

University of Texas at Dallas Indoor Air Quality Policy for University Buildings

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Office of Environmental Health and Safety

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The University of Texas at Dallas (UTD) has created a guiding policy for the minimization of indoor air quality issues surrounding new construction/ remodeling/ renovation projects on campus or leased facilities. The policy framework adopted relevant sections of the Voluntary Indoor Air Quality Guidelines for Government Building issued by the Texas Department of Health, December 22, 2002.

- (a) **Purpose.** UTD developed these guidelines to promote practices that prevent or reduce the contamination of indoor air, thereby contributing to a safe, healthy, productive and comfortable environment for building occupants.
- (b) **Scope.** UTD buildings owned or leased that are enclosed on all sides from floor to ceiling by walls or windows (exclusive of door ways) that extend from the floor to the ceiling are covered by this policy.

Definitions

- (1) Acceptable indoor air quality - The quality of air in an occupied enclosed space that is within an established temperature and humidity comfort zone, and which does not contain air contaminants in sufficient concentration to produce a negative impact on the health and comfort of the occupants.
- (2) Air contaminant - A gaseous, liquid, or solid substance or combination of substances in a form transported by or in air that has the potential to be detrimental to human health.
- (3) ASHRAE - American Society of Heating, Refrigerating and Air-conditioning Engineers, Incorporated.
- (4) Building commissioning - The process of ensuring that all building systems are designed, installed, functionally tested, and operated in conformity with design intent. Commissioning includes planning, design, construction, start-up, testing, documentation, owner acceptance, and training throughout the life of the systems and building.
- (5) HVAC system - The heating, ventilation, and air conditioning system that provides the processes of comfort heating, ventilating and/or air conditioning within, or associated with, a building.
- (6) IAQ - Indoor Air Quality. The attributes of the respirable atmosphere (climate) inside a building including gaseous composition, humidity, temperature, and contaminants.
- (7) IAQ coordinator - A designated person who provides leadership and coordination of IAQ activities. The responsibilities should include coordination of an IAQ team, preparation for emergency responses, dissemination of IAQ information, tracking of IAQ complaints and direction of responses, and communication of IAQ issues and status to interested parties.

- (8) IAQ management plan - A written plan for preventing and resolving IAQ problems.
- (9) Indoor air pollution - The presence, in an indoor environment, of one or more air contaminants in sufficient concentration and of sufficient duration to be capable of causing irritation and/or adverse effects to human health.
- (10) MERV - Minimum Efficiency Reporting Value. A number that reflects the filter efficiency based on the testing procedure defined in ASHRAE Standard 52.2-1999
- (11) Microbials - Agents derived from, or that are, living organisms (e.g., viruses, bacteria, fungi, and mammal, bird and dust mite antigens) that can be inhaled and can cause adverse health effects including allergic reactions, respiratory disorders, hypersensitivity disorders, and infectious diseases. Also referred to as "microbiologicals" or "biological contaminants."
- (12) Negative pressure - A condition that exists when the air pressure in an enclosed space is less than that in the surrounding areas. Under this condition, if an opening exists between these locations, air will flow from surrounding areas into the negatively pressurized space. A negatively pressurized building will have airflow from the outside into the building through available openings.
- (13) Occupied zone - the region within an occupied space between the planes three and 72 inches above the floor and more than two feet from the walls or fixed air-conditioning equipment (ASHRAE Standard 62-2001).
- (14) Positive pressure - A condition that exists when the air pressure in an enclosed space is greater than that in the surrounding areas. Under this condition, if an opening exists between these locations, air will flow from the positively pressurized space into surrounding areas. A positively pressurized building will have air flow from the building to the outside through available openings.
- (15) Preventive maintenance - Regular and systematic inspection, cleaning, and replacement of worn parts, materials and systems. Preventive maintenance helps to keep parts, materials, and systems from failing by ensuring they are in good working order.
- (16) Qualified - Personnel possessing the necessary education, experience and equipment (where required) to accomplish the activities being performed. Certifications may be required for some regulated functions, such as asbestos and lead-based paint abatement.
- (17) Recognized best practices - Those procedures that are considered by knowledgeable practitioners to be necessary to produce the most favorable results

Recommendations for Implementing a Governmental Building IAQ Program.

(a) Initial program development. The development of a UTD IAQ program should include the following considerations.

- (1) IAQ coordinator. An IAQ coordinator should be appointed and trained to manage the IAQ program.
- (2) Occupant considerations. When implementing an IAQ program for a building, characteristics and activities of the population occupying and visiting the building should be considered, as these may indicate unique needs relating to indoor air quality.
- (3) Facilities assessment. An IAQ and operational assessment of all facilities should be performed to identify and document building operations and problem areas based on current use and recognized codes and standards where available. Operational and maintenance needs that can be addressed immediately, and in the future, should also be identified and documented.
- (4) Development of goals. Based on the results of the IAQ occupant needs and facility assessment, and resources available, each IAQ coordinator should develop goals, written plans and programs, which must be achieved for the implementation of an effective IAQ program.
- (5) UTD administrative support for stated goals. Administrative support from the highest level of the organization and a written commitment to the goals is necessary for an effective IAQ program.
- (6) Funding. Adequate budgets are necessary for IAQ and maintenance staff to meet the stated goals, plans and programs. The amounts of funding will vary based on the scope of each governmental program.
- (7) Staff. An IAQ support team should be developed and trained as necessary to achieve the goals of the governmental entity. The team may include administrators, facility managers, health officials, custodians and maintenance personnel, an energy manager, design and construction staff, occupants, and others.

(b) IAQ management plan. A written IAQ management plan should be developed and maintained. The plan should include the following.

- (1) Training. Training of IAQ team, and all the personnel involved in maintaining the building

- (2) Communication. Should be established with various groups including the people using the building, physical plant, 24-hour maintenance, and the administration.
- (3) Complaint response. Documenting and responding to IAQ complaints and problems.
- (4) Record keeping. Records retention rules specific for each agency should be followed.
- (5) Maintenance and operation plan. A written description of the building systems and functions, and occupancy, schematics and/or as-built drawings with equipment locations and performance criteria, outside air requirements, sequences of operation, daily building and system operation schedules, test and balance reports, maintenance schedules, building inspection checklists and maintenance equipment checklists.

§297.4. Design/Construction/Renovation.

- (a) **Building design (new construction).** The following factors should be considered during the planning and design stages.
 - (1) New buildings. Design and construction standards that facilitate the maintenance of acceptable IAQ should be established.
 - (2) Site selection. During the selection of building sites, consideration should be given to minimizing or designing to avoid potential contaminant sources. Some of these considerations include the following.
 - (A) Environmental assessment. A Phase I (visual inspection and condition measurements) environmental assessment of property to identify on-site contamination that could affect indoor air quality should be conducted.
 - (B) Climate. Climate assessment data that include factors affecting building layout and other architectural design considerations such as temperature, relative humidity, dewpoint, rain quantity and prevailing direction, elevation and prevailing winds should be developed and evaluated.
 - (C) Drainage. Conduct a drainage survey to assure water can be diverted from the building site and away from the building.
 - (3) Documentation. Facility design should include the development of owner's project requirement and basis of design documents to guide the design and construction team in the selection of the least polluting materials and the production of a healthy building environment for the occupants. Some of the documentation and methods include:

- (A) The design team should be assembled from qualified and licensed professionals that are knowledgeable in air quality issues.
 - (B) A building use and occupancy plan, schedule, and requirements should be assembled.
 - (C) An indoor pollutant source control plan should be developed to guide the materials usage, equipment selection and activities in the building.
 - (D) Comply with appropriate codes and standards.
 - (E) Assess the budget and schedule impacts of all materials and systems.
 - (F) A testing and commissioning plan should be developed to quantify the facility performance results required.
 - (G) Building operational and training documentation plans should be provided including the requirements for equipment systems manuals.
- (4) Site and Facility Planning. The building design should consider the following.
- (A) Building structure factors. Factors that can affect IAQ, such as the shape and size, orientation, layout, proximity to pollution-generating activities, building materials, types of windows and doors, ventilation system design, location of air intakes and exhausts, and susceptibility to pest intrusion should be considered.
 - (B) Internal contaminant sources. Proper venting to the outside atmosphere of pollution source areas, such as laboratories and preparation rooms, housekeeping and material storage, restrooms, workshops, cooking areas, art and hobby rooms, computer rooms, copy rooms, and other emission-producing spaces should be provided.
 - (C) Loading docks should be designed such that vehicle exhaust shall be prevented from entering enclosed work spaces (including air intakes and building openings) and by installing barriers to airflow from loading dock areas (i.e. doors, curtains, etc.) and using pressurization. Outside air intakes should not be near or above truck or other vehicle access areas.
 - (D) Moisture prevention. Water intrusion, condensation, water vapor intrusion, and other moisture problems in the building should be avoided through the proper design and installation of the building components. The use of vapor barriers (membrane inserted in a wall assembly to reduce moisture flow) should be based on best practices design for the local area. Care should be taken not to have two vapor barriers in one wall such as an exterior barrier with vinyl wall covering on the inside. In hot and humid climates, vinyl wall covering should not be used on exterior walls to avoid condensation and mold growth behind the covering.

(E) Space allocation.

- (i) Adequate space for maintenance access and proper operation of building equipment, such as HVAC system equipment and boilers, should be provided.
- (ii) Separate designated rooms used for materials and chemical storage only and that are kept under negative pressure and vented to the outside atmosphere should be provided.

(F) Building materials, interior finishes, and furnishings.

- (i) The lowest chemical-emitting building materials, interior finishes, and furnishings that are practical should be used. Contaminant-emitting and retention potential of furnishings, floor and wall coverings and casework, and other interior finishes should be evaluated. Emissions data from manufacturers should be evaluated before specifying or approving construction products and building furnishings.
- (ii) Materials that prevent (or at least inhibit) microbial growth without occupant exposure to potentially harmful chemicals should be used.
- (iii) The use of porous or fleecy materials is discouraged where unmanaged excessive moisture or improper maintenance could occur.
- (iv) Projected life cycles of materials and equipment should be considered to provide the most sustainable construction.
- (v) Recycling of construction waste and materials from remodeled facilities should be provided where possible.
- (vi) Maintenance requirements should be considered. Materials that can be easily cleaned with the least toxic cleaning supplies should be utilized when possible.
- (vii) Building materials and products susceptible to water damage should be properly stored and protected to prevent damage before or during construction phase.

(5) HVAC system design. HVAC systems should be designed to include the following.

- (A) Air intakes: Sufficient acceptable outside air to maintain a healthy environment in all occupied areas should be provided. (Reference ASHRAE Standard 62-2001). Preconditioning of outside air supplies, particularly dehumidification, is recommended where possible.
- (B) Air distribution: Proper air distribution should be provided to all occupied areas.

- (C) Filters: Medium to high efficiency (MERV 9 - 11) filtering systems should be used. Air handlers should be designed and selected to accommodate the pressure drops required for adequate filtration. Low capacity systems may use lower efficient filters (MERV 6 - 8) if it cannot be retrofitted for the more efficient filters. Filters should be installed to minimize air bypass around the filters and maintained per the manufacturer's recommendations.
- (D) Access doors/ports: Convenient access doors/ports to facilitate inspection, maintenance and cleaning of air handling units and ducts should be provided.
- (E) Coils: Coils with adequate heating and/or cooling capacity and with features to facilitate maintenance should be used.
- (F) Drain pans: Insulated drain pans with proper slope and drainage to prevent standing water should be installed on all new cooling (wet) coils.
- (G) Drain lines and traps: Drain lines need to be adequately sloped to provide proper drainage. Drain traps should be properly installed when drain lines from condensate pans connect to sewer systems.
- (H) Ducts: Ducts with internal surfaces that are easily cleaned, not damaged by typical cleaning methods, do not harbor dust and microbials, and that will not emit materials or gases that can harm the occupants should be provided on all new HVAC systems.
- (I) Return air: Ducting of return air is recommended.
- (J) Positive building pressure: The rooms of the buildings should be maintained at a net positive pressure (minimum of 1 Pascal) with respect to the wall cavities and plenums, and the wall cavities should be maintained at a net positive pressure (minimum of 1 Pascal) with respect to the outside atmospheric pressure. Some areas in buildings that have isolation or process requirements, such as print shops, darkrooms, and restrooms, may require defined pressure relationships to adjacent areas.
- (K) Exhaust systems: Adequate exhaust systems for restrooms, storage rooms, copy rooms, animal areas, chemistry labs, computer rooms, industrial arts rooms, kilns, home economics rooms, locker rooms/showers, swimming pools and other areas with contaminant sources should be provided. These areas should be under negative pressure with respect to adjacent areas, such as classrooms, offices and hallways.
 - (i) Exhausts should be vented directly to the outside.
 - (ii) Exhaust vents should be located to avoid contaminants being drawn back into the building and no closer than 25 feet from an air intake.

- (L) Comfort: Adequate temperature and humidity control with proper air velocity should be provided to maintain comfort, process requirements, and minimize microbial and contaminants in all occupied areas.
 - (M) Humidity: The maximum relative humidity should be maintained below 60% throughout the year to prevent mold growth. Ideal relative humidity levels are generally between 30% and 60%, however between levels 30% and 50% will decrease the chance of mold growth. In climates where outdoor humidity levels are often less than 30% and building occupants do not complain of health effects or discomfort from the lower humidity, then lower humidity inside buildings is acceptable.
 - (N) Air diffusers: Air diffusers should be used to manage air flow volumes, mixing, and patterns for occupant comfort. Normal occupied spaces should have an average air velocity between 20 and 50 feet per minute in the occupied zone.
 - (O) Controls: Proper controls and energy management systems should be installed to maintain recommended interior conditions. Thermostats in each occupied room and conference room are preferred. Humidistat should be used in rooms where humidity control is important.
- (b) Maintaining acceptable IAQ during renovation.** Building occupants should be protected from airborne contaminants that may be disturbed, generated, or released during mitigation and/or renovation, including irritating or toxic substances such as asbestos, lead, pesticides, heavy metals, mold, cement dust, paint vapors, and roof tarring vapors.
- (1) The IAQ Coordinator should review designs and construction activities for all proposed remodeling and renovation activities prior to their initiation.
 - (2) Minimize volatile organic compounds (VOCs) by purchase and use of low-emitting products, such as paints, varnishes, building materials, furnishings, etc., and processes (wet-sanding drywall). Minimize emissions from new furnishings by airing out the product before installation. Water-based solvents, when available, are preferred.
 - (3) Hazardous chemicals and substances: Hazardous chemicals as defined in the Health and Safety Code, §502.003 and hazardous substances as defined in the Health and Safety Code, §361.003, should be managed and disposed of in accordance with all applicable state and federal laws.
 - (4) Scheduling: Occupant exposure to contaminants should be minimized by scheduling renovations that may produce contaminants or uncomfortable conditions when the building is unoccupied.
 - (5) Remediation of toxic contaminants: Procedures appropriate for toxic contaminants (lead, microbial, asbestos, hazardous chemical, etc.) should be

utilized if such contaminants are expected or discovered during renovation and in some cases must be utilized under state and federal law.

- (6) **Filters:** Filters should be changed more frequently during contaminant-generating activities, and also replaced after work is completed. The highest possible MERV rated filters should be used during renovation and for a few days after to minimize exposure to renovation related particulates and dust.
- (7) **HVAC equipment:** Ensure that HVAC equipment is protected from damage and entry of contaminants.
- (8) **Water-damage:** Porous building supplies that become water-damaged should be discarded to avoid the potential for mold contamination.
- (9) **Re-occupancy:** All renovated areas should be thoroughly cleaned utilizing high-efficiency particulate air (HEPA) filtered vacuuming and adequately ventilated prior to re-occupancy.
- (c) HVAC system testing:** For new construction and major remodeling, the HVAC systems in those areas should be tested and balanced by an independent certified contractor at the completion of construction or remodeling.
- (d) Design documentation:** Design documentation including the owner's project requirements (design intent), and basis of design should be retained for the life of the facility. As-built documents should be prepared during construction and retained at the facility.
- (e) Monitoring activities:** Construction and renovation activities should be monitored by the owner's representative, facility IAQ coordinator, and commissioning authority.
- (f) Ventilation protocols:** Ventilation protocols should be developed to include proper area exhaust rates and pressurization requirements to be used during repairing and remodeling. During initial occupancy of a new area and during re-occupancy following repairs or renovations, the fresh air rate and the total air supply rate may need to be increased until any out gassing of the new material has decreased to a level that will not cause adverse health effects to the occupants.

§297.5. Building Operation and Maintenance Guidelines.

- (a) Written preventive maintenance program:** A written preventive maintenance program should be established for each public building to provide a healthy environment. The program should include procedures for the following.
 - (1) **HVAC Systems**
 - (A) **Filters:** A system filter change-out program should be developed and implemented. A filter upgrade program should be implemented if the filters

do not meet the latest recommended efficiency of MERV 9 or higher. Some low capacity air handlers may only have sufficient capacity to utilize MERV 6 filters.

- (B) Coils and condensate drain systems: A cleaning program of the coil and condensate drain systems of the HVAC systems should be developed and implemented.
 - (C) Cleanliness: The air supply and return systems and mechanical rooms should be kept clean and properly maintained.
- (2) Sewer traps: A sewer trap maintenance program should be developed and implemented to prevent sewer gas back drafts into buildings.
 - (3) Emergency response plan: An emergency response plan for water leaks and other contaminant problems should be developed and utilized.
 - (4) Records: A written maintenance record program should be developed and implemented.
 - (5) Maintenance requirements: Adherence to product manufacturers' maintenance requirements should be required as a minimum.
 - (6) Recommissioning: Scheduled recommissioning of the facilities should be conducted to facilitate efficient and healthy building operations.
- (b) Training:** Personnel should be educated and trained in the prevention, recognition, and resolution of IAQ concerns.
- (c) Scheduling maintenance:** Schedule and conduct maintenance activities that could produce high emissions (painting, roofing repair, pesticide applications) to minimize occupant exposure to indoor air contaminants. Increase ventilation in occupied areas as necessary to control odors.
- (d) Housekeeping**
- (1) Custodial program. A written custodial program should be developed with specified cleaning procedures, schedules, quality levels, and chemicals allowed for each facility.
 - (2) Storage. Storage and janitorial rooms should be kept clean and properly maintained. Air handling rooms should not be used for storage.
 - (3) Supplies. Maintenance and operational supplies should be kept in order and properly labeled in a clean, dry room to prevent contamination of the air and infestation of insects and rodents. Material safety data sheets (MSDS) for all products should be readily accessible.

- (4) Cleaning procedures. Cleaning procedures and equipment should be selected to be effective and to minimize airborne dust.
 - (5) Walk-off Mats. Use walk-off mats (barrier mats) to trap dirt at all entry ways into the building, including pedestrian entrances, loading docks, receiving areas, freight entrances, and garages.
- (e) Tobacco products.** The use of any smoking tobacco products or smokeless tobacco products by employees or visitors should be prohibited in government buildings, within twenty feet of any entrance, and within twenty feet of the building's fresh air intakes. The use of such tobacco products should be permitted only in outside areas that have been designated for "Tobacco Product Use."
- (f) HVAC systems.**
- (1) Outside air. The HVAC systems should be operated to provide acceptable outside air with quantities in conformance with the most current and accepted standard, such as ASHRAE Standard 62, up to the equipment capabilities. Proper operation and flow rates should be verified annually. The outside intake should be covered with a grill to prevent insects or birds from entering the intake ducts; the grills need to be routinely inspected and cleaned to prevent clogging by dirt and debris. In humid areas, the outside air should be humidity-controlled if the outside air is vented directly into occupied spaces, is continuously left running, or the HVAC unit cannot handle the humidity load on very hot and humid days.
 - (2) Positive pressure. The HVAC systems should be operated to provide a positive building pressure to significantly reduce the entry of outside contaminants, and provide more effective temperature and humidity control.
 - (3) Moisture control. The HVAC systems should be operated to prevent excessive moisture that could cause microbial growth or high humidity.
 - (4) Ducts.
 - (A) Inspection. Periodic (annually is recommended) visual inspection of ducts for mold, dirt and deterioration should be performed.
 - (B) Cleaning. Routine cleaning of ducts
 - (C) Replacement. When a duct is repaired or replaced, those with internal surfaces that are easily cleaned, not damaged by typical cleaning methods, do not harbor dust and microbials, and that will not emit materials or gases that can harm the occupants should be used.
 - (5) Drain pans. Condensate drain systems should be free of microbial growth and other debris. The condensate pan should drain completely so there is no standing water.

- (6) Exhaust air. Exhaust air systems should be operating properly and vented to the outside. Proper operation and flow rates should be verified annually.
 - (7) Preconditioning. The HVAC systems should be operated for sufficient time prior to building occupancy to remove contaminants and to condition the air.
 - (8) Responsibility. Assignment of responsibilities for maintenance and operations of all areas and systems is essential to an indoor air quality program.
 - (9) Documentation. Documentation provided by design, construction and renovation projects must be maintained and updated.
 - (10) Standards. Maintenance standards should be developed and maintained for all systems and operations.
- (g) Loading dock operation.** Vehicle exhaust should be prevented from entering enclosed work spaces (including air intakes and building openings) by installing barriers to airflow from loading dock areas (i.e. doors, curtains, etc.) and using pressurization.
- (h) Remediation of contaminants.** Use recognized best practices for the removal of toxic contaminants of concern (lead, microbial, asbestos, chemical, etc.) when performing maintenance, repairs or remediation. Always follow any applicable state and federal laws.
- (i) Cleaning products.**
- (1) Toxicity. The least toxic cleaning products needed to accomplish the task should be used. Sanitizers are not recommended for general cleaning.
 - (2) Directions. Follow manufacturer's directions for cleaning products. The use of excessive amounts of cleaning materials can cause unacceptable IAQ.
 - (3) Training. Assure that all personnel using cleaning products and hazardous chemicals have been trained in the proper usage and handling of such products as required by the Texas Hazard Communication Act, the Health and Safety Code, §502.010.
 - (4) Labeling. The employer shall follow the labeling requirements of the Health and Safety Code, §502.007.
 - (5) Ventilation. Adequate ventilation during and immediately after use of cleaning products should be used to minimize exposure to potentially harmful or irritating substances in the products.
 - (6) Scheduling. Schedule the use of cleaning products when building is unoccupied to minimize exposure to students, staff and other occupants.

(j) Pesticide use.

- (1) Management. Pest management, for both building and lawn care, should emphasize non-chemical management strategies whenever practical, and least toxic chemical controls when pesticides are needed.
 - (2) Products. Pest control products used in and around a building should be documented and a Material Safety Data Sheet (MSDS) made available for building occupant review if requested. Either a written procedure or contract language will ensure that people who use pest control products read and follow all label directions for proper use, mixing, storage, and disposal.
 - (3) Statutes. Pest management for schools must be in accordance with the Structural Pest Control Act, Texas Revised Civil Statutes, Article 135b 6, §4J and 22 Texas Administrative Code, §595.11 (relating to schools). These protocols are recommended for all other government buildings.
 - (4) Contracting. When contracting for pest control services, the use of businesses that conform to the standards set forth in 22 Texas Administrative Code §595.14 relating to Reduced Impact Pest Control Service, is recommended.
 - (5) Removal. Dead pests should be promptly removed from the premises.
- (k) Emergencies.** An emergency response plan, including staff training, should be developed for chemical spills, release of hazardous air contaminants, and similar events. Such response measures may be required by state or federal law in some circumstances.
- (1) Ventilation. The required outside ventilation air rate should not be interrupted during building operation unless a known contaminant presents an immediate concern of entering the building's outside air intake. Consider the use of high efficiency and carbon-filtered outdoor air to improve general IAQ and reduce potential impact of intentionally released contaminants. Outdoor air intakes should be able to be closed manually in case of an intentional release of contaminants outside.
 - (2) Airborne Chemical, Biological, or Radiological Attacks. Guidance is available from the United States Department of Health and Human Services (DHHS): "Guidance for Protecting Building Environments from Airborne Chemical, Biological, or Radiological Attacks," DHHS (NIOSH) Publication No. 2002-139.
- (l) Records.**
- (1) Material safety data sheets. A public employer shall maintain a legible copy of the current Material Safety Data Sheet for each hazardous chemical used or brought into the workplace including those in cleaning supplies, pesticides and art supplies in accordance with the Health and Safety Code, §502.006.

- (2) Workplace chemical list. The employer shall prepare a workplace chemical list if required by the Health and Safety Code, §502.005.
- (3) Facility chemical list. The employer shall prepare a facility chemical list (also known as a Tier Two report) if required by the Health and Safety Code §506.006.
- (4) Maintenance records. Maintenance should be documented by a signed and dated report or check-off list.

§297.6. Recommended Building Occupant Responsibilities.

- (a) **Cleanliness.** Offices, classrooms, workrooms, mechanical rooms and supply areas should be kept clean and orderly to prevent contamination of indoor air and conditions conducive to insect or rodent infestations.
- (b) **Product usage.** Products such as pesticides, air fresheners (including plug-ins), scented products (including candles), spray products, and other materials that may be a health concern, should not be used.
- (c) **Work activities.** Use the least toxic instructional or work materials (markers, glue, art supplies, etc.) that will serve the intended purpose. When activities/projects generate air pollutants, steps should be taken to minimize impact, such as using local exhaust fans or opening windows.
- (d) **Diffusers and grills.** Supply air diffusers and return air grills should be kept free and clear of any obstructions.
- (e) **Mechanical Rooms.** Mechanical rooms and/or closets housing HVAC systems should not be used for storage.
- (f) **Spills.** Spills should be cleaned up promptly and properly. Materials to cleanup the spills of hazardous chemicals must be disposed of in accordance with all applicable state and federal laws.
- (g) **Pets.** Animals should be maintained in such a manner to prevent IAQ problems.
- (h) **Sensitive individuals.** Carefully consider and, to the extent feasible, accommodate the needs of sensitive individuals by the following.
 - (1) Consulting. Individuals with allergies or chemical intolerances should consult, as necessary, with health officials, and their physicians.
 - (2) Locating. Locate sensitive individuals away from potential sources of symptom-triggering substances and activities.
 - (3) Discouraging. Discourage the use of scented personal care products or other scented products that may cause adverse reaction in sensitive individuals.

- (i) **Food.** Food should be stored in airtight containers and refrigerated if necessary. Applicable food policies should be followed.
- (j) **Garbage.** Waste containers should be stored properly, emptied regularly, and located away from air intakes or other sensitive areas.
- (k) **Tobacco policy.** Employees and visitors entering a government building will abide by the building's written "Tobacco Policy."
- (l) **Portable air cleaning devices.** Portable air cleaning filtration devices may be of limited help in cleaning a small area. They must be properly maintained to be beneficial.
- (m) **Ozone-generating devices.** Ozone-generating devices should not be used in occupied spaces. Ozone is a lung irritant.
- (n) **Reporting.** Promptly report IAQ problems/complaints to the IAQ coordinator or designee.
- (o) **Medical care.** Any building occupant experiencing chronic or serious health problems is encouraged to seek appropriate medical care, and work with medical professional(s) to manage the illness.

§297.8. Guidelines for Comfort and Minimum Risk Levels.

- (a) **IAQ comfort.** Comfort is an important part of indoor air quality. The major comfort issue is thermal comfort that involves temperature, relative humidity, and air velocity. Other comfort issues not covered here but that could affect the indoor environment are lighting, noise, and vibration. Maintaining the proper temperature range is not sufficient to achieve thermal comfort; it is also necessary to properly control the combination of temperature, relative humidity and air velocity.
 - (1) **Temperature.** The room temperature for a typical occupied office or classroom environment should be kept between 72 to 79 degrees Fahrenheit in the summer and 68 to 76 degrees in Fahrenheit in the winter and controlled within a temperature range of ± 2 degrees in Fahrenheit for a given day. Temperature at body and head height and near the floor needs to be considered. Occupant preferences, activity and attire will influence the comfort. Additional guidance documents for other situations are available.
 - (2) **Relative Humidity.** The relative humidity for a typical occupied office or classroom environment should be generally between 30 to 50%. The relative humidity should never exceed 60% due to potential mold growth. In geographical regions where the outdoor relative humidity is typically below 30%, no humidification is recommended if the occupants do not complain of discomfort due to the dryness.

(3) Air Velocity. Some air movement is recommended to avoid a feeling of stagnant air, typically 25 to 55 feet per min (fpm). Higher air speeds may be acceptable if the affected occupants have control of local air speeds. Air supplied to the occupied zone (standing and sitting positions) should be supplied at a moderate velocity within the recommended temperature and relative humidity ranges. Air supplied from a diffuser at elevated speeds can create drafts in the occupied zone, causing complaints of too hot or too cold, dry eyes, sore throats and nasal irritation. Directing diffusers directly onto occupants' work zones or directly overhead may cause occupants discomfort, resulting in them "modifying" the supply system (e.g., placing cardboard over diffusers). The system should be properly tested and balanced. The appropriate supply and exhaust diffusers based on the occupant locations should be installed. These diffusers should supply air at an acceptable temperature and humidity. Additional guidance documents are available, including ASHRAE Standard 55-1992 and 55a-1995.

(b) Minimum risk levels. Table 1 in paragraph (4) of this subsection provides Minimum Risk Levels (MRLs) for common contaminants found in indoor air. The MRLs in Table 1 are not IAQ standards. There are no required federal or Texas standards for indoor air contaminants. The MRLs are based on the data contained in the Texas Commission on Environmental Quality's (formerly the Texas Natural Resources Conservation Commission) Effects Screening Levels List (July 19, 2000), the Agency for Toxic Substances and Disease Registry's (ATSDR) Minimal Risk Levels for Hazardous Substances (December 2001), and the Environmental Protection Agency's (EPA) Integrated Risk Information System (IRIS) inhalation RfC values and the National Primary and Secondary Air Quality Standards (40 CFR 50). These information sources can be used as a reference for other contaminants not listed in Table 1.

- (1) These levels are based on inhalation for an eight hour exposure for the general public. If a particular contaminant is expected to last significantly longer, the MRL should be lowered to compensate for the longer duration. The references in subsection (b) of this section may have this information. For one year, a reasonable approximation is to multiply the 8-hour MRL by 0.14.
- (2) Most of the MRLs are at a no-observed-adverse-effect-level. They are set below levels that, based on current information, might cause adverse health effects in the people most sensitive to such substance-induced effects. If the indoor levels of contaminants in air exceed the MRL, it does not necessarily indicate a problem, but should trigger a concern for a more in-depth evaluation of the potential health effects or to reduce the concentration below the MRL. Most of the MRLs are based on non-cancer health effects only.
- (3) The MRLs are expressed in units of parts per million (ppm) for most gases and volatiles, or milligrams per cubic meter (mg/m³) for particles and some volatile organic compounds (VOCs).

(4) UTD Environmental Health and Safety recommends following the OSHA standards. The following table shows some common parameters along with the OSHA’s PEL values.

Table 1. OSHA Standards

Test Parameter	OSHA PEL
Formaldehyde	0.75 ppm
Benzene	1 ppm
Carbon dioxide	5000 ppm
Carbon monoxide	50 ppm
Temperature	68-79 F
Humidity	30-60%

OSHA – Occupational Health and Safety Administration

PEL – Permissible Exposure Limit (8-hr Time Weighted Average)

ppm – parts per million

F – Degree Fahrenheit

§297.9. Lease Agreements.

Whenever a government entity leases from or to another public or private entity, a clause should be included in the lease agreement to require the property owner/property management to comply with all applicable sections of the current Texas Department of Health Voluntary Guidelines for Indoor Air Quality in Government Buildings.

Important Note: The building should be opened and aerated with fresh air for 2-4 weeks prior to opening it up for occupancy (Texas IAQ Guidelines).

Reference:

- (1) ASHRAE
- (2) OSHA
- (3) Texas IAQ Voluntary Guidelines