LAFAYETTE COLLEGE

Indoor Air Quality Policy

Public Safety Department
Environmental, Health and Safety (EHS) Division
Standard Operating Procedure (SOP) #44

Introduction

This policy on Indoor Air Quality (IAQ) has been developed to provide a safe and healthy working and living environment by proactively identifying and controlling pollutants and thermal conditions that negatively impact indoor air quality.

This policy includes multiple aspects of indoor air quality, including, but not limited to asbestos, chemical sensitivities, construction and renovation activities, HVAC equipment, mold, particulates, pests, smoking, temperature and humidity, as well as outside environmental conditions.

Although there are no regulatory requirements – other than building and mechanical code compliance – Lafayette College follows applicable guidelines from the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Centers for Disease Control (CDC), as well as the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) and the National Institute of Occupational Safety and Health (NIOSH).

Purpose

The purpose of this plan is to provide the College with a resource to best manage potential environmental risks in and around buildings that can and will have the potential to cause health and safety concerns for faculty, staff, students, and visitors.

Responsibility

Indoor air quality (IAQ) complaints vary from basic comfort issues (too hot, too cold, too humid) to complex issues resulting in lost worker productivity and illness. Although it may be difficult to identify a single cause of poor IAQ, Lafayette College is committed to meeting or exceeding existing IAQ standards.

Environmental, Health and Safety is responsible for the oversight and coordination of this policy and:

- Providing training to personnel who could impact IAQ
- Developing and maintaining an occupant complaint response system
- Investigating indoor air quality complaints
- Maintaining results of monitoring and corrective actions taken
- Ensuring departments are maintaining up-to-date records in accordance with the College's Hazard Communication Program
- Contracting for IAQ testing and/or remediation, if necessary.

Facilities Operations is responsible for:

- Maintaining up-to-date building drawings and records
- Developing/reviewing maintenance and housekeeping plans and procedures for IAQ
- Communicating with college personnel about building activities that could impact IAQ
- Maintaining up-to-date manufacturer's operating instructions for HVAC system components
- Scheduling maintenance for HVAC system components
- Establishing HVAC control system set-points/ranges and pressure relationships
- Adjusting HVAC operation during remodeling/renovation to maintain building air quality.

Hazard Identification

Indoor Quality Testing and Parameters

The following chart will be used as a reference for the acceptable parameters for indoor air quality.

Table 1 – Physical and Chemical Parameters

Parameter	Limit/Range	References	Common Sources
Temperature	73 – 79 summer 68 – 75 winter	ASHRAE Standard 55 – 1992	
Relative Humidity	30 – 60 %	EPA Recommendation	
CO_2 Carbon dioxide	700 ppm over ambient (= 15 cfm per person (sedentary))	ASHRAE Standard 62.1 – 2004	Building occupants
CO Carbon monoxide	9 ppm (8 hour TWA)	EPA NAAQS	Leaking vented or unvented combustion appliances, vehicle exhaust, outdoor air
O_3 Ozone	0.05 ppm	World Health Organization	Electrostatic appliances, office machines, ozone generators, outdoor air
SO_2 Sulfur dioxide	0.03 ppm	EPA NAAQS	Unvented space heaters (kerosene), diesel combustion, outdoor air
NO_2 Nitrogen dioxide	0.05 ppm	EPA NAAQS	Leaking vented or unvented combustion appliances, outdoor air
NO Nitrogen oxide	25 ppm	ACGIH TLV and NIOSH REL	Combustion
H_2S Hydrogen sulfide	10 ppm (8 hour TWA) 0.001 minimum odor threshold	ACGIH TLV NIH National Library of Medicine	Sewer gas
HCHO Formaldehyde	0.1 ppm	World Health Organization	Pressed wood products (e.g., particleboard, plywood, medium density fiberboard)
NH_3 Ammonia	0.04 ppm minimum odor threshold	NIH National Library of Medicine	Cleaning supplies, fertilizer
Cl_2 Chlorine	0.02 ppm minimum odor threshold	NIH National Library of Medicine	Cleaning supplies, pool chemicals
Total VOCs	0.64 ppm	Molhave Institute of Evironmental and Occupational Medicine	Paints, solvents, waxes, adhesives, cleaning supplies, new building materials and furnishings
$PM_{2.5}$ Particulate Matter 2.5 micron	12 µm/m^3	EPA NAAQS	Pet dander, pollen, bacteria, mold, burning candles, cooking

PM_{10} Particulate Matter 10 micron	150 µm/m^3	EPA NAAQS	Dust from roads, smoke from fires, car and truck exhaust, some pollen and bacteria

When special equipment or laboratory analysis is necessary, outside contractors may be used to perform monitoring or to provide remediation.

Reporting Indoor Air Quality Concerns

The following emergency situations require immediate notification of Public Safety at 610-330-4444:

- Hazardous material spill
- Flooding on porous materials
- Gray water (e.g. sewer) spills
- Gas leak
- Sudden onset of headaches, dizziness, drowsiness, nausea, and/or combustion odors (could be carbon monoxide poisoning)
- Widespread breathing difficulties, chest tightness, or respiratory infection (potentially serious infectious or allergenic agent)
- Diagnosed Legionnaires disease or tuberculosis.

To report a non-emergent IAQ problem, contact the Facilities Operations at 610-330-5373 between the hours of 7:00 AM – 5:00 PM, Monday – Friday.

Between 5:00 PM – 8:00 AM Monday – Friday and on weekends, contact Public Safety at 610-330-5330.

Include the following information in your request:

- Nature of problem
- Where the problem occurs (one or more locations)
- When the problem was first experienced
- When the problem occurs or when it is the worst (time of day, day of week, during certain activities/events/seasons).

Responding to Indoor Air Quality Concerns

IAQ complaints will be assigned to Environmental, Health and Safety (EHS). EHS will investigate promptly and track the problem through its resolution.

The complainant will be notified of the progress of the investigation, factors that have been investigated and ruled out as causes, and what they can do to help.

Mold

There are more than a million different fungi that could be described as mold, but less than a thousand of these are typically present in indoor environments.

To survive mold needs oxygen, organic nutrients, the right temperature, and moisture. Oxygen is plentiful, most common building materials provide organic nutrients, and molds thrive at indoor temperatures, therefore controlling moisture is the best way to prevent mold growth.

Molds reproduce and spread by producing spores which are dispersed in the air. A single spore can germinate and spread millions more spores in just days. The ubiquitous nature of molds in outdoor and indoor environments makes positive testing a sure bet. Finding indoor mold growth and favorable conditions for mold growth are the real keys to determining if mold problems exist or are likely to occur.

Health Effects of Mold

The complexity of molds can lead to a variety of health effects including: allergies, respiratory irritation, asthma attacks, and infections; however, since the effects of mold varies with each individual, Lafayette College recommends that any person who believes they have health problems related to mold seek professional medical attention.

Testing for Mold

The main objective of any mold investigation should be to locate sites of indoor mold growth, in order to determine how to best control the underlying moisture problem and remove the contamination. Mold testing rarely answers the difficult question of what the health risk is and often leads to unrealistic expectations that can't be met.

The key to solving a mold problem will always be to correct the source of excess moisture and remove mold contamination and these can generally be achieved without mold testing.

If mold testing is performed, it must be done by experienced and competent investigators who have stated a hypothesis and how the test results will be used in determining solutions to the problem. Investigators must describe the limitations of any testing method and the applicability of test results including uncertainties.

*** Testing should not delay corrective actions, or divert resources from moisture control and mold remediation.**

Mold Remediation

From a public health perspective, there is no practical reason to test visible mold growth. Instead, the growth should be promptly removed by cleaning or disposal. However, testing may be appropriate to verify a suspected material is mold in order to justify expenditures or corrective steps.

Mold cleanup will cause the release of spores into the air. Wear appropriate personal protective equipment in accordance with the College's PPE policy.

The following guidelines shall be followed when cleaning and removing mold covering an area of less than 25 square feet:

- Identify the source of moisture and begin to remove excess moisture as soon as possible.
- Trap or capture as much surface mold growth as possible from accessible surfaces by vacuuming all visible mold with a HEPA vacuum or wet vacuum or carefully and systematically wipe up mold with a damp cloth.
- Determine if the material(s) supporting mold growth can be cleaned or must be discarded;
    - Discard porous materials (e.g. – processed wood, ceiling tiles, and insulation) in sealed plastic bags.
    - Clean non-porous materials (e.g. – solid wood) with an all-purpose cleaner or detergent)
- Expand cleaning to areas and materials in the vicinity of the visible mold growth, where it is likely pedestrian traffic has carried contaminants from the primary growth site. Use HEPA vacuums and damp cleaning (do not sweep, dust, or brush)
- Determine if disinfection is needed. For example, when hard-surfaced porous materials (e.g. – concrete floors/walls; ceramic tiles, linoleum) are impractical to replace, they should be disinfected with a diluted bleach solution (10 parts water to 1 part bleach) or other appropriate cleaning agent. The solution should be applied by light misting or wiping on to avoid runoff; treat the entire area that supported visible growth. The surfaces should be kept damp for at least 30 minutes, rinsed, and allowed to air dry. Facilitate drying with fans or dehumidifiers if needed. NOTE: It is critical to thoroughly clean off visible growth and soiling before disinfecting.
- Monitor for signs of moisture return or mold growth before replacing building materials or furnishings. If growth reappears, repeat cleaning and disinfecting with a stronger bleach solution (e.g. 5:1) and allow a longer contact time. Consider that regrowth may indicate that the material supporting the growth should be removed and/or that excess moisture has not been controlled adequately.

When mold covers an area greater than 25 square feet, professional remediation services may be necessary due to increased containment and PPE requirements. These services will be coordinated by Environmental, Health and Safety.

Indoor Air Quality Control Methods

The following source management protocols shall be followed to manage pollution sources with high potential to cause IAQ problems:

Remodeling/Renovation

- Notify employees of planned remodeling/renovation
- Create a complete physical enclosure of the construction zone
- Keep construction areas under negative pressure and occupant areas under positive pressure
- Seal return ducts to insure contaminants do not enter HVAC system
- Schedule work during periods of minimum occupancy
- Provide increased ventilation before, during, and after construction
- Choose building materials and work processes (e.g. – wet sanding of walls) that are low-emitting

- Minimize emissions from new furnishings (request information on potential indoor air contaminant emissions from product suppliers, air out furnishings before installation)
- During clean-up use vacuums with HEPA filters
- Change air filters more frequently, especially after work is completed.

Painting

- Use low-emitting products (water based and fast-drying paints where feasible)
- Paint during unoccupied hours
- Provide increased ventilation before, during, and after painting
- Avoid spraying when possible
- Notify occupants

Pest Control

- Ensure that pesticides are stored, used, and disposed according to the label and SDS
- Choose non-chemical pest control strategies where possible (e.g. -- control dirt, moisture, clutter, foodstuff that attract or harbor pests, and close building penetrations which allow pest access)
- Use baits and traps rather than sprays where possible
- Apply pesticides only where pests are located
- Choose a pesticide that is specifically formulated for the targeted pest
- Apply pesticides during unoccupied hours
- Provide increased ventilation before, during, and after application
- If applying outside, avoid areas near air intakes
- Notify occupants of planned pest control activities.

Shipping/Receiving

- Do not allow idling of vehicles at loading docks, post signs, and enforce the ban
- Maintain receiving area under positive pressure to insure contaminants from the loading area do not enter the building
- Notify delivery companies of policy

Smoking

Smoking in any form is prohibited inside all college-owned or leased buildings including both residential and non-residential buildings and all recognized student housing including fraternities. In addition, smoking is prohibited in any college-owned or rented vehicles.

Individuals who choose to smoke must smoke outside and must stand at least 25 feet away from any campus building. The separation is required to prevent persons from having to inhale second hand smoke at the door, and to prevent smoke migration into the HVAC systems of the building.

Any person can report smoking related concerns to their supervisor and/or EHS for corrective action.

Pets

With the exception of certified service animals and animals specially approved for the educational purposes of the College, the presence of animals in all college-owned or leased buildings, including residential and non-residential buildings is prohibited, with the possible exception of College rental housing. For rental properties, this issue will be addressed on a case-by-case basis.

Dogs and other animals are permitted on campus roads, walks, and grounds when they are on a leash and controlled by the owner. It is the owner's responsibility to clean up after the animal.

All pets must be tagged, registered, and vaccinated in accordance with Pennsylvania State Law.

Managing Moisture and Mold

- Maintain relative humidity below 60%
- Insulate exterior walls and ceilings to avoid condensation on cold surfaces
- Insulate cold water pipes to avoid sweating
- Thoroughly clean and dry water from porous surfaces (such as carpet) within 24 hours or discard the material
- Maintain proper drainage around the perimeter of buildings
- Provide exhaust ventilation in showers and kitchens producing steam
- Clean drain pans often and insure a proper slope to keep water draining
- Ensure proper maintenance of cooling towers and treat cooling water
- Discard building materials and furniture having a persistent musty odor
- Discard all ceiling tiles with visible water stains.

HVAC Operations and Maintenance

Mechanical Trades HVAC technicians will perform or contract services to perform preventive and unscheduled maintenance to establish good indoor air quality, including but not limited to:

- Inspecting equipment for unusual conditions like excessive noise and heat
- Inspecting equipment for leaks, rust, dirt, and mechanical problems
- Performing mechanical and electrical adjustments (e.g. adjusting belt tension, tightening bolts)
- Performing HVAC testing and balancing
- Inspecting outside air intakes for nearby sources of contaminants
- Maintaining air distribution dampers, diffusers, and grilles that are clear of obstructions and operating properly
- Changing filters per manufacturer’s instructions
- Cleaning heating and cooling coils and inspecting for leaks
- Cleaning drain pans and inspecting for proper drainage
- Inspecting and cleaning the interior of air handling units
- Inspecting and cleaning air humidification systems
- Inspecting and cleaning cooling towers and treating water according to schedule
- Inspecting and cleaning air distribution pathways and CAV/VAV boxes as needed
- Cleaning boilers and performing combustion and flue gas tests
- Analyzing and adjusting chemicals for chiller
- Draining water from compressor tanks

Housekeeping

The Custodial department will perform or contract services to perform preventive and unscheduled maintenance to establish good indoor air quality, including but not limited to:

- Preventing dirt from entering and removing it once there (e.g. – cleaning outside buildings, using walk off mats)
- Purchasing products (e.g.. avoid aerosols) and choosing cleaning methods that minimize the introduction of pollutants and maximize removal of pollutants (e.g.. vacuums with HEPA filters, lint free dust clothes, no feather dusters)
- Deep cleaning carpet at regular intervals
- Minimize use of ammonia, chlorine, and volatile acid products
- Drying wet carpet or other porous materials within 24 hours or discarding material.
- Removing trash from building as soon as possible
- Following storage, use, and disposal guidelines on container labels and in SDS.

Guidance for Residence Halls

Temperature and Humidity Controls

- Do not operate the air conditioner while windows are open. Leaving windows open can cause cool dry air from the air conditioner to mix with warm humid air from outside. This can cause condensation to develop around air supply vents and windows.
- Do not block the air intakes or vents with furniture. Do not place your loft bed over the air conditioner. Obstructed airflow to the AC can result in excess moisture and condensation. Air should be allowed to flow freely around the air conditioner.
- Do not place potted plants or any other source of moisture on or around heating and cooling units.
- Open window coverings during the day to allow natural light into the room. Any window covering, including room-darkening curtains/shades, blankets, banners and/or tapestries that are placed over windows need to be opened during times when the room is unoccupied during the day. Ultraviolet rays from the sun can help to control growth of indoor air contaminants.
- Keep air conditioner on and running at all times during warm and humid days. Do not turn off the air conditioner when you leave the room. The air conditioner will help control both temperature and humidity.
- Set thermostats no lower than 70 degrees when cooling and no higher than 74 degrees when heating your room. Fans should be set on low speed and on ‘auto’ mode if possible.
- Be sure to run bathroom ventilation fans during showers, and for a period of time after showers, to prevent additional humidity from building up in the bathroom and adjacent rooms.

Housekeeping and Hygiene

- Regularly sweep, vacuum and/or mop floors. Wipe down window sills, counter tops and other furniture that can accumulate dust.
    - It may be useful to develop a cleaning plan/chart with roommates, or for yourself, to keep living spaces clean and mold-free from the start of the semester.

    - Area rugs can trap dust and dirt, and also hide moisture from spilled food and drinks. Be sure to thoroughly dry large spills, and regularly vacuum any area rugs.
- Do not leave wet or damp clothes, towels or shoes in piles, on the floor, or in closets, items should be placed on a drying rack until completely dry.
- Do not store shoes, laundry or other belongings, such as athletic gear, in front of the air intake of the air conditioner.

Empty room and bathroom trash on a daily basis, do not let waste accumulate in the living space. If you're removing a full bag of trash/recycling from your room, take it straight out to the dumpster/recycling bin outside.

Asbestos

Lafayette College has an Asbestos Operations and Maintenance Plan for all areas of the College which includes; hazards and identification of asbestos, as well as requirements for maintenance operations, special work activities and emergency response procedures for incidents that could result in a release.

Lafayette College also has a testing process to check for the possibility of asbestos in new products being used in alteration, construction and renovation of projects, before installation of same occurs.

Asbestos Management Plan

Lead

Lafayette College has a lead abatement, notification, and painting policies for both interior and exterior painting on both academic and residential buildings.

Lead Based Paint Management Plan

Radon

Lafayette College has a radon management plan to minimize potential radon exposure to occupants of College-owned facilities.

Radon Management Plan

Information and Training

All employees of the College will be made aware of the IAQ plan, the factors that contribute to poor IAQ, their role in minimizing problems, and the process used to identify and resolve IAQ problems.

Environmental, Health and Safety provides additional training to College personnel who could impact IAQ (e.g. custodial staff and HVAC technicians)

Recordkeeping

Records shall be kept in accordance with the Lafayette College Hazard Communication Plan.