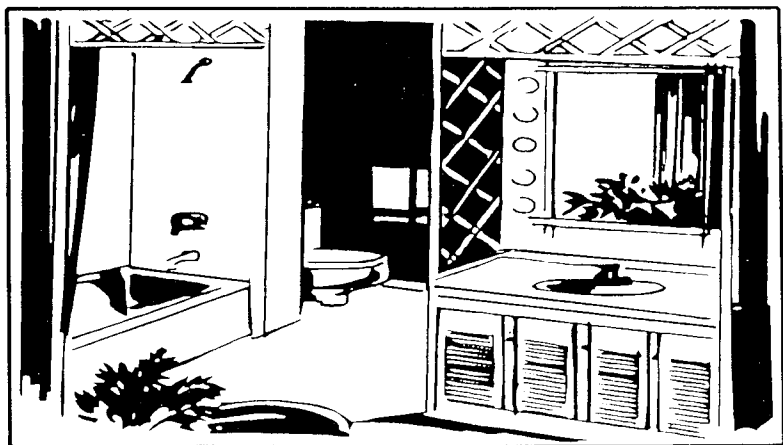
Commercial fungicidal products will inhibit mildew growth, but may be toxic for humans and pets. Follow instructions for using carefully.

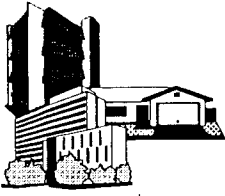
Sealants are available to put on clean, dry wood. They penetrate the wood surface and prevent moisture from penetrating wood.

Bathroom

Scrub surfaces with a solution made from 1 quart liquid chlorine (household) bleach, 2 tablespoons liquid detergent, 6 tablespoons trisodium phosphate and 9 quarts of water. Use a brush or old toothbrush to clean grout. Let surface dry, then rinse with plenty of water. If shower curtains can be washed by machine, add chlorine bleach with the detergent. Use a warm water rinse for plastics and hang while warm for wrinkles to fall out.

Keep the area as clean and dry as possible. Use an exhaust fan to pull dry air conditioned air into the bath after showering or bathing. If it is cool and dry outside, open a window in the bathroom. If it is humid outside, it will be better to use the fan to pull air conditioned air through the bathroom to dry it out after bathing.





Chemical Mildew Inhibitors

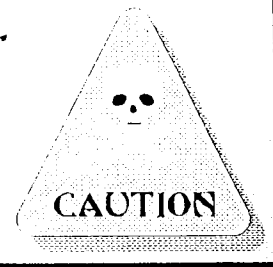
There is no true mildewcide — no product you can use to kill mildew and guarantee it will not return. Keeping materials clean and dry is the best defense in controlling mildew growth. Cleaning with a chlorine bleach solution removes mildew, but it will grow again when conditions are right.

People who leave their Florida homes during the summer months know they must take extra precautions to protect against mildew. Caulk windows and seal doors and vents to keep as much moisture as possible from coming into the house from outside. Develop special techniques to keep water from evaporating from toilets and drains by covering with a plastic film. Leave everything clean and dry. Desiccants, such as silica gel, may be sealed in vapor-proof boxes or cans to keep small items dry.

Leaving closet doors ajar and drawers open keeps moisture from being trapped, causing mildew to grow in these places. If people have air conditioning, they may put it on a timer to operate a couple of hours each morning when it is cool outside. The dehumidification by the air conditioner helps keep mildew from starting. When people leave Florida homes without air conditioning, they sometimes turn to the use of chemical mildew inhibitors. They are rightly concerned about the safety of such products. Will such products be harmful to themselves, to their pets and to their possessions?

Active ingredients in chemical mildew inhibitors are poisonous. Inhaling fumes is to be avoided. Their use is governed by provisions of the Federal Insecticide, Fungicide and Rodenticide Act as amended. According to the provisions of the Act, *“It shall be unlawful for any person to use any registered pesticide in a manner inconsistent with its labeling.”* [Section 12 (a)(2)(G)]. Federal and state regulations require registration numbers to be on all pesticide containers.

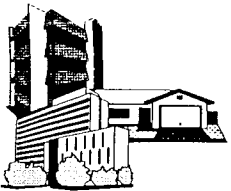
Anyone using a chemical mildew inhibitor is cautioned to carefully read the instructions provided to know what the product can be expected to do and precautions to follow when using it.



Anyone considering the use of chemical mildew inhibitors should follow these guidelines:

- ◆ If you live in an apartment or condominium, check with the owner or the management before using a chemical mildew inhibitor. Its use is prohibited in some multi-family dwelling facilities. If not prohibited, there are still precautions to take to prevent fumes from straying into other units or into common halls and rooms. This means covering vents and sealing cracks around doors and windows with plastic wrap and tape. Electrical and other outlets in walls may require sealing as well. This is necessary to keep fumes in the area you are protecting as well as to protect others living nearby.
- ◆ When preparing to use a chemical mildew inhibitor in your absence, the first steps should be to clean your home and any possessions you plan to leave behind, seal openings to the outside of the dwelling and keep water in drains and toilets from evaporating.

- ◆ Some materials, such as cameras, color slides, negatives and prints, may be affected by fumes. Dyes in some fabrics and some plastics used on furnishings and accessories, such as buttons, may be affected as well. If you are concerned about specific items, check with the manufacturer of the mildew inhibitor product.
- ◆ Carefully follow instructions for use of any mildew inhibitor. When fumes are heavier than air, you may be instructed to place the product in high locations, such as the top of the refrigerator and the top shelves of closets.
- ◆ The amount of chemical mildew inhibitor and how long it will be effective will vary with many things, such as the size of the area, how tightly enclosed the area is and the concentration of the product.
- ◆ Plants cannot be expected to survive in the environment that has these poisonous fumes.
- ◆ Foods exposed to chemical mildew inhibitor fumes will develop off flavors and should be disposed.
- ◆ *Air conditioning should not be operated during the use of chemical mildew inhibitors.* Fumes will accumulate in the system and filter which may cause odors when you return. Also, some chemical mildew inhibitor products are reported to be more effective at higher temperatures.
- ◆ Chemical mildew inhibitors do not decrease humidity in areas of use. Items that might be damaged by high humidity should be protected to keep them dry. Sealing items in containers with desiccant, such as silica gel, will protect some items, such as cameras.
- ◆ Expect a clean-up procedure when you return to your home. Open windows to air out all spaces. Linens should be aired. Dishes and cookware should be washed before use.



How To Close Your Home

Most people living in Florida have lived in other parts of the country and frequently return to their former communities to visit friends and neighbors. Some people spend part of the year in Florida and part of the year in other areas of the country. Additionally, almost everyone is likely to be away from his home several days or weeks at a time for business or pleasure. Occasionally, we hear of people who return to their Florida homes to find they have a mildew or moisture problem, or the exterior of their house seems to look more rundown when they return. Worse yet, reports of burglary or vandalism appear in the news daily.

What can you do to minimize the possibility that you may return to your home and find a serious problem? *Closing Your Florida Home* has been developed to help residents make plans for protecting their homes when they are to be absent. There are things you can do to protect your home from moisture problems, deteriorating of the exterior, or the intrusion of burglars and vandals. Air conditioning can be used to reduce potential moisture problems, yet use a minimum amount of energy. As you read or study each section, consider the steps you should take in preparing for an extended absence.

INTERIOR PROCEDURES

You have heard the stories of people returning to their Florida homes in the fall and winter greeted by mildew on the walls, clothing and furnishings; musty smells and other unpleasant odors; and rusty spots on appliances. Why do such conditions seem to abound when no one is there?

Remember why you leave for the summer? Florida is warm and humid. Pests and organisms such as mildew and bacteria attack organic materials. Wood, cotton, wool, leather and the tiniest traces of dirt or even starch in fabrics can decay, deteriorate and develop odors. Metals are attacked. The slightest scratch through the enamel on a washer or refrigerator exposes the base metal to moisture and oxygen in the air. Rust and corrosion follow.

Knowing the rules to Mother Nature's game plan will help you plan a counter-attack before you leave for the summer. There are two important watch words: **clean** and **dry**.

Clean ♦ ♦ ♦

Food soils and body soils left on towels, articles of clothing or furnishings absorb water out of humid air and attract mildew fungi and pests such as roaches and ants. It's important to clean thoroughly before you leave.

Kitchen and Laundry

- ◆ Clean each appliance thoroughly. Clean enamel exterior with sudsy water, rinse and dry. Apply a coating of appliance wax to enamel exteriors to protect scratches from rust. Leave appliances unplugged while you are gone to protect from electrical current surges during summer storms.
- ◆ Unopened cans and jars of food can be left on shelves. Flour, sugars and salt should be stored in tightly sealed containers. Dispose of cereals, crackers and pastas to avoid household pests.
- ◆ Clean cabinet interiors and exteriors.
- ◆ Clean oven, broiler and drip trays under surface units of the range.
- ◆ Fresh and perishable foods should be eaten or discarded. Give away or toss opened bottles and jars of salad dressings, condiments, etc., in the refrigerator. It will cost less to replace them if you are gone 2 to 3 months than to run your refrigerator. Clean the refrigerator interior with a solution of 1 tablespoon baking soda in 1 quart of water to neutralize food soils and prevent odors. Dry thoroughly. Remove and clean the defrost pan behind the grill at the bottom of your refrigerator. The refrigerator and freezer doors should be left ajar.
- ◆ Remove food particles from the filter if one is present in the bottom of the dishwasher. Run dishwasher through a short cycle. After a few minutes into the cycle, turn off the dishwasher, open the door and clean around the door gasket and under the bottom of the door to remove any residual soil that might mold in these areas. Complete the cycle. Unlatch the door, but leave it closed to release the pressure on the door seal.
- ◆ Clean the garbage disposer by running a batch of ice cubes from the freezer. Run a solution of baking soda and water through the disposer and leave the stopper in place to prevent water from the trap beneath the disposer from evaporating during the summer.

- ◆ To remove spatters in a microwave, heat a cup of water in a cool microwave for 2 minutes on high. Condensation on the walls will loosen spatters. Wash with sudsy water, rinse and dry. If portable model, leave it unplugged.
- ◆ Clean portable appliances thoroughly. Be sure to open the trap door under the toaster to remove crumbs and clean.
- ◆ Turn off water supply to the washer to eliminate pressure damage to the hoses. Clean the lint filter, if any.
- ◆ Clean the lint filter in the dryer.
- ◆ Turn the water heater off if gone for a month or more. For shorter absences, turn the thermostat to its lowest setting.

Bath

- ◆ Clean all surfaces and fixtures. Cover toilet and tank top with plastic wrap. Put stoppers in drains.

Other Rooms

- ◆ Clean and leave a light coating of wax on surfaces of wood furniture.
- ◆ Vacuum upholstered furniture (even crevice areas) well. If there are spots and stains, remove or clean before closing the home. Use a commercial upholstery cleaner. Follow instructions carefully.
- ◆ Leave bedding and bath linens clean and dry. Vacuum mattresses thoroughly ~~and lightly with a brush.~~
- ◆ Leave only clean clothes in closets. Allow space between garments to permit circulation of air. Do not leave items on the floor. Leather shoes, belts, handbags should be cleaned with a leather cleaner. Spray with a disinfectant spray. Do not wrap garments or other items tightly in plastic. This may increase mildew and other problems. Metal hangers, even when covered with paper, can rust and stain clothing. Plastic hangers are a must. Leave closet doors open to permit air circulation.

Dry ◆ ◆ ◆

Outdoor Moisture

Since the air in Florida has lots of moisture, it is important that windows and doors be weather-sealed to keep moisture out. Bath and kitchen vents can be covered with plastic wrap to seal out moisture. If you have a fireplace, be sure the damper is closed.

Indoor Moisture

Water from drains and toilets will evaporate and add moisture in the house. If all moisture from drain evaporates, sewer gas can come into the home. Drain stoppers should be closed and toilets and tank tops sealed with plastic wrap. Leave house plants outside or with a neighbor; having someone water plants adds moisture. Turn off water at the meter if it is not used for lawn irrigation. This will prevent flooding if a pipe should break.

HUMIDITY MANAGEMENT

If You Don't Have Air Conditioning ♦ ♦ ♦

The temperature in your home will rise during the heat of the day when you are away in the summer. This temperature rise will actually result in a lower relative humidity. This may inhibit moisture related problems if enough moisture is kept out of your house by the methods prescribed earlier. Desiccants that do not liquify may help keep moisture down in enclosed spaces that are tightly sealed, such as in an airtight trunk. A dehumidifier operated by a drain to carry moisture away can be a help, though it will not be as useful as air conditioning.

Air Conditioning Considerations ♦ ♦ ♦

There is not reason to maintain comfortable living temperatures when you are away, however, periodic air conditioner operation will remove moisture from your home. To assure the continued effective operation of your air conditioner and to prevent excessive energy use, follow these suggestions:

Leave Your Air Conditioner in Good Condition

Just before you leave is a good time for an air conditioner check-up by a professional, but there is some checking you can do:

- ◆ Air conditioning filter. Change it or if washable, wash it. An accumulation of dirt plus the summer heat and humidity can cause mildew and mold growth which can spread through the house.
- ◆ Leakage. Check around the edges of window air conditioners for leakage. Tape any leaks with approved duct tape.

A Professional Check-Up Should Additionally:

- ◆ Clean the blower wheel and coil.
- ◆ Check the temperature drop across the cooling coil and add refrigerant if needed.
- ◆ Adjust tension on belts.
- ◆ Check the thermostat.
- ◆ Clean the condensate pan and pipe.
- ◆ Check the operation of motors.
- ◆ Properly calibrate the humidistat, if you have one.

Operate Your Air Conditioning to Save Energy

Running your air conditioner for 2 hours a day when your house is closed and sealed will reduce potential development of mildew. The air conditioner should be equipped with a timer set to operate in the cool morning hours. Set the thermostat low enough to operate continually during a 2-hour period between two and six am. Humidistats should be checked and properly calibrated by an air conditioning professional.

EXTERIOR PLANNING

Warm weather in Florida is hard on housing that is not in good repair. Heavy seasonal rains will drive water inside the structure where defects exist. Algae and mildew will thrive if conditions are right. Before you leave for an extended period, it is wise to check the exterior of your house to make sure it is in tip-top shape.

Many condominium or manufactured home parks take care of some or part of the exterior maintenance. People who live there must check with the management to see what their responsibilities for care and maintenance are during a period of absence.

Foundation of the House ◆ ◆ ◆

- ◆ Whether a house is on a slab or over a crawlspace or a basement (basements are rarely used in central or southern Florida), the grading of the ground should direct rainwater away from the house.
- ◆ Exterior wood on a house should be high enough from the ground that it won't get wet during a downpour. With a wide overhang, lower exterior walls are less likely to get wet.
- ◆ Landscaping around the foundation of a house should be placed far enough away from the house (2 feet or more) to permit air to flow freely and prevent high humidity areas that allow algae and mildew to grow.
- ◆ The crawlspace, if there is one, should not have standing water after heavy rains; it should be well ventilated.

Roofs and Gutters ◆ ◆ ◆

- ◆ Neglect and damage to roof and gutters can result in leaks, seepage and decay problems.
- ◆ Check for damaged, curled, loose or missing shingles.
- ◆ Check flashing around chimneys and vents for damage.
- ◆ Remove leaves and debris from gutters and downspouts. Check gutters and downspouts for damage. Observe after heavy rain to see if water is flowing freely in them.
- ◆ Remove accumulations of debris from roof.

Exterior Walls ◆ ◆ ◆

- ◆ Exterior walls should be free of leaks that would let water from rains or moisture in the air enter a house in warm, humid climates.
- ◆ Check masonry walls for cracks or loose mortar.
- ◆ Painted walls should not have mildew, cracks or blisters.

Windows and Doors ♦ ♦ ♦

- ♦ Look for gaps between windows or doors and walls. Caulk if necessary.
- ♦ Replace broken or cracked putty as well as weatherstripping that is loose or damaged.

Swimming Pool ♦ ♦ ♦

Your pool should be thoroughly cleaned before you leave. It is important to maintain the pool regularly. A reliable pool maintenance service should check every 7 to 10 days to make sure the pool pH and chemical balance are correct. Untreated and under-treated will result in algae growth. Do not drain pool as the sun can dry it out and cause it to crack. If there is considerable rain, pressure can build up outside the empty pool causing it to crack.

Shrubbery and Lawn ♦ ♦ ♦

Regular trimming and mowing must be arranged to keep plants from taking over.

SECURITY CONSIDERATIONS

When you will be away from your home for either a short or long period, it pays to plan for protection of your home and possessions from burglars or intruders. Review your insurance policy to insure that it's current and in force. Five important considerations are:

- ❶ Discouraging the interest of burglars
- ❷ Inhibiting entry into your home by an intruder.
- ❸ Disrupting a break-in when it is happening.
- ❹ Protecting valuables left in your home.
- ❺ Covering potential burglary losses.

It is wise to become friends of neighbors who may be at home during your absence. You can trade-off helping to protect each other's homes and make your neighborhood more secure. If you live in a condominium, some security may be provided. Know what is provided and make arrangements to cover your responsibilities.

Discourage Interest of Burglars ♦ ♦ ♦

The best defense is prevention. Both amateur and professional burglars are likely to bypass houses that appear to have active residents at home. Your house should have a lived-in look.

- ♦ Mail, newspapers and other deliveries should be stopped or promptly picked up by a friend or neighbor.
- ♦ A car parked in the drive or carport discourages burglars. A friend or neighbor may agree to leave his or her car in your drive.
- ♦ Don't disconnect your phone. Call your telephone company for special rates during your absence.

- ◆ Several lights within a home should be placed on timers to simulate movement within the house suggesting normal activities.
- ◆ Outside lighting and trimmed shrubbery should provide nighttime visibility of windows and doors from the street and other houses in the neighborhood.
- ◆ Outside lights left on during the day may signal that you are gone for an extended period.
- ◆ Don't leave clues that you are to be away. Don't announce your plans in the newspaper or talk about it casually in public places.
- ◆ Window treatments should not make the house look closed-up, but should not permit easy viewing of valuables within the home, such as electronic equipment and cameras.

Inhibiting Entry By an Intruder. ◆ ◆ ◆

If, in spite of your efforts to make your house look lived-in, a burglar decides to try to break-in, don't make it easy.

- ◆ All doors should have secure locks; a deadbolt or jimmy-proof lock on each door.
- ◆ Glass panels in doors or next to doors should be shatterproof or double-glazed.
- ◆ Locks in doors with glazed windows or side panels should include one that can be opened from the interior only by a key. The key should not be left in the lock.
- ◆ Sliding glass doors should have a bolt-type lock to prevent being lifted out of its track plus a jamming bar in the inside track. Glass in sliding glass doors should be shatterproof, double-glazed or have a break-resistant plastic sheeting.
- ◆ Clear plastic film on windows can make them more difficult to break and slow the progress of a burglar.

Disrupting a Break-In ◆ ◆ ◆

Electronic or mechanical door and window alarms can frighten a burglar away if your house is close enough to neighbors for the alarms to be heard. Perimeter sensor systems, window-foil or glass breakage sensors will help in the same way. House alarm systems to inhibit the progress of burglars include undercarpet sensing devices, passive infrared, ultrasonic, microwave and photo-electric beam alarm systems. The more sensitive and reliable alarm systems are likely to cost more. Look for the Underwriters Laboratories seal of approval for a system that has been tested for performance and safety.

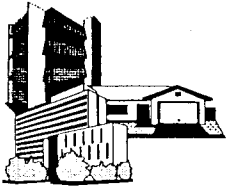
Protecting Valuables ◆ ◆ ◆

Burglars are eager to take items that have a ready market value. The value of items drops when these items have identification and can be traced to the original owner. Valuables such as jewelry, watches and other items should not be left behind when you leave. Place them in a safety deposit box.

Cameras, electronics, silver and appliances should have your social security number, car license number or name engraved on the bottom. Engraving equipment can frequently be borrowed from your police department. Participants in the Operation Identification Engraving program receive window stickers announcing that possessions are marked. this will inhibit most burglars.

Covering Potential Burglary Losses ♦ ♦ ♦

Most homeowners' policies provide some protection against burglary. Don't take your insurance for granted. Check to see if theft protection is provided and if your valuables will be adequately covered. If a list of items is required, provide that list. Make sure you meet all requirements. Check the fine print to be sure of your protection. Whether or not it is required, it may be wise to have well-lighted, clear photographs or pictures or items that would be costly or difficult to replace.



Duct Cleaning and Indoor Air Quality

With concern about secondary smoke, dust mites, formaldehyde emissions and bioaerosols, the public has become more aware of indoor air quality problems. Heating, air conditioning and ventilation units, as well as associated ductwork, can be the sources of mold, fungi and other microbial pollutants as well as particulates of dust, secondary smoke and pieces of dead dust mites. Along with the public's concern has been the development of businesses directly associated with indoor air quality. Some of these businesses are reputable and supply effective indoor air quality services; others, on the other hand, offer little more than technical jargon and will take advantage of the unwary consumer. Duct cleaning has been an area that has been attracted by both reputable and unscrupulous businesses.

A Florida International University study was undertaken to determine the effectiveness of three commercial HVAC duct cleaning processes in reducing the level of airborne particulate matter and certain bioaerosols in fiberglass board duct systems. They investigated the following three procedures:

- ① The *contact method* in which conventional vacuum cleaning of the interior ducts was performed.
- ② The *air sweep method* in which compressed air is introduced to the duct for dislodging dirt and debris and are carried downstream through the duct and out of the system by vacuum collection equipment.
- ③ The *mechanical brush method* in which a rubbery brush is inserted into the ductwork to agitate or dislodge debris and, as with the air sweep method, are drawn through the duct out of the system by vacuum collection equipment.

Their conclusion was that duct cleaning using the air sweep and mechanical brush methods was only modestly effective in the short term for indoor air quality improvement. The contact method was least effective. The effectiveness of the contact method as inconclusive in that one of the experimental homes showed reduction while the other experienced an increase of particulates at the one micron level and above. The air sweep and mechanical brush methods indicated a reduction at the one micron level when readings were taken two days after the cleaning.

With respect to bioaerosol reductions, homes cleaned with the air sweep method showed the greatest reduction two days after cleaning. Based upon FIU's study, it appears that the air sweep method is most effective at reducing both particulates at the one micron level and above and bioaerosols. FIU found that both particulate count readings and bioaerosol concentrations were higher when the cleaning was in progress than before or after. This may be due to disturbances caused by the cleaning process. The general conclusion was that at the 0.3 micron level, no significant changes occurred between the pre-cleaning and post-cleaning readings. Particulates less than one micron cause the most health problems and respiratory damage. One micron is about 1/10 the thickness of a sheet of paper. Cigarette smoking produces 0.3 micron particles, which were at elevated levels in homes that had smokers. The air sweep and mechanical brush methods reduced the bioaerosol contaminants by approximately 85%. This measurement is expressed in terms of cfu/m³ and was taken two days after cleaning. However, the remaining concentration will quickly reproduce to previous levels unless the underlying condition of high humidity is reduced.

The shortcoming of the FIU study was that readings were only taken immediately prior to cleaning, during cleaning and two days after cleaning. A follow-up study is currently underway to determine the long-term effectiveness of duct cleaning. It is the conclusion of other indoor air quality experts such as T. Brennan, J. Lstiburek and J. Bower, that generally, between one and three months after duct cleaning has taken place, the bioaerosol counts and particulate levels will increase to near their pre-cleaning levels. Studies also suggest that cleaning techniques that agitate the duct systems, particularly fiberglass ducts, may pose a greater problem by loosening fiberglass particles from the ductboard. Fiberglass now is a suspected carcinogen or cancer-causing agent.

The problems originally associated with how the air ducts got dirty in the first place are generally not addressed by duct cleaning methods. It is more important to fix leaking ducts and ensure cooling coil condensate pans are clean and draining properly. Often, these pans will become clogged due to debris, dust and microbial growths. If the drip pan becomes clogged, moisture carryover can occur, wetting adjacent duct in the process. If these are made of uncoated fiberglass ductboard, they will become wet and serve as a media for dust mites, mold and other microbial growth that will affect the air quality downstream.

Dr. Virginia Peart (Housing Specialist with the University of Florida), in her internal unpublished fact sheet "*Is Your House A Sick House?*" (H-2001) on cleaning of fiberglass ducts, quotes Dr. Thad Godish and Dr. Harriet Burge. These comments were made at the *1990 Indoor Air Quality In Homes: Synthesizing the Issues and Educating Consumers Symposium*. Dr. Godish stated:

"A lot of fiberglass ducts are used, and in high humidity environments, they are going to trap organic dust which can result in mold and bacteria growing on them. In response to that, a number of companies are selling a service which really is not going to do much good simply because the ducts are recontaminated so quickly. It is not possible for the cleaning to be as effective as it needs to be. One of the problems with fiberglass ducts is that they have a very rough surface which makes an excellent trap for dust. A lot of dust is organic dust, and if you have organic dust, you are going to get the growth of mold and bacteria."

Dr. Harriet Burge answered the question, "*Can fiberglass-lined ductwork be cleaned?*", as follows:

"Fiberglass-lined ductwork that is merely dirty (i.e., that has accumulated dust and dirt) can be cleaned if care is taken not to damage the fiberglass. However, if such ductwork has become wet (that is, if mold is actually growing on the fiberglass), it cannot be cleaned. The mold penetrates into the fiberglass and will begin to grow again as soon as surface growth is removed. The use of biocides (agents designed to kill molds and bacteria) is not recommended in ductwork because of the danger to the building occupants of exposure to the biocide."

Dr. Peart recommends certain precautions before engaging duct cleaning services. What do you know about the company? What questions should you ask? Consider these:

- ◆ *How long has the company been in business?* Written testimonials can be impressive, but it can be more important to talk with company clients of a year ago or longer. Most treatments cannot be guaranteed for long periods of time. Test results of mold or other micro-organisms before and soon after cleaning do not tell you if molds will return in a few months.

- ◆ *What chemicals are used in the treatment?*

The best duct systems are made of galvanized sheet metal with outside insulation covered by a vapor retarder. The smooth surfaces in these ducts facilitate cleaning and the zinc coating serves as a fungicide that prevents mold and mildew growth. From an energy conservation and indoor air quality point of view, controlling the pollution source seems to be the best way of keeping duct systems clean and free from trouble. It is important to change filters regularly and to have the air conditioning system serviced by an HVAC contractor once a year. During this process, it is important that they vacuum the heat exchanger, clean coils and assure that the drip pan is clean and draining properly.

THE USE OF OZONE IN DUCT SYSTEMS

Some businesses are promoting a duct cleaning method using high concentrations of ozone in the duct system. EPA points out that ozone is a very corrosive and toxic gas that is harmful to humans in any concentration. So, it is imperative (if this method is used) that occupants be cleared and remain away from the house until the ozone levels are back to normal. Generally, ozone concentrations of five to seven parts per million are needed to kill microbial and other bioaerosol contaminants that occur in the ducts. While it has been shown to be effective at killing dust mites, bacteria and germs, the EPA points out that dead toxins such as dust mite carcasses and incapacitated mold and other bioaerosol agents can be just as allergenic as the live ones, if not more so. In addition, if the ductwork is wet, only the surface layer containing contaminants will be affected. Ozone, being very corrosive, has the capability of fading carpets and draperies and rusting or oxidizing metals if not controlled properly.

EPA and most experts do not generally recommend the use of biocides, air fresheners and cleaning agents in the filters or the duct systems until they have been specifically approved for that purpose by EPA. Some harsh cleaning agents that kill germs and bacteria may also harm the delicate lining in human lung tissue and in itself be a carcinogen or allergen.

The overall conclusion about duct cleaning is that the air sweep and mechanical brush methods appear to be only modestly effective in the short-term and in the long-term, it may be effective at reducing air pollutants. A more effective approach is to properly select ducts prior to construction and to keep the air conditioning system clean with proper filtration and servicing of the drip pan and cooling and heating coils once a year by a qualified service contractor. Ozone cleaning methods and the use of biocides, germicides, cleaning agents and deodorants should only be used with great caution and only if approved for that purpose by EPA.

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The best duct systems are made of galvanized sheet metal with outside insulation covered by a vapor retarder. The smooth surfaces in these ducts facilitate cleaning and the zinc coating serves as a fungicide that prevents mold and mildew growth. From an energy conservation and indoor air quality point of view, controlling the pollution source seems to be the best way of keeping duct systems clean and free from trouble. It is important to change filters regularly and to have the air conditioning system serviced by an HVAC contractor once a year. During this process, it is important that they vacuum the heat exchanger, clean coils and assure that the drip pan is clean and draining properly.

THE USE OF OZONE IN DUCT SYSTEMS

Some businesses are promoting a duct cleaning method using high concentrations of ozone in the duct system. EPA points out that ozone is a very corrosive and toxic gas that is harmful to humans in any concentration. So, it is imperative (if this method is used) that occupants be cleared and remain away from the house until the ozone levels are back to normal. Generally, ozone concentrations of five to seven parts per million are needed to kill microbial and other bioaerosol contaminants that occur in the ducts. While it has been shown to be effective at killing dust mites, bacteria and germs, the EPA points out that dead toxins such as dust mite carcasses and incapacitated mold and other bioaerosol agents can be just as allergenic as the live ones, if not more so. In addition, if the ductwork is wet, only the surface layer containing contaminants will be affected. Ozone, being very corrosive, has the capability of fading carpets and draperies and rusting or oxidizing metals if not controlled properly.

EPA and most experts do not generally recommend the use of biocides, air fresheners and cleaning agents in the filters or the duct systems until they have been specifically approved for that purpose by EPA. Some harsh cleaning agents that kill germs and bacteria may also harm the delicate lining in human lung tissue and in itself be a carcinogen or allergen.

The overall conclusion about duct cleaning is that the air sweep and mechanical brush methods appear to be only modestly effective in the short-term and in the long-term, it may be effective at reducing air pollutants. A more effective approach is to properly select ducts prior to construction and to keep the air conditioning system clean with proper filtration and servicing of the drip pan and cooling and heating coils once a year by a qualified service contractor. Ozone cleaning methods and the use of biocides, germicides, cleaning agents and deodorants should only be used with great caution and only if approved for that purpose by EPA.



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