

GENERAL SERVICES ADMINISTRATION
Washington, DC 20405

PBS 1000.8A
October 26, 2023

GSA ORDER

SUBJECT: Indoor Air Quality Management

- 1) Purpose. This Order establishes Public Buildings Service (PBS) nationwide requirements for effectively managing and overseeing indoor air quality (IAQ) to help ensure the well-being of building occupants, contractors, and visitors.
- 2) Cancellation. Indoor Air Quality Management PBS 1000.8, dated October 3, 2016.
- 3) Authority.
 - a) Code of Federal Regulation 41 CFR Part 102.80 & 41 CFR 102.74.185
 - b) United States (U.S.) Occupational Safety and Health Administration (OSHA): 29 CFR 1960, 29 CFR 1910 Subpart G, 29 CFR 1926, & General Duty Clause (Section 5(a)(1) of the Occupational Safety and Health Act)
- 4) Organizations, Consensus Standards, and Guidelines Used in the Development of the Order.
 - a) U.S. OSHA: Indoor Air Quality in Commercial and Institutional Buildings & Sampling and Analytical Methods
 - b) U.S. Environmental Protection Agency (EPA): Clean Air in Buildings Challenge, Energy Star, & various website resources
 - c) National Institute for Occupational Safety and Health (NIOSH): Manual of Analytical Methods
 - d) ASHRAE: Standards 55 & 62.1
 - e) U.S. Green Building Council: Leadership in Energy and Environmental Design (LEED)
 - f) International WELL Building Institute: The WELL Building Standard
 - g) American National Standards Institute (ANSI) / Institute of Inspection Cleaning and Restoration Certification (IICRC): S500 & S520

- h) Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA): IAQ Guidelines for Occupied Buildings Under Construction
- 5) Background. PBS is committed to providing safe and healthy spaces for building occupants. IAQ refers to the condition of the air inside buildings and structures, particularly in enclosed spaces where people work or spend a significant amount of time. It encompasses various factors that can affect the quality of the air we breathe, including pollutants, temperature, humidity, ventilation, and the presence of allergens or irritants. Poor IAQ can impact human health, leading to symptoms such as respiratory problems, allergies, headaches, fatigue, and reduced cognitive function. Adequate ventilation and filtration systems, regular maintenance, implementation of best practices during construction, and the use of low-emission materials are among the key components of maintaining good IAQ. By addressing these factors, efforts can be made to help ensure healthy and comfortable indoor environments for occupants, contributing to their well-being and productivity.
- 6) Scope and applicability. This Order, and the companion desk guide, apply to federally owned facilities under the jurisdiction, custody, and control of the U.S. General Services Administration (GSA), including facilities operating under a GSA delegation of authority. Limited aspects of this Order also apply to facilities leased by GSA and are dictated by the provisions of the lease.
- 7) Responsibilities.
- a) PBS Office of Facilities Management (OFM) Facility Risk Management Division (FRMD). Central Office PBS OFM FRMD is responsible for:
- i) Issuance of this Order and subsequent updates,
 - ii) Providing national guidance and training in support of this Order,
 - iii) Supporting regional environmental, health, safety, and fire protection (EHSF) program offices in IAQ program management activities.
- b) PBS OFM Facilities Operations. Central Office PBS OFM Facilities Operations is responsible for:
- i) Ensuring the operations and maintenance (O&M) master specification incorporates the most current and applicable IAQ requirements.
- c) PBS Office of Architecture and Engineering (OAE). Central Office PBS OAE is responsible for:
- i) Ensuring that updates to the P100 Facility Standards Guidance incorporate the most current and applicable IAQ requirements,
- d) PBS Office of Project Delivery (OPD). Central Office PBS OPD is responsible for:

- i) Ensuring that the Division I IAQ specifications are kept up to date.
- e) PBS Office of Leasing. Central Office PBS Office of Leasing is responsible for:
 - i) Ensuring that updates to the standard, national lease contracting language incorporate the most current and applicable IAQ lease requirements.
- f) PBS Regional EHSF Program Office. The PBS Regional EHSF program office is responsible for:
 - i) Overseeing compliance with the IAQ management program and this Order throughout the region,
 - ii) Providing technical IAQ program support and training to regional facility managers, project managers, lease administration managers, and additional internal customers, as needed,
 - iii) Reviewing IAQ submittals that are required as part of the ODC Division I IAQ specifications, as needed,
 - iv) Reviewing IAQ reports and documentation for accuracy and completeness and providing recommendations to responsible offices as needed,
 - v) Providing review and input on mitigation and corrective action efforts in buildings where sources of poor IAQ are identified.
- g) PBS Regional Design and Construction Division. Regional Design and Construction Divisions are responsible for:
 - i) Ensuring Division I IAQ specifications are included in applicable projects,
 - ii) Ensuring that the deliverables are received before construction and outlined actions are executed during construction.
- h) PBS Regional Facility Management and Service Center (FM/SC) Divisions. The Regional FM/SC Divisions are responsible for:
 - i) Ensuring IAQ incidents, complaints, and emergencies are promptly investigated and reported to the regional EHSF Office,
 - ii) Documenting initial IAQ incidents, complaints, and emergencies submitted through the O&M and Facility Manager in the PBS National Computerized Maintenance Management System (NCMMS),
 - iii) Communicating to affected occupants any relevant information about IAQ-related incidents or emergencies per PBS 2400.1 Risk Management Notification,

- iv) Ensuring the completion of mitigation and corrective action efforts in buildings where sources of poor IAQ are identified,
 - v) Ensuring Division I IAQ specifications are included in applicable projects, the deliverables are received before construction and outlined actions are executed during construction,
 - vi) Ensuring buildings and building systems are maintained in accordance with the existing O&M and custodial specifications, site-specific building operating plans, and preventive maintenance programs.
- i) PBS Regional Leasing Specialists / Lease Contracting Officers / Lease Administration Managers (LS/LCO/LAM). Regional LS/LCO/LAMs are responsible for:
- i) Ensuring the most updated IAQ clauses are added for new, replacing, succeeding, and superseding leases,
 - ii) Working with Lessor and escalating issues, if needed and provisions of the lease apply, to address IAQ concerns raised by Federal occupants in GSA-controlled leased space.
- j) Delegated Agencies. Delegated Agencies must comply with this Order and the accompanying desk guide.
- 8) Policy.
- a) Maintaining IAQ. The following items shall be used to proactively reduce the most common causes of IAQ problems.
- (i) P-100, the Facilities Design Standards for the Public Buildings Service promotes the implementation of IAQ requirements in design, renovation, and new construction.
 - (ii) The OFM Master Specification for O&M Contracts integrates the ventilation and thermal comfort standards established by ASHRAE into the requirements for heating, ventilation, and air conditioning (HVAC) systems maintenance, ensuring compliance with industry guidelines.
 - (iii) The ODC Division One Construction Indoor Air Quality Management Master Specification aims to ensure thorough pre-construction planning is carried out to mitigate any potential impacts on IAQ resulting from construction activities.
 - (iv) The Green Purchase and Green Product Requirements establish criteria for environmentally friendly products, prioritizing reducing volatile organic compound (VOC) levels and addressing related IAQ issues.
 - (v) Health and Safety Risk Management Surveys aim to identify and address the underlying factors that may impact IAQ.

- (vi) Certification Programs provide facilities with the opportunity to showcase their commitment to excellence in IAQ. Participating voluntarily, these programs, including Guiding Principles, LEED, WELL, Energy Star, and others, highlight the significance of IAQ and offer recognition for meeting rigorous standards in this area.
 - (vii) The PBS Child Care Center Design Guide outlines guidelines for designing, renovating, and constructing child care centers, focusing on promoting IAQ and ensuring that operational conditions meet the set standards.
 - (viii) The PBS Lease Contract language aims to enforce IAQ requirements in lease contracts, ensuring that the specified IAQ standards are upheld and maintained.
 - (ix) The PBS Standard Operating Procedures for Operation and Maintenance of Delegated Real Property focus on enforcing IAQ requirements in delegated facilities. The goal is to ensure that the specified IAQ standards are consistently upheld and maintained throughout these facilities.
- (b) Incidents, Complaints, and Emergencies. In response to incidents, complaints, and emergencies related to IAQ, it is the responsibility of GSA, the Delegated Agency, or the Lessor (if a provision of the lease) to promptly investigate such complaints in federally owned and leased facilities under the jurisdiction, custody, or control of GSA. The investigation process should include:
- (i) Efforts to identify the nature and source of the suspected IAQ issue, which may involve conducting confirmatory tests or measurements to assess initial IAQ parameters.
 - (ii) If the investigation confirms the presence of an IAQ issue, appropriate corrective action should be initiated to address and remediate the source of the problem.
 - (1) In some cases, follow-up testing may be necessary after implementing corrective actions to ensure the effectiveness of the measures taken.
 - (iii) In owned facilities that are controlled by GSA, initial IAQ incidents, complaints, and emergencies reported through the GSA O&M Contractor or GSA Facility Manager channels should be documented and maintained in NCMMS for record-keeping purposes.
- 9) PBS Desk Guide for IAQ Management. The PBS Desk Guide for IAQ Management serves as a practical resource for regional implementation of the PBS IAQ Management Order. It provides additional guidance, procedures, and best practices for addressing specific IAQ issues and managing IAQ programs effectively.

10) Signature.

/S/ _____
ELLIOT DOOMES
Commissioner
Public Buildings Service

Attachment: PBS Desk Guide for Indoor Air Quality Management



Desk Guide for Indoor Air Quality Management

Companion to

GSA Order PBS 1000.8A

Public Buildings Service (PBS)

Office of Facilities Management (OFM)

Facility Risk Management Division (FRMD)

October 26, 2023



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Introduction

The Indoor Air Quality (IAQ) Management Desk Guide serves as a practical resource for national and regional implementation of the IAQ Management Order. It provides additional guidance, procedures, and best practices for addressing specific IAQ issues and managing IAQ programs effectively.

Guidance

Proactively Maintaining IAQ

To proactively maintain IAQ, the following measures shall be implemented to address common causes of IAQ problems:

- 1) **Implementation of IAQ Best Practices:** The Facilities Design Standards for the Public Buildings Service (P-100) promote the integration of IAQ best practices in design, renovation, and new construction projects. By adhering to these standards, IAQ considerations are incorporated from the initial stages, minimizing potential issues.
- 2) **Ventilation and Thermal Comfort Standards:** The OFM Master Specification for O&M Contracts incorporates the ventilation and thermal comfort standards established by ASHRAE and further defined in this document. This ensures that heating, ventilation, and air conditioning (HVAC) system maintenance aligns with industry guidelines, optimizing air quality and occupant comfort. This also entails a requirement for conducting regular maintenance activities and adhering to ASHRAE Standard 62.1 Table 8-1 Minimum Maintenance Activity and Frequency guidelines for ventilation system equipment and its associated components, as applicable.
- 3) **Construction IAQ Management:** The PBS Office of Project Delivery's (OPD) Division One Construction IAQ Management Master Specification emphasizes thorough pre-construction planning to mitigate any potential impacts on IAQ resulting from construction activities. This proactive approach helps prevent IAQ issues during and after construction.
 - a) The OPD Division One Construction IAQ Management Master Specification was developed based on valuable techniques discussed in the "IAQ Guidelines for Occupied Buildings Under Construction" (Second Edition, 2007) published by the Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA). These guidelines serve as a foundation for addressing key aspects such as protecting HVAC systems, establishing containment measures, monitoring work practices, managing moisture and mold, and implementing commissioning and re-occupancy criteria. The ODC Division



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One Construction IAQ Management Master Specification incorporates and builds upon these guidelines to ensure comprehensive and effective management of IAQ during construction projects. Similarly, the LEED® Green Building Certification Program's Indoor Environmental Quality Rating System recognizes SMACNA and has incorporated multiple construction management credits in its rating system.

- 4) **Environmentally Friendly Product Requirements:** The Green Purchase and Green Product Requirements establish criteria for environmentally friendly products, prioritizing the reduction of volatile organic compound (VOC) levels and addressing related IAQ issues. By selecting products that meet these requirements, potential sources of indoor air pollutants are minimized.
- 5) **Facility Health and Safety Risk Management Surveys:** Facility Health and Safety Risk Management Surveys aim to identify and address underlying factors that may impact IAQ. By conducting these surveys, potential IAQ issues can be identified early on, allowing for timely corrective actions.
- 6) **Certification Programs:** Voluntary certification programs such as Guiding Principles, LEED, WELL, Energy Star, and others provide facilities with the opportunity to showcase their commitment to excellence in IAQ. These programs highlight the significance of IAQ and offer recognition for meeting rigorous standards in this critical area.
 - a) The Guiding Principles Program for Sustainable Federal Buildings, led by the United States (U.S.) General Services Administration (GSA), promotes sustainability and high performance in Federal buildings. It encompasses integrated design, energy performance, water conservation, indoor environmental quality, and materials' environmental impact. The program's goal is to enhance building efficiency, minimize environmental footprint, and improve occupant well-being. As part of the certification process, an IAQ assessment is mandated, along with a specific Statement of Work (SOW). For further details, please refer to the provided [link](#) (accessible to GSA employees only).
- 7) **IAQ Guidelines for Specific Facilities:** The PBS Child Care Center (CCC) Design Guide provides guidelines for the design, renovation, and construction of CCCs, with a specific focus on promoting IAQ and ensuring adherence to set standards. This ensures a healthy indoor environment for children and staff. For further details, please refer to the provided [link](#).
- 8) **IAQ Requirements in Lease Contracts:** The PBS Lease Contract language includes provisions to enforce IAQ requirements in lease agreements, ensuring that specified IAQ standards are maintained throughout the leased space. Best practices for IAQ in GSA-leased facilities are included in [Appendix D](#).



- 9) Standard Operating Procedures for Delegated Real Property: The PBS Standard Operating Procedures for Operation and Maintenance of Delegated Real Property focus on establishing IAQ requirements in delegated facilities. These procedures ensure that the specified IAQ standards are consistently upheld and maintained throughout these facilities.

By proactively implementing these measures, GSA demonstrates its commitment to maintaining a healthy indoor environment and safeguarding the well-being of occupants and visitors.

Reactively Responding to Incidents, Complaints, and Emergencies

While proactive measures significantly reduce the likelihood of IAQ incidents, prompt response to unforeseen situations is crucial to ensure a safe and healthy indoor environment. In the event of incidents, complaints, or emergencies related to IAQ, it is important for GSA, the Delegated Agency, or the Lessor to promptly investigate and address the matter. The investigation process includes the following steps:

- 1) Identify the nature and source of the suspected IAQ issue, which may involve conducting confirmatory tests or measurements to assess initial IAQ parameters.
- 2) If the investigation confirms the presence of an IAQ issue:
 - a) Notify affected occupants per PBS 2400.1 Risk Management Notification of IAQ concerns that could negatively impact their health such as HVAC systems that do not meet ASHRAE 62.1 or actionable levels of a chemical contaminant. However, routine concerns such as thermal comfort (e.g., temperature and relative humidity) and HVAC adjustments do not necessitate notification. Applicability should be discussed with the GSA regional environmental, safety, health, and fire protection (ESHF) program office responsible for IAQ program management. A sample notification is available [here](#) (accessible to GSA employees only).
 - b) Initiate appropriate corrective action to address and remediate the source of the problem.
- 3) In some cases, follow-up testing may be necessary after implementing corrective actions to ensure the effectiveness of the measures taken.
- 4) Document and maintain records of initial IAQ incidents, complaints, and emergencies reported through the GSA O&M contractor or GSA Facility Manager channels in the NCMMS (National Computerized Maintenance Management System) for record-keeping purposes.



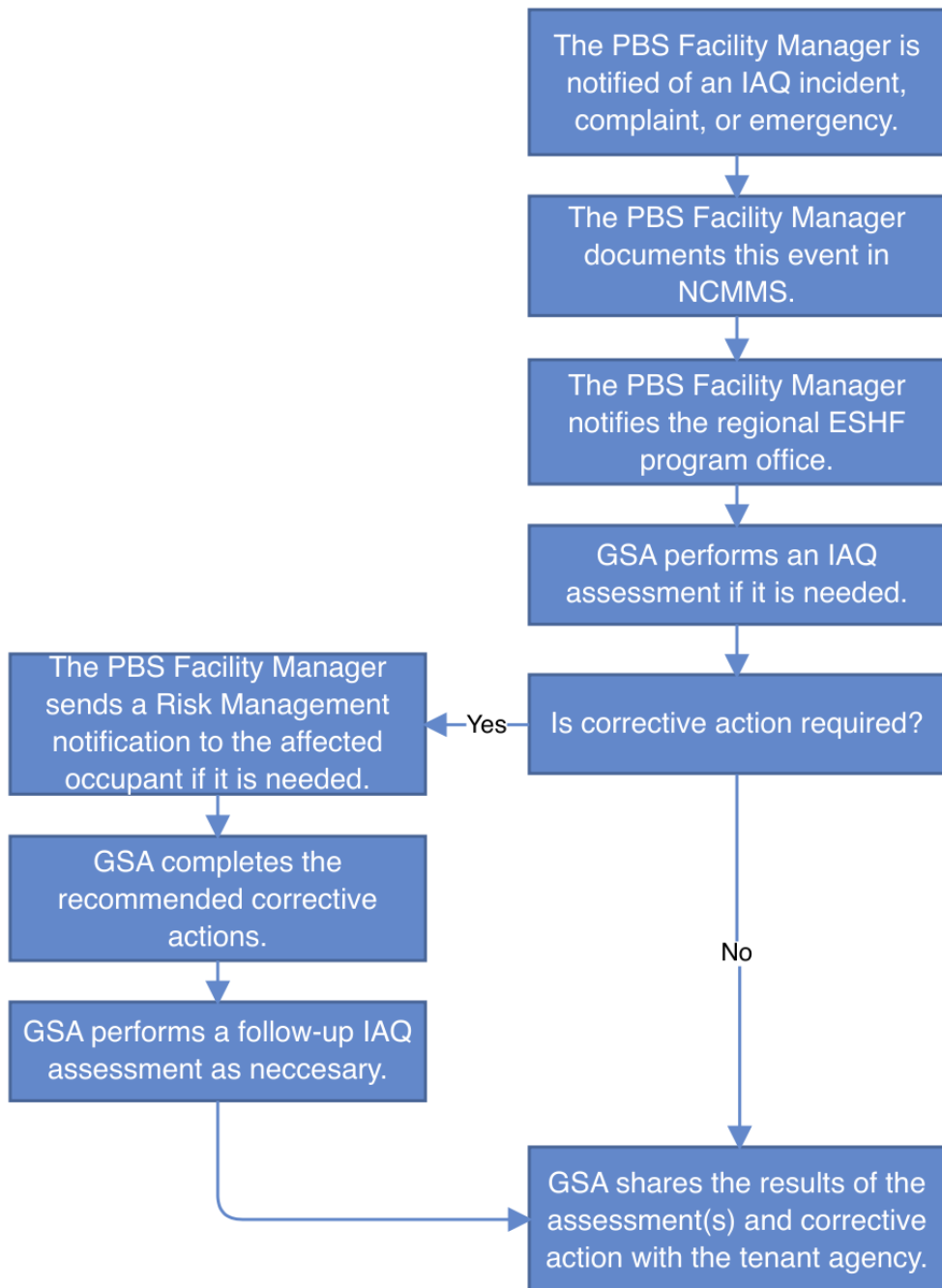
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By promptly responding to IAQ incidents and following a systematic investigation process, we can mitigate potential risks and ensure the well-being of building occupants and visitors. More information is provided below on the assessment process.

Please refer to [Appendix D](#) for additional information on IAQ in GSA-leased facilities.



Flow Diagram for Federally Owned Facilities





Smoke during Wildfire Events

Wildfire events are becoming more frequent in many areas of the U.S., posing significant IAQ challenges to buildings and their occupants due to the large amounts of smoke produced that contain a complex mixture of gasses and particulate matter that can pose respiratory and other health risks.

In areas with an elevated risk of wildfires, it is important for buildings to be prepared for potential smoke impacts. While not mandatory, except as specified in the P100 for mission-critical operations that are in or adjacent to wildfire-prone areas, it is recommended that facility managers, in collaboration with their O&M contractors and with potential input from regional subject matter experts (SME), develop a Smoke Readiness Plan for facilities that are in or adjacent to wildfire-prone areas following the guidelines provided in the ASHRAE guidance document titled "[Planning Framework for Protecting Commercial Building Occupants from Smoke During Wildfire Events](#)." This document provides valuable information and practical steps that can be implemented immediately to mitigate the effects of smoke infiltration during wildfire emergencies.

The purpose of a Smoke Readiness Plan is to ensure that buildings are prepared to minimize the adverse effects of wildfire smoke on IAQ and occupant health. It serves as a proactive approach to safeguarding occupants and maintaining a safe and healthy indoor environment during wildfire emergencies.

Even in cases where a Smoke Readiness Plan has not been prepared in advance, the ASHRAE guidance document remains a valuable resource for taking reactive steps during a wildfire event. Facility managers can refer to the guidelines provided in the document to understand the necessary actions to be taken in response to the presence of wildfire smoke. By following the recommendations outlined in the ASHRAE document, even without a pre-established plan, building occupants and management can make informed decisions and take appropriate measures to minimize the impact of smoke and safeguard IAQ during wildfire emergencies.

The P100 also includes the following language:

New and existing buildings which house mission critical activities that are in or adjacent to wildfire-prone areas must have the capability to readily adapt to a "Smoke Mode" operation during these events that can:

- *filter out smoke contaminants*
- *operate at a slight positive pressure*
- *operate so that exhaust air systems function properly*



IAQ Assessments

The assessment and management of IAQ greatly depend on the specific nature of the complaint or incident. While IAQ assessments commonly consider parameters like temperature, relative humidity, carbon dioxide, carbon monoxide, and oftentimes VOCs, it's important to note that the inclusion or exclusion of these parameters, as well as the addition of others, may vary based on the circumstances. However, carbon dioxide is referenced in nearly all IAQ guidelines as a principal parameter of interest to assess ventilation rates and should be included in all IAQ assessments.

Each IAQ issue requires a tailored approach, and the selection of parameters to be assessed is determined by the incident's nature on a case-to-case basis. Some cases may involve evaluating all the aforementioned parameters, while others may focus on specific contaminants or conditions. Additional factors like particulate matter, ventilation rates, or building characteristics may also be taken into account as needed.

Qualified professionals with a comprehensive understanding of the incident and potential factors at play should plan and conduct IAQ assessments. By adopting a flexible approach and considering a range of parameters, these professionals can effectively diagnose IAQ problems and implement appropriate corrective actions to address occupants' specific concerns.

In conducting IAQ assessments, it is crucial to combine visual assessments and potential occupant questionnaires with targeted sampling for certain contaminants, as required. Visual assessments play a significant role in identifying potential issues, such as water damage or blocked HVAC equipment, which provide valuable insights into IAQ.

By integrating visual assessments with targeted sampling, professionals can make well-informed decisions regarding suitable mitigation measures. This comprehensive approach ensures that both visible indicators and specific contaminants are addressed, leading to a more effective resolution of IAQ concerns.

A checklist for common IAQ issues is included in [Appendix A](#) of this document. Additionally, a standardized SOW for IAQ assessments is included in [Appendix B](#) of this document.

Space Temperatures

GSA shall follow:



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- 1) Federal Management Regulation (FMR)-102-74.185: Within the limitations of the building systems, Federal agencies must—
 - a) Operate heating and cooling systems in the most overall energy-efficient and economical manner;
 - b) Maintain temperatures to maximize customer satisfaction by conforming to local commercial equivalent temperature levels and operating practices;
 - c) Set heating temperatures no higher than 55 degrees Fahrenheit during non-working hours;
 - d) Not provide air-conditioning during non-working hours, except as necessary to return space temperatures to a suitable level for the beginning of working hours;
 - e) Not permit reheating, humidification, and simultaneous heating and cooling; and
 - f) Operate building systems as necessary during extreme weather conditions to protect the physical condition of the building.

- 2) GSA P100 HVAC System Design Requirements:
 - a) Summer months: Ability to maintain temperatures between 72°F and 78°F.
 - b) Winter months: Maintain temperatures between 69°F and 75°F.
 - c) Allowance for unoccupied hour setup and setback optimized with re-occupancy pick-up and pull-down energy demands within a range of 55°F to 83°F.

Please note that these temperature ranges have been developed from ASHRAE 55 and are applicable to the building as a whole during normal working hours and do not specifically apply to individual offices. It is important to understand that achieving 100% satisfaction with thermal comfort is typically not feasible due to variations in individual preferences and personal comfort. Thermal comfort is a subjective experience that can differ from person to person based on factors such as age, gender, clothing, activity level, and personal preference. The 80/20 rule, also known as the Pareto Principle, suggests that only approximately 80% of occupants can be satisfied with the thermal conditions within a given space, while the remaining 20% may have different comfort preferences or specific needs.

Relative Humidity

Relative humidity levels should be upheld following ASHRAE Standard 55, along with the supplementary restrictions introduced in P100. These constraints include a maximum dew point of 55°F for occupied spaces and 60°F for unoccupied spaces, aligning with the stipulated guidelines for ensuring thermal comfort. However, it is also important to consider the inherent limitations of the existing facility equipment in terms of humidity control and the local climate conditions when determining and adjusting relative humidity levels. In general, ASHRAE also recommends that indoor relative humidity be maintained at or below 60% with no prescribed lower humidity limit. Furthermore, it is worth noting



that according to FMR-102-74.185(d), *Federal agencies must not permit reheating, humidification and simultaneous heating and cooling.*

P100 outlines additional requirements for the high-performance tiers of humidity performance intended to protect humidity-sensitive finishes and contents of the space. In these circumstances, additional or above-standard services may be required to meet those specific needs.

Carbon Dioxide (CO₂)

The air exchange rate and outside air intake volume must be sufficient to maintain CO₂ levels below 700 parts per million (ppm) over outdoor ambient levels.

Carbon Monoxide (CO)

CO levels should not surpass nine (9) ppm when measured instantaneously. This benchmark is established on the consensus guidelines put forth by authoritative bodies such as the EPA, ASHRAE, LEED, and the WELL standard. While indoor CO sources are infrequent, it remains imperative to emphasize preventing the infiltration of external sources into enclosed areas or ensuring the proper functionality of any indoor equipment.

Total Volatile Organic Compounds (TVOCs)

Measuring TVOCs can be helpful in assessing IAQ. TVOCs encompass a variety of organic chemicals emitted from sources like building materials, furnishings, cleaning products, and human activities. Elevated TVOC levels indoors can potentially contribute to health risks and occupant discomfort. While setting a specific threshold for TVOCs is challenging due to the range of chemicals involved and their varying effects on health, several guidelines (e.g., LEED and WELL) recommend maintaining TVOC levels below 500 µg/m³ for good IAQ. This threshold aims to minimize potential adverse effects associated with high TVOC concentrations. TVOC screenings may involve utilizing a direct reading photo-ionization detector (PID).

Water Intrusion and Water-Damaged Building Materials

Water intrusion and water-damaged building materials have the potential to trigger mold growth if not promptly addressed in accordance with established guidelines. GSA follows:

- 1) [EPA Guidance for Mold Remediation in Schools and Commercial Buildings](#)
- 2) [ANSI/IICRC S500 Standard for Professional Water Damage Restoration](#) (accessible to GSA employees only and upon request)



- 3) [ANSI/IICRC S520 Standard for Professional Mold Remediation](#) (accessible to GSA employees only and upon request)

Prompt investigation of water intrusion incidents is essential to prevent the development of mold and maintain a healthy indoor environment. The following steps should be taken during the assessment process:

- 1) **Visual Inspection:** A comprehensive visual inspection should be conducted to identify visible signs of water intrusion, such as water stains, discoloration, or mold growth. This helps pinpoint areas that require further investigation.
- 2) **Moisture Mapping:** Tools like moisture meters and thermal imaging cameras should be used to aid in mapping the extent of moisture intrusion. These instruments help identify hidden moisture pockets behind walls, under flooring, or within building materials.
- 3) **Destructive Investigation:** In some cases, more invasive techniques may be necessary to assess the extent of water intrusion. This can involve removing portions of walls, ceilings, or flooring to reveal hidden damage and assess the condition of components.
 - a) Before conducting any destructive sampling, it is necessary to perform a pre-alteration assessment to determine whether the work will have any impact on hazardous materials.

By implementing these assessment methods, potential sources of moisture can be identified and promptly addressed. This helps prevent the growth of mold, as well as other issues associated with water damage. It is crucial to mitigate water intrusion promptly and effectively to ensure the restoration of a healthy indoor environment.

In accordance with industry standards, such as the ANSI/IICRC S500 and S520, water intrusion incidents are classified into different types and classes:

- 1) **Water Types:** Water intrusions are categorized based on the source of the water. This includes:
 - a) Category 1 is clean water that originates from a sanitary source, such as broken water supply lines.
 - b) Category 2 is contaminated water that contains some level of contamination, such as discharge from dishwashers or washing machines.



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- c) Category 3 is sewage or severely contaminated water that carries significant health risks and comes from sources like sewage backups or flooding.
- 2) Water Classes: Water intrusions are also classified based on the level of evaporation and potential damage.
- a) Class 1 incidents involve minimal moisture, affecting only a small area.
 - b) Class 2 incidents involve a larger area with moderate moisture absorption into materials.
 - c) Class 3 incidents include extensive saturation of walls, ceilings, and floors.
 - d) Class 4 incidents require specialized drying techniques due to deep penetration and high humidity levels.

By understanding the water types and classes, professionals can assess the severity of the water intrusion and determine appropriate mitigation and restoration measures. This ensures the effective management of moisture, minimizes the risk of mold growth, and supports the restoration of a safe and healthy indoor environment.

It is important to note that air and surface sampling for mold is not considered standard practice within the industry. This is primarily because there are no universally accepted standard collection methods, analytical techniques, or regulatory thresholds for mold in indoor environments. Mold spore levels can vary significantly depending on factors such as time, location, and environmental conditions. Additionally, the interpretation of mold sampling results can be challenging, as there are no established guidelines for determining acceptable or unacceptable levels of mold spores.

Furthermore, mold air sampling has limitations that make it problematic. Air samples only provide a snapshot of the mold spore levels at the specific time and location of sampling, and results can be influenced by factors like airflow patterns and variations in spore release. Additionally, the presence of mold spores in the air does not necessarily indicate an active mold growth problem or pose an immediate health risk. Conversely, the absence of detectable mold spores in air samples does not guarantee the absence of mold growth in the environment.

Given these limitations and the lack of standardized protocols, it is recommended that if tenants request sampling for mold, the Regional EHSF program office should be contacted, which can provide guidance and assistance based on specific circumstances and local regulations. They can help evaluate the



situation comprehensively, considering multiple factors beyond sampling alone, to effectively assess and address any potential mold concerns.

Water Intrusion and Water-Damaged Building Materials in U.S. Courts Spaces

GSA and the Administrative Office (AO) of the U.S. Courts have collaborated to establish a standardized SOW and communication protocol for addressing water-related impacts in their shared space. The standardized SOW for IAQ assessments is included in [Appendix B](#) of this document, and the communication protocol is outlined in [Appendix C](#), both are required to be followed.

Other Considerations

Sampling Methodology & Protocols

Sampling methodology and protocols for assessing IAQ should adhere to applicable regulations, standards, and guidelines. Key considerations include:

- 1) **Regulatory Compliance:** Follow regulations and guidelines set by governmental agencies or industry bodies.
- 2) **Standardized Guidelines:** Refer to established guidelines from organizations like the American Society for Testing and Materials (ASTM), the American Industrial Hygiene Association (AIHA), and the Environmental Protection Agency (EPA).
- 3) **Equipment Selection:** Choose appropriate sampling equipment and ensure proper calibration and maintenance.
- 4) **Sample Collection Locations:** Select representative locations based on emission sources and occupant activities.
- 5) **Sampling Duration and Frequency:** Determine sampling duration and frequency based on IAQ parameters and assessment goals.
- 6) **Chain of Custody:** Establish a documented chain of custody to maintain sample integrity.
- 7) **Laboratory Analysis:** Send samples to accredited laboratories following recognized methods and quality control procedures.
- 8) **Data Interpretation:** Interpret results in accordance with applicable regulations and reference values, more information is available below.



By following these protocols, GSA can ensure accurate and reliable IAQ assessments to make informed decisions and maintain a healthy indoor environment.

Data Applicability

It is important to understand how and when these Desk Guide requirements should be applied to characterize IAQ conditions. Specifically, they are primarily intended for office spaces and adult office workers, with the following considerations:

- 1) The requirements establish airborne concentration thresholds above which IAQ may potentially degrade and adverse health effects could be expected among exposed individuals.
- 2) The requirements assume exposure at or near the individual's breathing zone while in typical work areas, such as workstations or commonly occupied spaces like lobbies and cafeterias. They do not apply to locations such as parking garages, crawlspaces, air plenums, or mechanical equipment rooms.
- 3) The requirements are not meant to be a rigid dividing line between safe and unsafe, but rather serve as target values for identifying, diagnosing, and addressing potential IAQ problems.
- 4) While the requirements apply to the majority of healthy, working adults, hypersensitive, allergic, or immune-compromised individuals may still react to IAQ conditions even when the requirements are met.

Data Interpretation

When interpreting testing data for IAQ determination, it is essential to consider various variables that can complicate interpretation. The following variables should be taken into account and controlled as much as possible when developing specific testing strategies:

- 1) Air concentrations can vary significantly from day to day and hour to hour.
- 2) Air concentrations can differ based on testing locations.
- 3) The need for expedient sample collection or IAQ testing may result in less statistically reliable results.
- 4) Testing methods may not always consider exposure routes other than inhalation, such as contact or ingestion.



Associated Costs

The responsibility for investigating and resolving the aforementioned building conditions typically falls on GSA, the Delegated Agency, or the Lessor, as they are responsible for basic building operations. They are usually responsible for the associated costs and efforts involved.

However, if the adverse IAQ condition is caused by factors beyond the control of the GSA, the Delegated Agency, or the Lessor, the costs may be transferred to the occupant agency, contractor, or other responsible entity. In such cases, the responsible party for the condition may be liable for the associated expenses.

Similarly, if an agency or entity requests a specific IAQ test or investigation for a parameter that is highly unlikely to be present in the given situation, it may be responsible for bearing the associated costs.

Furthermore, if an agency has an employee with special accommodations that exceed the industry standard for acceptable IAQ, it is the responsibility of that agency to fully fund the investigation and implement the necessary corrective actions for that employee.



Appendix A: Checklist for Responding to Common IAQ Issues

Each IAQ issue requires a customized approach, and the response actions are determined based on the nature of the incident. Some cases may require an evaluation of all the factors listed below, while others may focus on specific aspects. By adopting a flexible approach and considering various circumstances, IAQ professionals or GSA regional SMEs can effectively diagnose IAQ problems and implement appropriate corrective actions to address the specific concerns of occupants or visitors.

- Conduct interviews with a representative sample of affected building occupants and management personnel to gather their insights and perspectives regarding any IAQ concerns.
- Examine relevant documents such as IAQ-related reports, entries in the automated building management work order system, lease agreements, memos, ventilation specifications, safety data sheets, and other pertinent materials. These documents can provide valuable information for identifying IAQ issues and concerns and assist in the assessment process.
- Perform a thorough walk-through of the areas in question, focusing on specific areas that were identified through interviews and document reviews. During the inspection, look for any signs of potential issues such as evidence of water intrusion, stained ceiling tiles, dust accumulations, poor housekeeping, potential pollutant sources related to specific building activities (e.g., laboratories, medical offices, operations involving chemicals), blocked or improperly functioning supply or return air registers, inadequately ventilated reconfigured spaces, and more. Additionally, take note of any significant use of in-office air cleaners, dehumidifiers, fans, or other devices, as this may indicate potential IAQ concerns.
- Utilize a direct reading instrument to assess IAQ indicators based on the nature of the complaint. Conduct measurements at various locations inside the building, with a specific focus on the areas of concern, as well as obtain outdoor baseline data. Compare the collected data against recognized IAQ guidelines to evaluate the air quality.
- Perform a qualitative check of supply and return ducts, including visual inspections above drop ceilings if possible. Look for any evidence of air movement and ensure that the ducts are properly connected.
- Conduct a qualitative assessment of pressure differentials at the boundary between the suite and hallway, as well as other locations, using ventilation smoke tubes or similar. In general, offices and suites should maintain a positive pressure compared to adjacent hallways to minimize the ingress of contaminants.



- Inspect the HVAC units for any noticeable deficiencies and engage in discussions regarding their operations and maintenance with building engineers. During the inspection, pay particular attention to the air intakes for potential sources of contamination that could significantly impact the quality of incoming air, such as stagnant water, vehicular emissions, smoking areas, decaying vegetation, bird droppings, or bulk chemicals. Verify that preventive maintenance is being carried out as scheduled, including checks to ensure that coils are relatively clean, condensate pans are unobstructed and treated with biocide, and high-quality air filters are in place and properly fitted. Check plenums and, where possible, inspect the interior of ducts for signs of moist or delaminating insulation liners that may generate contaminants like mineral fibers or mold spores. Additionally, assess the functionality of Variable Air Volume (VAV) boxes, confirming that they are equipped with the required filters and maintaining the minimum set points as intended.
- Conduct any additional screening evaluations or testing required to address concerns regarding potential inadequate conditions. These additional screenings may involve utilizing a direct reading PID to test for TVOCs, using a direct reading dust monitor to assess airborne particulate matter (PM), or evaluating airflow at the air-supply diffusers in the suite to compare against available building specifications and TAB (Testing, Adjusting, and Balancing) reports, among other measures.



Appendix B: Standardize SOW: IAQ Assessment & Questionnaire

Please note that the standardized SOW provided below is a starting point for conducting an IAQ assessment. It is crucial to customize this scope of work for each specific IAQ issue, taking into account the incident's unique nature and potential contributing factors. The GSA regional EHSF program office responsible for IAQ program management should review and modify this SOW accordingly.

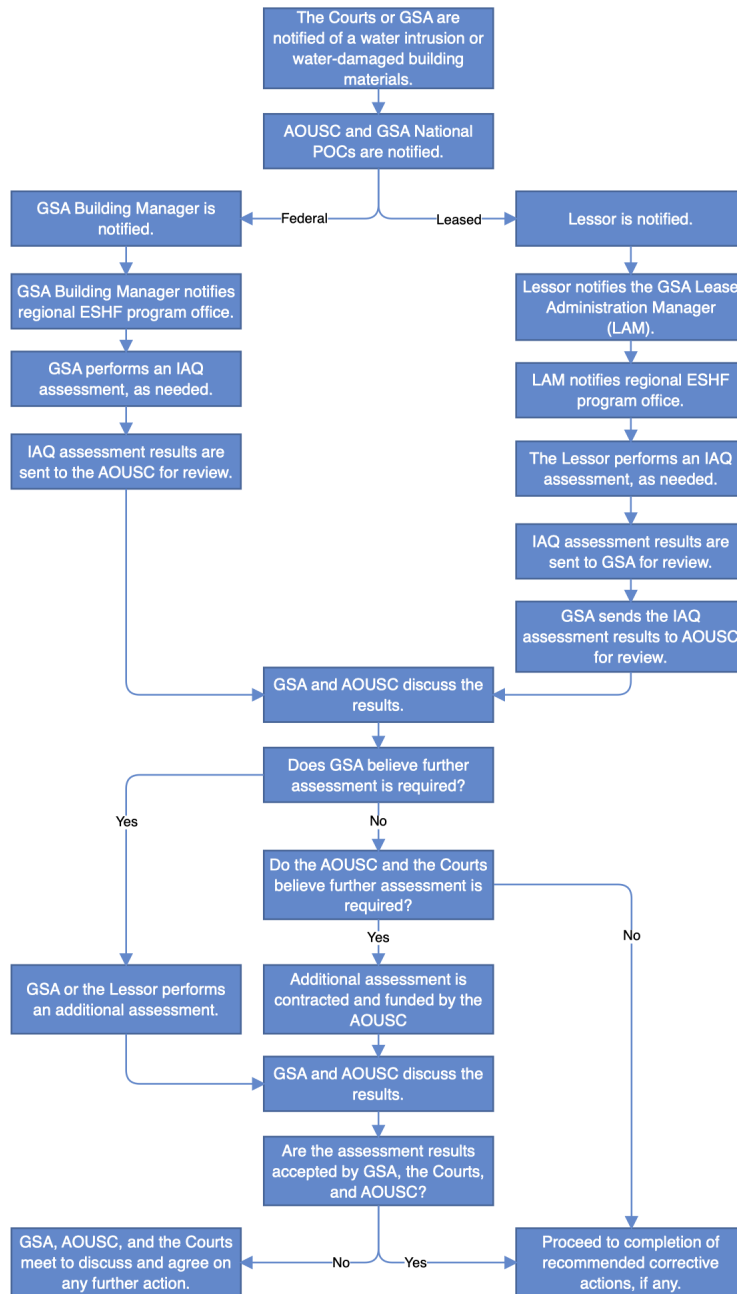
[Statement of Work: IAQ Assessment & Questionnaire](#) (accessible to GSA employees only)



Appendix C: U.S. Courts Water Intrusion Communication Protocol

Flow Chart

When a water intrusion event occurs in U.S. Court space, the following flowchart must be followed.





Interested Parties for Notification

When a water intrusion event occurs in the U.S. Court space, notification is to be provided to the following interested parties as part of the first item in the flowchart above.

AOUSC/Judiciary Staff

To:

1. AOUSC Facilities Program Manager (for the respective judiciary Circuit) [[See Directory](#)]

CC:

1. Assistant Circuit Executive/ACE for Space (for the respective judiciary Circuit) [[See Directory](#)]
2. Larry Brown, Chief - Program Management Branch (larry_brown@ao.uscourts.gov)
3. Keira Unterzuber, Facilities Program Manager (keira_unterzuber@ao.uscourts.gov)

GSA Staff

To:

1. Matt Robinson, Client Analyst for the Judiciary, Office of Portfolio Management & Customer Engagement
2. Bradley Short, National Industrial Hygienist & Safety Programs Manager, Office of Facilities Management

CC:

1. [[See Directory](#)]
2. Regional EHSF Program Office
3. Russ Riberto, National Client Executive for the Judiciary, Office of Portfolio Management & Customer Engagement

Note: *There may be other parties that need to be included.*



Appendix D: IAQ in GSA Leased Facilities (Best Practices)

Introduction

Clear communication and coordinated response are crucial in addressing IAQ concerns in GSA-leased facilities. Various parties have distinct responsibilities in ensuring IAQ and need to work together effectively. The occupant agency holds the responsibility of providing a safe and healthy workplace for its employees and managing the impact of their operations on IAQ. As the property owner, the lessor is responsible for overall facility operations per the terms of the lease. GSA, in its role as the lease contract administrator, supports the occupant agency's mission and enforces lease requirements.

The purpose of this appendix is to outline GSA's responsibilities and approach when dealing with IAQ issues in leased facilities. It establishes a consistent method of communication and coordination among GSA associates who respond to IAQ concerns or requests in lease agreements.

Responsibilities

The parties involved in GSA leased facilities have specific roles when addressing an IAQ concern. Here's an overview of each party's responsibilities:

- 1) **Lessors/Owners:** The lessor or owner of the leased facility holds the primary responsibility for addressing hazards and maintaining a safe environment, as specified in the lease agreement. They are accountable for correcting IAQ issues that violate those lease specifications, unless otherwise stated in the lease terms. In the case of an IAQ concern raised by the occupant agency and reported to GSA, the lessor shall serve as first responder to any occupant complaints about indoor air quality (IAQ). The Lessor shall promptly investigate such complaints and implement the necessary controls to address each complaint. Investigations shall include testing as needed, to ascertain the source and severity of the complaint. The Lessor shall provide written results of any testing along with recommendations to GSA.s. It is also the lessor's duty to promptly notify GSA of all IAQ concerns, providing information about their response and the resulting outcome. However, routine complaints such as HVAC adjustments, temperature, and relative humidity do not require notification.
- 2) **Occupant Agency:** The occupant agency is responsible for providing a safe and healthy workplace for their employees and managing their operations' impact on IAQ within the leased facility.
 - a) When an IAQ concern originates from the occupant agency, they are responsible for notifying the GSA LAM. An occupant agency employee originating an IAQ concern must



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also notify their direct supervisor, in accordance with requirements in 29 CFR 1910, OSHA workplace regulations. If the IAQ concern is determined to be the result of the agency operating in a manner inconsistent with the terms of the lease, the occupant agency may be responsible for the financial costs associated with investigating and/or remediating the IAQ concern.

- b) The costs of investigation and/or remediation fall to the party that is found to be responsible for the IAQ under the terms of the lease. Therefore, when an IAQ concern or related request is beyond the responsibility of either or both the lessor and GSA (see FAQ #1 below), the occupant agency may be responsible for funding both the initial investigation (if there was cost involved), the additional investigation or testing they deem necessary to address the concern or request, and the cost to remediate if remediation occurs.
- 3) GSA: As the lease management agency, GSA is responsible for enforcing the terms of the lease contract and representing the occupant agency in lease-related matters. According to Occupational Safety & Health Administration (OSHA) regulations (29 CFR 1960.1), GSA's role is derived from its duties as the government's primary landlord and its specific safety and health responsibilities under 41 CFR 102-80.
- a) Lease Contracting Officer (LCO):
 - i) The LCO has the authority and responsibility, as per applicable regulations, to bind GSA to the leasing contract.
 - ii) Their primary role is to enforce the terms of the lease contract, including provisions and requirements related to IAQ.
 - b) Lease Administration Manager (LAM):
 - i) The LAM serves as the main point of contact for communication among all parties involved in any IAQ concern.
 - ii) They are responsible for escalating any IAQ concern requiring GSA investigation or technical interpretation to the GSA regional EHSF program office responsible for IAQ program management.
 - iii) The LAM has delegated authority from the LCO to enforce the terms of the lease contract, limited to the terms of the Contracting Officer's Representative (COR) appointment letter, in cases where an IAQ concern falls within the aegis of the delegated authority.
 - c) Regional EHSF Program Office:



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- i) They provide investigative support to the LAM, LCO, and occupant agency for IAQ concerns that go beyond the responsibilities of the lessor and occupant agency.
- ii) When necessary, they offer their expertise in IAQ to facilitate communication, interpretation, and recommendations regarding applicable IAQ concerns.

Communication

Effective and timely communication is essential from the receipt of the IAQ complaint through the investigation and determination of any findings. The nature and complexity of the issue will determine the nature and level of GSA involvement. The GSA Regional EHSF program office should be included on complex issues to provide technical expertise and support the LAM and LCO in discussions with the lessor and/or occupant agency representative.

IAQ Assessments

Technical IAQ assessments that involve testing or the expertise of professional consultants should be reviewed by GSA before implementing any recommendations. This review is helpful to ensure the accuracy of conclusions and the appropriateness of suggested actions from a technical perspective. Whenever possible, the GSA Regional EHSF program office should be involved in reviewing such reports. After the review, the GSA regional EHSF program office should communicate its response to the LAM, who will then share the information with the tenant and lessor as necessary. It's important to note that this process does not apply to routine IAQ issues related to temperature, relative humidity, and general ventilation.

If an investigation into an IAQ concern reveals no adverse condition or identifies unique sensitivity among one or more agency employees, GSA will include the following information in their communication to the agency:

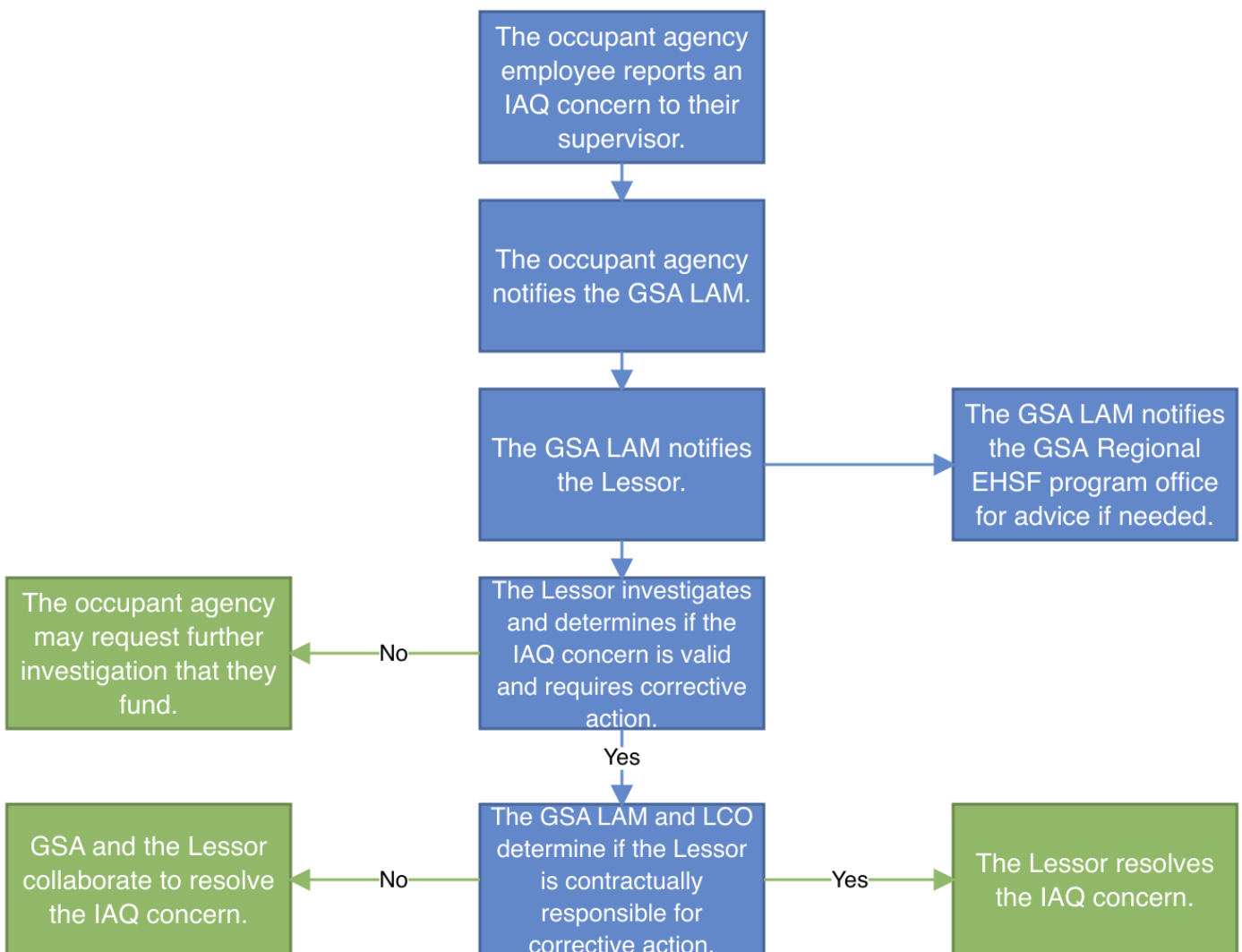
- 1) Results of any testing conducted.
- 2) Any relevant limitations in the lease contract requirements.
- 3) Recognition of the items that were previously discussed in the *Data Applicability* and *Data Interpretation* sections of this document.
- 4) The agency's right to conduct its own investigation at its own expense.



While GSA's communication primarily occurs with the lessor and occupant agency representative, GSA should encourage the occupant agency representative to communicate the activities and results related to an IAQ issue with the complainant.

Flow Diagram

The following flowchart illustrates the steps recommended upon notification of an IAQ concern in GSA-leased facilities.





Frequently Asked Questions (FAQs)

- 1) What are some examples of instances where an IAQ concern or related request is beyond the responsibility of both GSA and the lessor?
 - a) An occupant agency employee has an unusual or unique sensitivity to something in the office environment such as formaldehyde, mold, or dust, but the presence of such substances are within contractually acceptable levels.
 - b) The lessor and/or GSA have evaluated the space and found that levels of IAQ parameters are all within normal or acceptable ranges. For example, a tenant employee reports a skin rash and potential causes in the office are limited to particles (dust) or chemical vapors and gasses. But testing by the lessor or GSA shows dust, vapor, and common gas levels are normal or within acceptable ranges.
 - c) An occupant agency requests an IAQ evaluation for a substance that could clearly not be found in the lease space, such as unusual chemicals or dust, as determined by the professional assessment conducted by the GSA regional office responsible for managing the IAQ program.
 - d) An occupying agency has requested an IAQ evaluation for a substance that is not capable of causing acute health issues or whose effects do not align with the concerns, as determined by the professional assessment conducted by the GSA regional office responsible for managing the IAQ program.

NOTE: Any subsequent assessment requested by the tenant agency should be performed by GSA or the Lessor using a professional experienced in IAQ such as a certified industrial hygienist and funded by the tenant agency.

- 2) What are the most common and basic IAQ elements that a lessor may be responsible for?
 - a) Temperature
 - b) Relative humidity
 - c) Carbon monoxide
 - d) Carbon dioxide
 - e) TVOC
 - f) Water intrusion and water-damaged building materials
 - g) Ventilation issues
 - h) Dust and odor control during construction and maintenance work

Please note that the above list is dependent on the terms of the lease.



- 3) When should the GSA Regional EHSF program office be called in to consult on an IAQ concern or request in leased facilities?

The GSA Regional EHSF program office may need to review the report generated from the IAQ assessment to interpret the IAQ information and provide feasible recommendations. They can also be called upon by the LAM to explain the technical IAQ information in simpler terms or suggest IAQ testing, assessment, or mitigation measures. However, it is important to note that routine IAQ concerns related to common issues like temperature, relative humidity, or general ventilation usually do not require the involvement of the GSA Regional EHSF program office. Similarly, once an IAQ concern is resolved, the ongoing assistance of the GSA Regional EHSF program office is generally not necessary.

5. What is the proper response when a water leak or other moisture intrusion has been discovered in a leased facility?

Refer to the previous section on *Water Intrusion and Water Damaged Building Materials* for industry standard best practices that apply to all facilities regardless of ownership.

6. What needs to be done, if anything, with a newly constructed, build-to-suit lease?

New finishes, coatings, and fabrics in leased facilities may emit odors caused by the chemicals used in their construction. To reduce potential IAQ concerns and adverse effects from these odors, it is recommended that newly leased facilities be adequately ventilated with fresh air in accordance with the terms of the lease. This ventilation period helps to mitigate any lingering odors and allows for the dissipation of potentially harmful chemicals, promoting a healthier indoor environment.