

**This checklist discusses seven major topic areas:**

Communication  
 General Activities  
 Painting  
 Flooring  
 Roofing  
 Project Completion & Commissioning  
 Construction Administration

**Instructions:**

1. Read the *IAQ Backgrounder* and the information in this section.
2. Distribute appropriate portions of this checklist to groups or individuals involved in the planning process and/or actual repair/renovation work.
3. Use the checklists on pages 7-10 to limit indoor environmental hazards as repairs and/or renovations are planned and completed. Use the checklist hints to guide your observations.
4. Completed checklists should be returned to the IAQ Coordinator.

**NOTE:** Check EPA's web site for information on *Indoor Air Quality Tools for NEW Schools*, a comprehensive guide to new school construction with a good IAQ environment.

# Renovation and Repairs Checklist

When planning and conducting renovations in schools, it is important to remember four potential causes of indoor air problems during renovation and repairs:

- Demolition that releases toxic materials or mold
- Construction dust and fumes
- Designs that interfere with ventilation
- Off-gassing from building materials and new products

You can minimize these problems by making good indoor air quality (IAQ) one of the criteria during project planning. Also, contract language and negotiations with service providers (contractors) can help ensure that proper materials and procedures are used, such as performing work during unoccupied periods in the school. This Renovation and Repairs Checklist is for use before and during renovation projects.

Depending on who is performing the work, you may need to give relevant sections of this Checklist to the different in-house staff or contractors involved. Instruct those who receive a portion of the Checklist to return it to the IAQ Coordinator.

See **Appendix I, Resources**, in the IAQ Coordinator's Guide, for additional sources of information on the following activities. Also see the IAQ Coordinator's Guide for suggested contract language and other useful information.

## COMMUNICATION

It is important to provide advance notice and information about the project to all school occupants and parents. This helps build trust and avoid misunderstandings. Communication should include information about who will be affected, and how (e.g., disruption of normal routines). Input into the process and expression of concerns should be encouraged. During longer projects, periodic updates should be given to keep the school community informed.

Designate an individual to provide a timely response to IAQ problems that might arise during the renovation. Ensure that emergency response plans are appropriate for the work performed. For example, if an emergency exit is blocked, an alternative must be identified. Appropriate signs should be posted to alert occupants. Projects involving asbestos and, in some states, lead, have specific regulatory requirements.

## GENERAL ACTIVITIES

Plan to isolate students, staff, and other areas of the school from any dust or fumes generated during renovation work. This may include temporarily relocating people away from potential problem areas. Use plastic sheeting, portable fans, and a mechanical ventilation strategy (where applicable) to prevent dust and fumes from reaching school occupants through hallways, doors, windows, and the ventilation system (for additional details, see the

activity groups on this Checklist). Also consider conducting renovation work during hours when the school is unoccupied, for example during summer "vacation" months. Even during unoccupied times, the ventilation and containment strategies mentioned above should be used to prevent the spread of contaminants through the school.

During periods of renovation, heightened housekeeping practices may be necessary, not only in the renovation area, but also in the rest of the school.

Give attention to workers and equipment leaving renovation areas to avoid carrying dust and fibers to other parts of the school. Walk-off mats, the use of removable coveralls, and wiping down equipment before exiting the work area are all effective practices.

Do not disturb asbestos during demolition. Most schools have identified and dealt with asbestos in the school under state or Federal requirements. Schools that have asbestos-containing materials, as identified in an AHERA survey, should have a management plan on file at the school. Refer to the management plan when considering whether planned renovations will require disturbing areas containing asbestos. Use an asbestos professional to consult on and assist with such renovation work. Be sure to update the AHERA management plan to reflect any asbestos abatement activities.

Test for lead-based paint before removing old paint. Use a certified inspector (if your state certifies inspectors) or a reputable testing firm for areas to be demolished, sanded, or stripped. Use appropriate personnel and precautions when removing and disposing of lead-based paint.

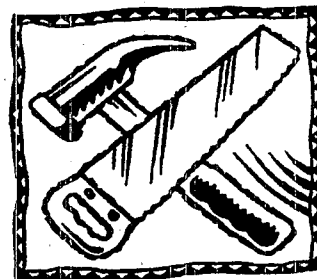
Avoid exposure to mold and bacteria. If renovation is likely to expose large areas of microbial growth such as mold and mildew (for example, while repairing water damage), consult with an environmental professional about adequate protective measures to ensure both worker and occupant safety.

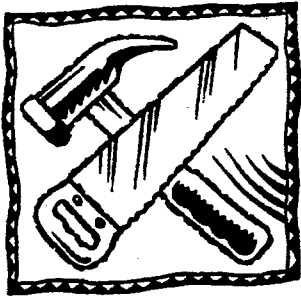
Note: Even dead mold can potentially still cause allergic reactions and other health effects. (see **Appendices H & I** in the IAQ Coordinator's Guide for more information on mold).

Consider the effect of the renovation on ventilation and mixing of air in rooms. Beware of cutting off a room from its supply of outdoor air, enclosing a pollutant source (like photocopiers) in a room with inadequate exhaust or supply air, or erecting barriers, such as new walls, that could prevent adequate movement of air throughout the a room.

Minimize and provide for off-gassing from new products. New products contain volatile constituents, such as resins, solvents, and binders, which off-gas volatile organic compounds for a period of time. This process is called "off-gassing." Whenever possible, obtain information on emissions from potential new products to be installed in the school and select lower emitting products when available. Whenever new products with the potential for off-gassing are installed, allow adequate time for off-gassing before re-occupying the area, and increase ventilation with outdoor air until off-gassing odors and any irritation symptoms no longer occur. Examples of products which will potentially off-gas include:

- Wall paneling
- Draperies





- Composite wood furniture and cabinets
- Cubicle dividers
- Carpet and vinyl flooring
- Paints and finishes

## PAINTING

There are many factors to consider before beginning a painting project. Special care should be taken when sanding a surface to prepare for painting, due to the dust released into the air. The dust may contain lead particles. Exposure to excessive levels of lead could affect a child's mental growth and interfere with nervous system development, which could cause learning disabilities and impaired hearing. In adults, lead can increase blood pressure.

The type of paint is an important decision. For instance, both solvent-based and water-based paints give off volatile organic compounds (VOCs) that could lead to IAQ problems. Water-based paints produce less VOCs than solvent-based paints, but produce them over a longer period of time.

Durability is important—a relatively low-emitting paint might create more IAQ problems in the long run than a higher-emitting paint, if the low-emitting paint requires repainting more often. In addition, many water-based paints (even interior paints) have, until recently, used mercury as a fungicide. Any paint that contains mercury should not be used indoors.

Check painting records or old paint cans to determine whether the paint contains lead. Do an initial screen

using a trained lead paint inspector. If there is lead in the existing paint, contact a trained lead-based paint contractor.

Evaluate existing stock of paint (properly dispose of paints containing lead or mercury or having higher VOC emissions than new paints).

Evaluate new paint before you purchase it. Express your indoor air quality concerns to paint suppliers and use their technical personnel as a resource. Not all paint suppliers have information on pollutant emissions; consult other sources (e.g., manufacturers) if your paint supplier cannot provide adequate information.

Schedule exterior painting to occur when the building is unoccupied (for example, weekends or vacation periods).

Keep nearby windows and doors closed as much as possible.

Schedule interior painting to occur when the area is unoccupied (for example, on weekends or during vacation periods), and allow time for paint odors to dissipate before occupants return to the area. *If the area being painted has a heating, cooling, and ventilation system which is shared with other areas, those areas should also be unoccupied.*

Use supply and exhaust fans to sweep paint fumes out of the building. Operate supply fans continuously (24 hours/day, 7 days/week), at the highest possible outdoor air supply setting, from the beginning of the painting work until several days after painting has been completed.

Block return openings to prevent air from circulating from the work area to occupied areas.

Seal containers carefully after use.

Keep paint containers in designated storage areas equipped with exhaust ventilation, never in heating, ventilation, and air conditioning equipment rooms.

Use an appropriate waste disposal method to dispose of any paints containing lead or mercury.

Follow EPA National Emission Standards for Hazardous Air Pollutant rules for disposal of asbestos-containing materials.

## FLOORING

As is the case with other building materials and furnishings, flooring materials have the potential to impact indoor air quality; therefore selection of flooring materials is an important consideration during the renovation process. Potential pollutants from flooring materials which can impact IAQ include volatile organic compounds (VOCs) that off-gas directly from many flooring materials, and the cleaning products used to maintain the flooring. Dirty and persistently damp flooring materials can become a location for the growth of biological contaminants, such as mold. Proper cleaning and maintenance of flooring materials helps to improve IAQ.

When your school installs flooring materials, the following selection, repair, and installation activities will help protect the indoor air quality in the school.

Determine whether resilient tile flooring scheduled for removal contains asbestos fibers. Asbestos surveys conducted under AHERA may have identified asbestos-containing floor tiles. Refer to the inspection report and management plan on file at the school.

Follow notification and handling procedures defined under the National Emission Standards for Hazardous Air Pollutants (NESHAP, 40 CFR Part 61 Subpart M) if renovations will disturb asbestos-containing tile flooring.

Use low-emitting adhesives.

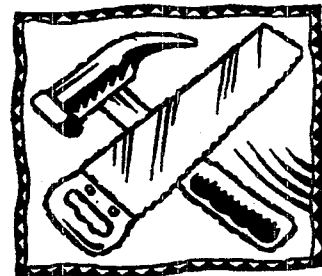
Follow manufacturers' recommendations for ventilating the work area.

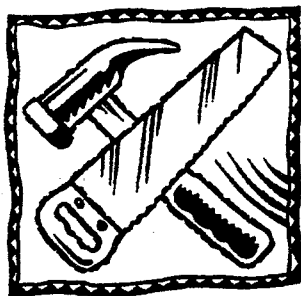
Ask manufacturers to submit information about product constituents and emissions that may adversely impact IAQ.

The Carpet and Rug Institute (CRI) has a carpet testing and labeling program. If your carpet supplier cannot provide information on any carpets you are considering, contact CRI (800-882-8846) to obtain data on emissions from these carpets.

If practical, unwrap and unroll flooring products and cushion (if any) in a well-ventilated location prior to installation, preferably in a location other than the school, such as a ventilated warehouse.

Install carpet, vinyl, and related flooring materials only when the school building is not in use, except in the case of a small installation where you are able to exhaust the air from the space directly to the outdoors and maintain the room under negative pressure relative to the surrounding rooms and hallways.





The typical recommendation is to continuously operate the building ventilation system at normal temperature and maximum outdoor air during installation and for at least 72 hours after installation is completed. The Carpet and Rug Institute Standard for Installation of Commercial Textile Floor Covering Materials (CRI 104) addresses airing and other installation procedures for carpet.

Avoid recirculating air from the installation area through the heating, ventilation, and air conditioning system, and into occupied areas. Seal return air grilles, open doorways, stairways, and use exhaust fans to remove airborne contaminants.

Vacuum old carpet that is to be removed and subfloor surfaces (once carpet is removed) to reduce release of particles such as dirt, dust, and biological contaminants into the air and onto the new carpet.

Vacuum new flooring after installation to remove loose matter and particles generated by the installation process and general construction in the area.

Do not install carpet near water sources or areas where there is a perpetual moisture problem, i.e., by drinking fountains, classroom sinks, or concrete floors with leaks or frequent condensation.

To reduce the potential for microbial growth in the joints of hard surfaces or porous flooring installed near water sources, be sure to seal entire surface.

## ROOFING

Roofing work often involves the use of tar or other pollutant-producing chemicals which may cause indoor air

problems if fumes enter the building. School officials and roofers can cooperate to prevent these problems and complaints from occupants.

**Schedule pollutant-producing activities for unoccupied periods (e.g., weekends or vacation periods).**

Check to ensure that pollutant-producing activities occur during unoccupied periods.

Consider wind patterns at the work site, and arrange equipment so prevailing winds carry odors away from the building.

**Modify ventilation to avoid introducing odors and contaminants.**

Advise staff and students to keep doors and windows closed until the roofing work is finished.

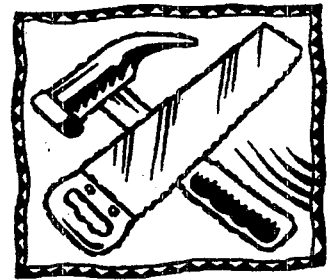
It may be advisable to temporarily close the outdoor air intakes of air handlers; particularly rooftop units in the vicinity of (and downwind from) the work area. (NOTE: To avoid creating IAQ problems from under-ventilation, provide a temporary means [fans and/or ducts] to supply unaffected outdoor air, and reduce pollutant generating activities indoors.)

## PROJECT COMPLETION & COMMISSIONING

You should establish IAQ-related procedures and criteria that must be met at the completion of any renovation project. These criteria should address the state in which the school should be in when the project is finished and the last worker leaves. Areas that should be covered include:

- General cleaning, including the wet wiping of surfaces and vacuuming (high efficiency vacuuming for fine or potentially toxic dusts, such as asbestos, lead or mold)
- Cleaning building system components, including those in the ventilation system which have been contaminated during the work. This includes the disposal and replacement of filters
- Balancing and testing the ventilation system if it has been modified, or if areas served by the ventilation system have been altered (e.g., if a partition wall was installed or removed)

- Use of isolation techniques, including barriers and negative pressure
- Ventilation and filtration requirements
- Work practices and housekeeping
- Material storage
- Close-out and commissioning criteria



## CONSTRUCTION ADMINISTRATION

Schools should include contract specifications which reflect the recommendations in this information and checklist. Oversight should be used to ensure the specifications are being met. Possible contract specification topics include:

- Notification and communication
- Scheduling to minimize occupant exposure
- Selection of building materials
- Protection of building systems and furnishings, including the ventilation system

# Renovation and Repairs Checklist

## GENERAL ACTIVITIES

### Pre-Renovation

- Notify school occupants and parents.
- Consult asbestos (AHERA) survey.
- Test for lead-based paint before removing old paint.

Plan isolation strategy for:

- Students and staff.
- Non-work areas of building.
- Ventilation system.
- Arrange for increased housekeeping activities.
- Consider ventilation implications, supply and exhaust for all affected rooms, in and out of work area.
- Select products to minimize off-gassing.
- Put IAQ-related specifications in construction contracts.
- Evaluate work area for signs of potential hidden mold before starting destructive activities. Signs include must or moldy odors, visible water damage, or a history of leaks in the area.

### During Renovation

- Progress reports made to school occupants and parents for longer projects.
- If asbestos will be disturbed, use an asbestos professional.
- Avoid exposure to mold and bacteria. For large areas of contamination, consult with an environmental professional about protective measures and special close-out procedures.
- Implement isolation plan.
- Verify that housekeeping activities are sufficient to control dirt and dust.
- Verify that contract specifications are being adhered to.

### Close-out

- Clean surfaces with wet-wiping and vacuuming (high efficiency vacuuming for fine or potentially toxic dusts, such as lead, asbestos, or molds).
- Clean building system components as needed.
- Ventilation system filters changed.
- If HVAC system has been modified, or if rooms served by system have been altered, balance and test HVAC system.

- I have completed the activities on the Renovation and Repairs Checklist, and I do not need help in any areas.

Name:

School: \_\_\_\_\_

Room or Area:

Date Completed:

Signature:

# Renovation and Repairs Checklist

## PAINTING

### Pre-Renovation

- Confirm that the painted surface is lead-free before preparing a surface for repainting.
  - Paint contains lead or testing is needed to determine if lead is in existing paint.
- Select a low-VOC emitting paint that is free of lead and mercury.
- Schedule painting to occur when building is unoccupied, if possible.

### During Renovation

- Minimize occupant exposure to odors and contaminants.
- Use exhaust and supply ventilation to sweep fumes out of building.
- Block ventilation return openings to prevent circulating air from the work area to other areas of the building.
- Use proper storage and disposal practices for paints, solvents, and supplies. Keep container lids sealed when not in use.

### Close-Out

- Allow paint odors to dissipate before occupants return to the area.
- Use supply and exhaust fans to sweep fumes out of the building. Operate supply fans continuously at the highest possible outdoor air supply setting until several days after the painting has been completed.
- Use appropriate storage and disposal practices for paints, solvents, and clean-up materials. Keep container lids sealed when not in use.
- Use an appropriate waste disposal method to dispose of any old paints containing lead or mercury.
- Follow EPA National Emission Standards for Hazardous Air Pollutants rules for disposal of asbestos-containing materials.
  - Need help with storage and disposal.

- I have completed the activities on the Renovation and Repairs Checklist, and I do not need help in any areas.

Name: \_\_\_\_\_

School: \_\_\_\_\_

Room or Area: \_\_\_\_\_

Date Completed: \_\_\_\_\_

Signature: \_\_\_\_\_



# Renovation and Repairs Checklist

## FLOORING

### Pre-Installation

- Determine whether resilient tile flooring scheduled for removal contains asbestos fibers.
  - Renovation may/will disturb asbestos-containing flooring.
- Select low-emitting adhesive when installing glue-down flooring.
- Obtain information about product constituents and emissions that may adversely impact IAQ from manufacturers.
- Select a low-emitting adhesive.
- Select low-emitting flooring materials.
  - Need additional information for selecting low-emitting adhesive and flooring materials.
- Do not install carpet near water sources.
- When possible, schedule installation for time when school is unoccupied.

### During Installation

- Use low-emitting adhesives.
- Use low-emitting flooring materials.
- Air out new products before installation.
  - Need help arranging the airing out of flooring products.
- Follow manufacturers' recommendations for ventilating the work area during and after flooring installation.
- Install carpet, vinyl, and related flooring materials only when the school building is not in use or maintain the room under negative pressure relative to the surrounding rooms and hallways.
- Avoid recirculating air from the installation area, through the heating, ventilation, and air conditioning system, and into occupied areas. Seal return air grilles, open door ways, stairways, and use exhaust fans to remove airborne contaminants.
  - Need help arranging the airing out of space during and after installation.
- Vacuum old carpet that is to be removed and subfloor surfaces (once carpet is removed).
- Seal joints of hard surfaces and/or entire surface of porous flooring installed near water sources.

### Post-Installation

- Vacuum new flooring after installation to remove loose matter and particles generated by the installation process and general construction in the area.
- Follow manufacturers' recommendations for ventilating the work area space during and after flooring installation. (Typical recommendation is maximum outdoor air for 72 hours after installation.)

- I have completed the activities on the Renovation and Repairs Checklist, and I do not need help in any areas.

Name: \_\_\_\_\_

School: \_\_\_\_\_

Room or Area: \_\_\_\_\_

Date Completed: \_\_\_\_\_

Signature: \_\_\_\_\_

# Renovation and Repairs Checklist

## ROOFING

### Pre-Renovation

- Schedule pollutant-producing activities for unoccupied periods (e.g., weekends or vacation periods).

**Need help to minimize occupant exposure**

### During Renovation

- Put "hot pots" of tar and other pollutant-producing materials away from outdoor air intakes.

- Consider wind patterns at the work site, and arrange equipment so prevailing winds carry odors away from the building.

**There is not a good location for pollutant-producing materials during this renovation**

- Modify ventilation to avoid introducing odors and contaminants.
- Advise staff and students to keep doors and windows closed until the roofing work is finished.
- It may be advisable to temporarily close the outdoor air intakes of air handlers, particularly rooftop units in the vicinity of (and downwind from) the work area. (NOTE: To avoid creating IAQ problems from under-ventilation, provide a temporary means [fans and/or ducts] to supply unaffected outdoor air, and reduce pollutant generating activities indoors).

**Need help to modify ventilation**

- I have completed the activities on the Renovation and Repair Checklist, and I do not need help in any areas.

Name: \_\_\_\_\_

School: \_\_\_\_\_

Room or Area: \_\_\_\_\_

Date Completed: \_\_\_\_\_

Signature: \_\_\_\_\_