

TDI

Safety @ Work
Division of Workers' Compensation



**Indoor
Air
Quality**



**Workplace
Program**



DISCLAIMER

This Indoor Air Quality (IAQ) Workplace Program is a guide to help employers develop a safety plan to comply with the requirements of the Occupational Safety and Health Administration (OSHA). It contains helpful information and the basic elements to build a safety and health program. It is not meant to supersede OSHA requirements. Employers should review the OSHA standard for each specific worksite and customize the program accordingly. This IAQ Workplace Program is provided as a public service by the Texas Department of Insurance, Division of Workers' Compensation (DWC)-Workplace

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INTRODUCTION



Workplace Program



Testing particulate matter levels

Architects, engineers, and construction professionals are constantly seeking ways to improve the energy efficiency of buildings to increase comfort and control costs. Installing vapor barriers, insulating walls and ceilings, and placing seals around windows and doorframes allow air-conditioning and heating systems to work more effectively. However, these measures also decrease the rate of exchange between outdoor and indoor air, trapping pollutants such as smoke, vapors, mold, and chemicals inside. This can have short- and long-term health effects on the people who live and work in these buildings

Indoor air quality (IAQ) refers to the quality of the air in any building environment. Monitoring IAQ and studying its impact on human health is important for several reasons:

- Americans spend about 90% of their time indoors,¹ where some pollutants are often 2 to 5 times higher than those outside.²
- People whose health is most often affected by pollution -- those with cardiovascular or respiratory disease; older adults; and the very young -- tend to spend more time indoors.³

- Indoor pollutants continue to increase as the amount of synthetic building materials, furnishings, pesticides, and cleaners are used.⁴

This workplace program is designed to provide information on the sources and other factors that affect IAQ; its effects on human health; and ways employers can improve IAQ as part of an overall health and safety program. It also includes management checklists and logs to monitor IAQ and a sample IAQ Management Plan to help improve employees' health, comfort, and ability to productively work.

At the time of this workplace program's publication, OSHA has no IAQ standards, but it does provide guidelines about the most common IAQ workplace complaints. It is important to note that poor IAQ can make employees sick. Under the Occupational Safety and Health Act of 1970, each employer is legally required to furnish each employee with a "workplace free from recognized hazards that are causing or likely to cause death or serious physical harm." This workplace program is intended to assist managers in understanding and fulfilling their legal obligations to protect the health and safety of their employees.

TABLE OF CONTENTS

Indoor Air Quality Workplace Program

INTRODUCTION	3
POLLUTANTS AND SOURCES	5
Indoor Sources.....	5
Combustion Sources	5
Chemicals	5
Building Materials	5
Substances of Natural Origin	5
Outdoor Sources	6
Radon, Smoke, Dust, Contaminated Groundwater and Soils	6
Other Factors Affecting Indoor Air Quality	6
Air Exchange Rate.....	6
Outdoor Climate and Weather Conditions	6
EFFECTS ON HUMAN HEALTH	6
Carbon Monoxide	7
Particulate Matter	7
Volatile Organic Compounds (VOCs)	7
Radon	7
Mold	7
Other Factors	7
WAYS TO IMPROVE IAQ	7
APPENDIX A: IAQ Management Checklist	11
APPENDIX B: Log of Activities and System Operations	15
APPENDIX C: IAQ Complaint Log	16
APPENDIX B: IAQ Management Plan Template	17
REFERENCES	24

POLLUTANTS & SOURCES

Most pollutants affecting IAQ come from sources inside buildings, but some come from outdoors.

Indoor Sources

Combustion sources

These are gases and particles made by burning any fuel (including those from cooking equipment and fireplaces) such as wood, natural gas, kerosene, charcoal, or tobacco. Combustion sources release harmful byproducts into the indoor environment, such as:

- **carbon monoxide**-an odorless, colorless, and possibly deadly gas; and
- **particulate matter**-tiny pieces (or particles) of solids or liquids in the air, including dust, dirt, soot, smoke, and drops of liquids, which are often too small to see but small enough to enter the respiratory system.

Chemicals

Products such as **cleaning supplies, paints, insecticides, and other commonly used products** can introduce chemicals into the indoor air. This may include:

- **volatile organic compounds (VOCs)**-a large group of chemicals found in many products used to build, maintain, and operate a facility, including products made with benzene, ethylene glycol, formaldehyde, methylene chloride, tetrachloroethylene, toluene, xylenes, and 1,3-butadiene.

Building materials

New materials, such as **pressed wood products, varnishes, adhesives, vinyl flooring, carpet, and upholstery foam**, to name a few, may contain products that can pollute indoor air. Also, degrading materials such as asbestos fibers released from building insulation can be a source of dangerous pollution.

Substances of natural origin

Other organic substances, such as **radon, mold, and pet dander**, introduce pollutants into indoor air. Radon forms naturally in uranium ore and decays into the soil. Radon can enter buildings through cracks or gaps in structures.

Air Quality Index

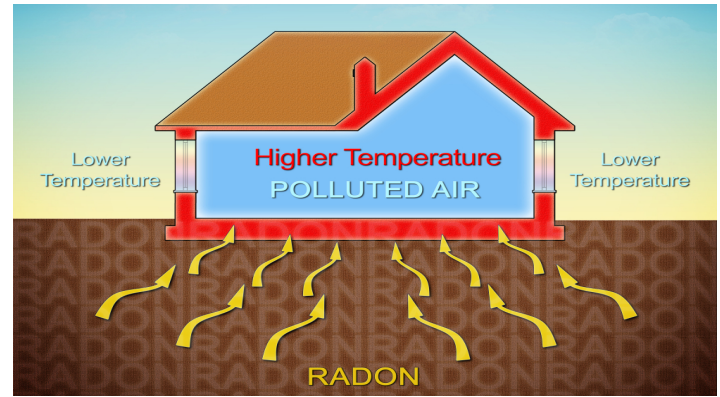
The AQI is an index for reporting daily air quality. It reports how clean or polluted the air is and what associated health effects might be of concern.

Good	0-50
Moderate	51-100
Unhealthy for sensitive groups	101-150
Unhealthy	151-200
Very unhealthy	201-300
Hazardous	301-500

Outdoor Sources

Radon, smoke, dust, and contaminated groundwater and soils

Outdoor air pollutants, such as **radon** (see above) or **smoke from chimneys and wildfires**, can enter buildings through open doors and windows, ventilation systems, and cracks in structures. When people enter buildings, they can bring in **soil and dust** on their shoes and clothing, along with pollutants that stick to those particles. Some pollutants come indoors through building foundations. In areas with contaminated groundwater or soil, VOCs can enter buildings through the same process. VOCs in water supplies can also enter indoor air when building occupants use the water while showering or cooking.



- **natural ventilation**, the air that flows through opened windows and doors; and
- **mechanical ventilation**, the air that is forced indoors or vented outdoors by devices such as fans or air handling systems.

Other Factors Affecting IAQ

Air exchange rate

The air exchange rate is the rate at which outdoor air replaces indoor air within a room. The design, construction, and operations within the building affect how air flows, or **infiltrates**, through and around openings, joints, and cracks in walls, floors, ceilings, windows, and doors. The following also affects the air exchange rate:

Outdoor climate and weather conditions

Certain climatic conditions can increase the potential for **indoor moisture and mold growth** if not controlled by adequate ventilation or air conditioning. Weather conditions also influence whether building occupants keep windows open or closed and whether they operate air conditioners, humidifiers, or heaters, which affect indoor air quality.

EFFECTS ON HUMAN HEALTH

The health effects of indoor air pollutants include:

- **irritation of the eyes, nose, and throat;**
- **headaches, dizziness, and fatigue;**
- **respiratory diseases;**
- **heart disease; and**
- **cancer.**

The link between indoor air pollutants and health effects is well established. Many indoor air pollutants, such as dust mites, mold, pet dander, tobacco smoke, cockroach allergens, and more, are known to cause **asthma** in some people.

Other common health concerns linked to indoor pollution include:

Carbon Monoxide

Carbon monoxide is toxic. Short-term exposure to high levels of carbon monoxide levels indoors can be lethal.⁶ It is harmful because it binds to a protein that reduces the blood's ability to carry oxygen to the body's organs. The most common effects of carbon monoxide exposure are **fatigue, headaches, confusion, and dizziness** due to a lack of oxygen to the brain. It can also cause **chest pain and cardiovascular problems** due to a lack of oxygen to the heart muscles.^{7,8}

Particulate Matter

Particles too small to see can cause or contribute to **respiratory problems** for many people. Dust, tobacco smoke, cooking, candles, tracked-in soil, pet dander, human skin cells, copier toner, and other types of particles can contribute to respiratory symptoms. Health problems may include a **cough, phlegm, wheezing, problems with lung (pulmonary) function, and inflammation of the airways and lungs.**⁹

Volatile Organic Compounds (VOCs)

Exposure to indoor VOCs can cause a variety of health effects, including **eye, nose, and throat irritation, headaches, loss of coordination, nausea, and damage to the liver, kidneys, or central nervous system.**¹⁰ Some VOCs are also suspected or proven carcinogens, such as formaldehyde, which can cause **nose and throat cancer**, and benzene, which can cause **leukemia.**¹¹ Others, such as high-level exposure to methylene chloride, often found in adhesives, paints, and other building and maintenance products, can result in **loss of consciousness and irreversible brain damage.**¹² Also, long-term exposure to high levels of para-Dichlorobenzene (p-DCB), a common



Testing of carbon monoxide (CO₂) levels = 825 parts per million (PPM).

bathroom deodorizer often found as a pink cake in urinals, has the potential to cause **anemia, skin lesions, appetite loss, liver damage, and changes in the blood.**¹³

While many common cleaners, deodorizers, and building materials that contain these chemical compounds are safe when people are exposed to them in small amounts, employers should review the [Indoor Air Quality Scientific Findings Resource Bank](#) and [OSHA's Indoor Air Quality in Commercial and Institutional Buildings](#) before deciding to use these products in the workplace.

Radon

Radon is the second leading cause of **lung cancer.**^{14,15} It is a radioactive gas found in the soil in all U.S. states.¹⁶ It can force its way through basements or concrete slabs by air pressure in the soil and concentrate in the indoor atmosphere. This can cause health problems for people working in or occupying these buildings after a period of years. Buildings can be tested for radon. Radon test kits, measures, and ways to contact mitigation professionals can be found on the [Environmental Protection Agency \(EPA\) Radon website.](#)

Mold



Exposure to large numbers of mold spores may cause allergic symptoms such as **watery eyes, runny nose, sneezing, itching, coughing, wheezing, difficulty breathing, headaches, and fatigue.**¹⁷ Repeated exposure can increase a person's sensitivity, causing more severe allergic reactions. Also, certain molds can produce toxins called mycotoxins under certain conditions. Mycotoxins can cause **nausea, gastrointestinal problems, and vomiting.**¹⁸

Other Factors

Damp indoor environments can cause serious health concerns, such as **asthma and sinusitis.** It can also be a breeding ground for a variety of bacteria. Among them is *Legionella*, a waterborne bacterium that causes a form of pneumonia known as **Legionnaires' disease.** This disease has been associated with buildings with poorly maintained air conditioning or heating systems.^{19, 20} In addition, another route of exposure is spray from hot-water systems. Mist from evaporative cooling towers without biocide treatment is a reported source.²¹

Viruses, too, such as **COVID-19**, can be transmitted by inhaling aerosol particles. Particles from an infected person can move throughout an indoor space and linger in the air for hours after a person has left the room.²²

While harmful health has been attributed to some organic and non-organic pollutants, the science of indoor air quality issues continues to evolve. One evolving concern is **sick building syndrome**, which happens when similar symptoms occur among the occupants of a building, then lessen or disappear after the individuals leave. This feeling of ill health increases sickness and absenteeism and decreases productivity among workers.²³ These symptoms are increasingly attributed to a variety of indoor air pollutants.

WAYS TO IMPROVE IAQ

IAQ directly affects the overall health and well-being of employees. Therefore, it should be a priority in an overall health and safety plan. Companies can hire professionals to improve IAQ or they can oversee it themselves. These steps can help:

Keep the workplace clean.

A clean workplace has lower levels of mold, dust, allergens, and contaminants that can spread through the air.

- **Vacuum and steam clean carpets regularly.**

Carpets are storehouses of particles, especially dust, dust mites, dropped food particles, and sluffed-off human skin cells (that nourish the dust mites). However, avoid using carpet shampoos that contain deodorizers, which add chemical vapors to the air. The U.S. Consumer Product Safety Commission (CPSC) recommends installing carpets that are “low-volatile organic compound emitters.”²⁴ The CPSC also encourages consumers to ask retailers or installers about the carpet industry’s voluntary “green label” program for new carpets.²⁵

- **Use walk-off mats.**

Mats at entryways keep dirt from entering the building.

- **Remove dirt and contaminants once it is in the building.**

Regularly dispose of garbage, store food properly, and keep products that can release odors and contaminants out of the building.

- **Use local exhaust.**

Devices such as canopy hoods are effective at removing point sources of pollutants before they spread into the building’s air.

- **Use a well-designed and functioning ventilation system.**

Effective HVAC systems should control temperature, humidity, odors, contaminants, and outdoor-air distribution.

Change HVAC filters regularly.

Change the HVAC filters regularly to prevent dust and other air pollutants from circulating back into the indoor air. Clogged filters can interrupt airflow and speed up the build-up of pollutants in enclosed spaces. Use High-Efficiency Particulate Air (HEPA) filters to cut the levels of airborne particles and compounds.

Ventilate properly.

Whenever possible, turn off the HVAC system and open the windows to allow outdoor air to enter the building. Keep air vents unblocked. Do not place furniture, storage boxes, chairs, or cabinets in front of air vents, which can disrupt air circulation.

Use eco-friendly cleaning products.

“Greener” cleaning products do not release harsh chemicals into the air. To identify more eco-friendly and healthier cleaning products, consult the EPA’s [Sustainable Marketplace](#).

Use air-cleaning devices.

Commercial-grade equipment, such as air scrubbers, dehumidifiers, and air purifiers, is a great way to keep indoor air quality at good levels and prevent the need to hire professionals.



Dirty filter on an HVAC system



Air flow test for Variable Air Volume (VAV)

Inspect the building routinely.

Check the roof, walls, foundations, and seals around doors and windows. Promptly fix any problems. Look for water leaks and any visible damp or moist areas. Clean and dry any damp materials and furnishings within 48 hours after detection to prevent mold. Ensure that the building is under a slight positive pressure (air comes out of the building when the exterior doors are opened). Keep scheduled renovations isolated from the building's general ventilation system.

Conduct regular air tests.

Performing periodic indoor air tests provides the right information and insights to make an IAQ improvement plan more directed and effective. Air quality tests include checking humidity levels, airflow, ventilation, mold growth, odors, and water damage.

- **Maintain a constant temperature and humidity.**

Keep the temperature at 68° to 78° and maintain a relative humidity of 30% to 60%.

- **Monitor carbon dioxide levels.**

Carbon dioxide levels can indicate how effective the ventilation is and if there is an overcrowding issue (excessive population density). Recent [studies](#) indicate that an increase in population density increases air pollution by 3% to 12%.²⁶

Consider adding indoor plants.

Indoor plants are a great addition to an office. They help promote better IAQ by absorbing carbon dioxide and releasing oxygen into the air.

Implement an IAQ management plan.

An IAQ management plan is designed to address, prevent, and resolve indoor air quality problems in each building. As part of the plan, management should:

- identify pollution sources;
- evaluate the HVAC system performance;
- observe production processes and work practices;
- measure contamination levels and employee exposures;
- provide medical testing or physical examinations;
- conduct employee interviews;
- review records of medical tests, job histories, and injuries and illnesses;
- perform periodic indoor air quality inspections;
- maintain the appropriate checklists and logs (see Appendix A, B, and C);
- perform repairs and upgrades to ventilation and cleaning equipment as needed; and
- implement follow-up assessments or other needed actions.

APPENDIX A:

IAQ Management Checklist

Building Name: _____ Date: _____

Address: _____

Completed by (name/title): _____

Use this checklist to make sure that you have included all necessary elements in your IAQ profile and IAQ management plan.

Item	Date started or completed (as applicable)	Responsible person (name, telephone)	Location ("NA" if the item does not apply to this building)
IAQ PROFILE			
Collect and Review Existing Records			
HVAC design data, operating instructions, and manuals			
HVAC maintenance and calibration records, testing and balancing reports			
Inventory of locations where occupancy, equipment, or building use has changed			
Inventory of complaint locations			
Conduct a Walkthrough Inspection of the Building			
List of responsible staff or contractors, evidence of training, and job descriptions			
Identification of areas where positive or negative pressure should be maintained			
Record of locations that need monitoring or correction			
(continued)			

Item	Date started or completed (as applicable)	Responsible person (name, telephone)	Location ("NA" if the item does not apply to this building)
Collect Detailed Information			
Inventory of HVAC system components needing repair, adjustment, or replacement			
Record of control settings and operating schedules			
Plan showing airflow directions or pressure differentials in significant areas			
Inventory of significant pollutant sources and their locations			
MSDSs for supplies and hazardous substances that are stored or used in the building			
Zone/Room Record			
IAQ MANAGEMENT PLAN			
Select IAQ Manager			
Review IAQ Profile			
Assign Staff Responsibilities & Train Staff			
Facilities Operation and Maintenance			
Confirm that equipment operating schedules are appropriate			
Confirm appropriate pressure relationships between building usage areas			
Compare ventilation quantities to design, codes, and ASHRAE 62-1989			
Schedule equipment inspections per preventive maintenance or recommended maintenance schedule			
<i>(continued)</i>			

Item	Date started or completed (as applicable)	Responsible person (name, telephone)	Location ("NA" if the item does not apply to this building)
Modify and use HVAC Checklist(s); update as equipment is added, removed, or replaced			
Schedule maintenance activities to avoid creating IAQ problems			
Review MSDSs for supplies; request additional information as needed			
Consider using alarms or other devices to signal the need for HVAC maintenance (e.g., clogged filters)			
Review trash disposal procedures; modify them if necessary			
Housekeeping			
Evaluate cleaning schedules and procedures; modify if necessary			
Review MSDSs for products in use; buy different products if necessary			
Confirm proper use and storage of materials			
Review trash disposal procedures; modify them if necessary			
Shipping and Receiving			
Review loading dock procedures (Note: If the air intake is located nearby, take precautions to prevent intake of exhaust fumes.)			
Check pressure relationships around the loading dock			
<i>(continued)</i>			

Item	Date started or completed (as applicable)	Responsible person (name, telephone)	Location ("NA" if the item does not apply to this building)
Pest Control			
Consider adopting IPM methods			
Obtain and review MSDSs; review handling & storage			
Review pest control schedules and procedures			
Review ventilation used during pesticide application			
Occupant Relations			
Establish a health and safety committee or joint tenant/management IAQ task force			
Review procedures for responding to complaints; modify if necessary			
Review lease provisions; modify if necessary			
Renovation, Redecorating, Remodeling			
Discuss IAQ concerns with architects, engineers, contractors, and others			
Obtain MSDSs; use materials and procedures that minimize IAQ problems			
Schedule work to minimize IAQ problems			
Arrange ventilation to isolate work areas			
Use installation procedures that minimize emissions from new furnishings			
Smoking			
Eliminate smoking in the building			
If smoking areas are designated, provide adequate ventilation & maintain under negative pressure			
Work with others to develop non-smoking policies, such as starting smoking cessation programs			

APPENDIX B:

Log of Activities and System Operations

Building Name: _____ Address: _____

File Number: _____ Completed by: _____ Phone: _____

On the form below, please record your observations of the HVAC system operation, maintenance activities, and any other information that you think might help identify the cause of IAQ complaints in this building. Please report any other observations (e.g., weather, other associated events) that you think may be important. Attach additional pages or use more than one line for each event, if needed.

Equipment and activities of particular interest:

Air Handler(s): _____

Exhaust Fan(s): _____

Other Equipment or Activities: _____

Date/Time	Day of Week	Equipment Item/ Activity	Observations/ Comments

APPENDIX D:

IAQ Management Plan Template

The following IAQ Management Plan Template is provided courtesy of The State Office of Risk Management and Clemson University Environmental Health and Safety.

[Company Name] Indoor Air Quality Management Plan

[date]

Introduction

Concerns with Indoor Air Quality (IAQ) have increased since efforts to conserve energy in office buildings began in the 1970s. However, these measures lessened the flow of outside air, causing a buildup of contaminants in the indoor air. Complaints about IAQ range from odd smells and comfort issues -- too hot, cold, drafty, etc. -- to more complex problems, where the air quality may cause illness and lost work time.

It may not be easy to identify a single reason for IAQ complaints because of the number and variety of possible sources, causes, and individual sensitivities. Nevertheless, [Company Name] is committed to providing its employees and visitors with an indoor environment free of contaminants and airborne disease agents.

IAQ Coordinator

The [Company Name] IAQ Coordinator responsible for managing the IAQ Management Program is [Responsible Person]. The IAQ Coordinator will:

- train employees to recognize, prevent, and resolve IAQ problems;
- communicate with building occupants about IAQ issues or problems;
- develop a procedure to document and respond to IAQ complaints and problems;
- conduct, at a minimum, a yearly documented inspection of the premises; and
- maintain IAQ records, including:
 - IAQ complaints and resolutions; and
 - maintenance, repair, or remodeling activities that could negatively impact IAQ.

The duties of the IAQ Coordinator (or designate) will also include conducting periodic walkthrough inspections of occupied areas and mechanical rooms. During the walkthrough, the IAQ Coordinator will document and note on a floor plan or comparable drawing all potential IAQ problems including:

- odors;
- dirty or unsanitary conditions;

- visible fungal growth or mold;
- moisture in inappropriate locations, such as on walls, floors, or carpets;
- staining or discoloration of building materials;
- smoke damage;
- presence of hazardous substances;
- poorly-maintained filters;
- uneven temperatures;
- personal air cleaners, ozone generators, portable filtration units, or fans;
- inadequate ventilation;
- inadequate exhaust airflow;
- blocked vents;
- drain pans that do not fully drain;
- HVAC system condition and operations including:
 - any components that need to be repaired, cleaned, or replaced (and ensuring work orders are prepared); and
 - control settings and operating schedules for each air handling unit (including recording, filing, and checking against the design intent); and
- any other areas with sources of contaminants, such as copy rooms, food service areas, print shops, and photographic areas.

In addition, the IAQ Coordinator is responsible for correcting or taking steps to control all identified source-related and ventilation-related IAQ problems.

Training

[Company Name] will identify and train all employees and contract personnel whose functions could impact IAQ, such as housekeeping staff and maintenance contractors.

Facility Operations and Maintenance Plan

[Company Name] will ensure a Facility Operations and Maintenance Plan is in place that includes:

- **HVAC Operations**
Operating schedules for HVAC equipment have been written and are updated as needed.
- **Preventive Maintenance**
A preventive maintenance plan has been written and is followed on a regular schedule. This schedule, preventive maintenance plan, and operations manuals are updated when equipment is added, removed, replaced, or otherwise needed. It monitors:
 - outside air intakes (and any nearby sources of contaminants);

- air distribution dampers;
- air filters;
- drain pans;
- heating and cooling coils;
- air handling units;
- fan motor and belts;
- air humidifiers and controls;
- cooling towers (and needed water treatment);
- air distribution pathways; and
- variable air volume (VAV) boxes.

- **Unscheduled Maintenance**

Procedures for unscheduled maintenance events, such as when equipment fails, have been written and communicated with building staff. The procedures include:

- Company personnel shall immediately contact the IAQ Coordinator when a maintenance need occurs.
- The IAQ Coordinator:
 - ✓ notifies building occupants of the needed maintenance promptly;
 - ✓ provides information on the action that will be taken;
 - ✓ addresses how IAQ will be protected; and
 - ✓ informs occupants when corrective actions have been completed.

- **Housekeeping**

Housekeeping keeps an inventory of all housekeeping equipment and products used in the building and communicates it to the IAQ Coordinator. Housekeeping also keeps the IAQ Coordinator updated on inventory changes.

All products used at [Company Name] that produce strong odors, are potential irritants, or may have other IAQ impacts are replaced, where possible, by products without such impacts.

The Housekeeping Director has written procedures that detail the proper use, storage, and purchase of cleaning materials. These are updated as needed.

To improve IAQ, the housekeeping staff or contractors must receive training on the appropriate use and application of the following:

- proper cleaning methods;
- cleaning schedules;
- proper materials storage and use; and
- proper trash disposal.

Management of Processes with Potentially Significant Pollutant Sources

Purchasing Practices

When new products are purchased, information on potential indoor air contaminant emissions is requested from product suppliers. [Note: Emission information may not be readily available for many products. However, available information is collected.] When the services of architects, engineers, contractors, or other professionals are used, IAQ concerns, such as special exhaust needs, are discussed.

Remodeling and Renovation

Procedures to lessen contaminants or odors to occupied areas of the building are used and required of contractors. The procedures include:

- the IAQ Coordinator and Risk Manager review designs and construction activities for all proposed remodeling and renovation activities before contractors are involved;
- work is scheduled during periods of minimum occupancy;
- ventilation is provided to isolate work areas;
- lower-emitting work processes, such as wet-sanding of drywall, are used;
- specialized cleaning procedures, such as HEPA vacuums, are used;
- filters are changed frequently, especially after work is complete;
- emissions from new furnishings are minimized through processes such as buying lower-emitting furniture and airing out furnishings before installation; and
- ventilation and distribution equipment is protected from contamination during construction.

Painting

Exposure to paint vapors is minimized by using low-emitting products, scheduling work during periods of minimum occupancy, and increasing ventilation.

Pest Control

These Integrated Pest Management procedures are used to the extent possible:

- pest control products used in the building are communicated to the IAQ Coordinator;
- written procedures and contract language ensure that all people who use pest control products read and follow all label directions for proper use, mixing, storage, and disposal;
- non-chemical pest control strategies are used where possible; and

- the safest available pest control products that meet the building's needs are used or reviewed with the pest control contractor.

Shipping or Receiving Activities

Vehicle exhaust has been prevented from entering the building (including through air intakes and building openings) by installing barriers to airflow from loading dock areas, such as air curtains, and using pressurization to prevent the mixing of vehicle exhaust with building air.

In buildings where these barriers have yet to be installed, [Company Name] has an implementation plan.

Smoking

Smoking is prohibited in all [Company Name] buildings and subject to the [Company Name] Smoking Policy.

Maintaining Cooperative Relations with Occupants

The IAQ Coordinator keeps occupants routinely informed about building conditions and policies that may impact IAQ. This may include practices that attract insects or smoking policy clarifications. Also, occupants are notified about planned major renovations, remodeling, maintenance, or pest control activities.

Procedures for Responding to IAQ Complaints

Procedures for responding to IAQ complaints have been written and are as follows:

- IAQ problems are logged into the existing work-order system;
- information is collected from complainants;
- information and records obtained from complainants are kept confidential;
- the capability of in-house staff to respond to complaints is assessed;
- appropriate outside sources of assistance are identified;
- feedback is provided promptly to the complainant;
- remedial actions are taken;
- remedial actions are followed-up to determine if the action has been effective;
- building staff have been informed of these procedures; and
- building occupants have been informed of these procedures, are periodically reminded of how to locate responsible staff, and are informed on how to submit a complaint.

APPENDIX E:

Additional Resources

Applicable OSHA Standards and Regulations

OSHA does not have a general IAQ standard but does provide guidelines addressing the most common workplace complaints about it, which are typically related to temperature, humidity, lack of outside air ventilation, or smoking. OSHA standards address potentially hazardous conditions leading to serious physical harm or death. Such standards may include those for specific air contaminants, ventilation systems, or the General Duty Clause of the Occupational Safety and Health Act of 1970 (OSH Act). This section highlights OSHA standards, standards interpretations, and national consensus standards related to IAQ.

OSHA Standards

All OSHA regulations, interpretations, and the OSH Act can be found at www.osha.gov. Important OSHA statutes and standards include:

- **Occupational Safety and Health Act of 1970**
[Section 5\(a\)\(1\)](#), often referred to as the General Duty Clause, requires employers to furnish to all “employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.”

[Section 5\(a\)\(2\)](#) requires employers to “comply with occupational safety and health standards promulgated under this Act.”

Some of the applicable OSHA Standards are:

- [29 CFR 1904](#), Recording and Reporting Occupational Injuries and Illnesses.
- [29 CFR 1910.94](#), Ventilation.
- [29 CFR 1910.1000](#), Air Contaminants.
- [29 CFR 1910.1048](#), Formaldehyde.
- [29 CFR 1910.1450](#), Occupational exposure to hazardous chemicals in laboratories.

Standard Interpretations

- [Enforcement policy for respiratory hazards not covered by OSHA Permissible Exposure Limits. \(November 2, 2018.\)](#)
- [Air monitoring results, citations, and employee exposure records. \(March 27, 2002.\)](#)
- [The use of ozone gas from ozone generators in a large room. \(April 3, 1995.\)](#)
- [Request for a list of all OSHA-regulated air contaminants. \(March 22, 1995.\)](#)

- [Record retention requirements for indoor air quality documents and reports. \(August 1, 2002.\)](#)
- [Reiteration of existing OSHA policy on indoor air quality: office temperature and environmental tobacco smoke. \(February 23, 2003.\)](#)

Applicable Action Kits and Guides

- [Indoor Air Quality Guide: Best Practices for Design, Construction, and Commissioning](#)
- [Indoor Air Quality Tools for Schools Action Kit](#)
- [Green Building](#)
- [Building Assessment Survey and Evaluation Study](#)
- [Moisture Control Guidance for Building Design, Construction, and Maintenance](#)

Other Resources

Texas Occupational Safety and Health Consultants (OSHCON) are available to provide free, on-site, or virtual assistance to help companies create or improve their IAQ management program and comply with OSHA standards. For more information, contact an OSHCON consultant at **1-800-252-7031, option 2**, or OSHCON@tdi.texas.gov.

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