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EGLIN AIR FORCE BASE**

**EGLIN AIR FORCE BASE
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Aerospace Medicine

INDOOR AIR QUALITY (IAQ)

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This instruction implements AFD 48-1, *Aerospace Medicine Program*; HQ USAF *Interim Policy and Guidance for the Prevention, Surveillance, and Remediation of Water Damage and Associated Mold Contamination in Air Force (AF) Facilities* policy letter dated 10 May 2005; and the United States Air Force IERA, *Guide for Indoor Air Quality Surveys* dated February 2003. This base-level instruction establishes the requirements for indoor air quality (IAQ) surveys and procedures for evaluating, managing, and eliminating factors that may lead to poor building conditions. Guidance contained in this instruction is in accordance with (IAW) the Environmental Protection Agency (EPA), the Center for Disease Control and Prevention (CDC), and the Occupational Safety and Health Administration (OSHA). This instruction applies to military and federal civilian employees assigned to Eglin Air Force Base (EAFB) and associate units on the reservation (except Hurlburt Field) including Air Force Reserve, Air National Guard, and Civil Air Patrol. It does not apply to contract personnel working on EAFB. This publication may be supplemented at any level, but all Supplements must be routed to the Office of Primary Responsibility (OPR) of this publication for coordination prior to certification and approval. Refer recommended changes and questions about this publication to the OPR using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained IAW Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS). The authorities to waive wing/unit-level requirements in this publication are identified with a Tier number (T-0, T-1, T-2, T-3) following the compliance statement. See AFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers

through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication OPR for non-tiered compliance items.

SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Major changes include an update to references, regulations, and organizations; removal of statements containing base housing references due to privatization, and changes to the roles and responsibilities of appropriate parties.

1. Background.

1.1. IAQ conditions are dependent on the design, operation, or maintenance of a facility. Poor or inadequate IAQ describes non-industrial indoor spaces where occupants complain of health problems which are presumed to correlate with a building's condition. This instruction covers both facility (e.g., administrative, industrial, dormitories, and child development centers) and management issues related to IAQ and water damage including: prevention, evaluation, and control.

1.2. With increasing efforts toward energy conservation, a desire to reduce heating and cooling costs has led to changes in construction techniques which reduce ventilation rates.

1.2.1. These changes include tighter building envelopes, fewer and inoperable windows, decreased use of operable windows in older construction, use of sealant foams and vapor barriers, and reductions in the amount of outdoor air used for ventilation.

1.2.2. Improperly designed heating, ventilation, and air conditioning (HVAC) systems, renovations of existing buildings without corresponding changes to the HVAC systems, and inadequate building maintenance are also potential factors contributing to poor IAQ.

1.2.3. Common IAQ concerns are typically a result of increased levels of carbon dioxide, but may also be due to building material off-gassing or the presence of mold.

1.3. Mold.

1.3.1. Molds are common in the indoor and outdoor environment within the Southeastern United States.

1.3.2. Mold grows rapidly when spores have sufficient moisture to support active fungal growth.

1.3.3. Conditions contributing to mold growth in buildings include inadequate moisture control, deficient ventilation systems, poor housekeeping, and chronic water intrusion.

1.3.4. Effectively decreasing mold growth in a facility is accomplished by controlling moisture, implementing adequate and frequent housekeeping practices, and active participation of facility managers and residents by inspecting and responding promptly to initial signs of mold.

1.4. IAQ complaints and health effects are often similar to those of colds, flu, and stress. Though symptoms vary person to person, headaches, breathing difficulty, skin irritation, allergic reactions, and aggravation of asthma are common.

1.5. In some instances, a specific source of contamination or specific building condition causing the complaints is readily obvious; however, in the majority of cases, a more in-depth investigation may be necessary to consider all potential contaminants and stressors. Investigations are complex and may require a multi-level team approach from various base agencies: Civil Engineering (CE), Bioenvironmental Engineering (BE), facility managers, and others as appropriate (e.g., tenants, commanders).

2. Roles and Responsibilities.

2.1. Medical Treatment Facility (MTF) Commander will provide personnel and expertise to evaluate building-related health complaints. (T-3)

2.2. MTF Providers will:

2.2.1. Provide medical evaluations and appropriate care to personnel with health complaints which may be building-related.

2.2.2. Work with members of the Aerospace Medicine Squadron when requested to evaluate facilities for potential building-related illnesses.

2.2.3. Send an AF Form 190, *Occupational Illness/Injury Report*, or service branch equivalent to Occupational Medicine if he/she believes the symptoms are related to occupational exposure. (T-3)

2.2.4. Civilian members seeking medical care for suspected building-related illnesses or nonspecific indoor-related symptom complaints will notify their supervisor and should seek medical care from their primary care provider. (T-3)

2.3. Civil Engineer Squadron (796 CES) will:

2.3.1. Conduct facility evaluations upon the facility manager's request in dormitories, lodging, industrial, and administrative buildings. In facilities where mold or moisture and excess humidity problems are present, CE should determine the source. CE may request BE to assist with the facility evaluation as required for sampling. (T-3)

2.3.2. Survey, evaluate, and complete repairs and maintenance requested by facility managers when implicated as stressors for indoor air quality complaints. (T-3)

2.3.3. Respond to facility managers' requests for HVAC inspections due to air quality concerns. (T-3)

2.4. Bioenvironmental Engineering (BE) will:

2.4.1. Conduct health risk assessments, with 796 CES, to investigate/identify potential causes of building-related illnesses and will work with other Team Aerospace members to determine the need for and the completion of health risk assessments in response to physician-identified illnesses that may be building related. (T-3)

2.4.2. Conduct an IAQ survey as part of the investigation/identifying of potential causes of building-related or housing illnesses, if requested. (T-3)

2.4.3. Provide recommendations such as engineering, substitution, or administrative controls that will help reduce or eliminate identified indoor air quality stressors. (T-3)

2.4.4. Monitor IAQ parameters such as Carbon Dioxide (CO₂), relative humidity, and temperature. (T-3)

2.4.5. Provide recommendations/corrective actions if the results of the survey fall outside of the recommended levels identified in Table 1. (T-3)

Table 1. Recommended IAQ Levels.

Parameter	Recommended Level
CO ₂	≤ 1000 parts per million (ppm)
Relative Humidity	30-60%
Temperature	68-76°F

2.5. Facility Managers will:

2.5.1. Ensure a clean environment is maintained in each working area within their respective facility. (T-3)

2.5.2. Conduct regular and frequent evaluations of their facilities to inspect HVAC systems and initiate proper corrective actions when deficiencies are identified. (T-3)

2.5.3. Inspect and report moisture problems before mold and related microbial contamination become problematic. Conduct routine building inspections, including HVAC systems, pipe chases, utility tunnels, and the building envelope (roof, walls, flooring, etc.). (T-3)

2.5.4. As needed, submit an AF Form 332, *Base Civil Engineer Work Request*, to request an IAQ survey by 96 CEG/CENPP. (T-3)

2.5.5. Assist and become part of the IAQ investigation team. (T-3)

2.5.6. Initiate recommended corrective actions following investigation of IAQ complaints associated with their facility. (T-3)

2.5.7. Clean and correct any small mold problems or water damage not exceeding a single area of ten square feet within 48 hours. (T-3)

2.5.8. Submit an AF Form 332, *Base Civil Engineer Work Request*, if mold contamination or water damage exceeds the facility manager's abilities (T-3)

3. Procedures.

3.1. IAQ surveys will be initiated upon receipt of an AF Form 332 from the 796 CES Customer Service Unit submitted by the facility manager, an occupational illness report, or a special survey request to BE. (T-3)

3.1.1. A commander may request a special survey and bypass the 796 CES response. (T-3)

3.1.2. If appropriate, the assessment will be conducted and scheduled based on a priority basis. (T-3)

3.2. Individuals with health complaints associated with their work environment will report their concerns to their facility manager for individualized corrective actions. (T-3)

3.3. Facility managers will be called by 96 CEG/CENPP to schedule an initial IAQ survey and will report accumulative reports of health complaints or concerns from building occupants to BE. (T-3)

3.4. Facility manager must advise the individual showing signs and symptoms to report to their primary care manager. (T-3)

3.5. If a more detailed evaluation is necessary, a team approach will be used for the assessment, which may include BE, Occupational Medicine, Public Health, and CE. The team will determine any possible sources of contamination for the IAQ complaint (HVAC, renovations, new furnishings, etc.). (T-3)

3.6. The survey team will out-brief supervisors and facility managers and present them with recommendations for corrective actions. (T-3)

CHRISTOPHER P. AZZANO, Brigadier General, USAF
Commander

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFPD 48-1, *Aerospace Medicine Program*, 23 August 2011

AFRL Technical Guide for Indoor Air Quality Surveys, 20 July 2014

AFRL Bioenvironmental Engineer's Guide to Indoor Air Quality Surveys, September 2014

HQ USAF Interim Policy and Guidance for the Prevention, Surveillance, and Remediation of Water Damage and Associated Mold Contamination in Air Force (AF) Facilities, 10 May 2005

United States Air Force IERA, *Guide for Indoor Air Quality Surveys*, February 2003

Unified Facilities Guide Specifications, *Mold Remediation*, May 2011

EPA Mold Guide, *A Brief Guide to Mold, Moisture and Your Home* – www.epa.gov/mold

Adopted Forms

AF Form 190, *Occupational Illness/Injury Report*

AF Form 332, *Base Civil Engineer Work Request*

AF Form 847, *Recommendation for Change of Publication*.

Abbreviations and Acronyms

AF—Air Force

AFI—Air Force Instruction

AFPD—Air Force Policy Directive

AFRIMS—Air Force Records Information Management System

BE—Bioenvironmental Engineering

CDC—Center for Disease Control

CE—Civil Engineering

CO₂—Carbon Dioxide

EAFB—Eglin Air Force Base

EAFBI—Eglin Air Force Base Instruction

EPA—Environmental Protection Agency

HVAC—Heating, Ventilation, and Air Conditioning

IAQ—Indoor Air Quality

IAW—In Accordance With

IERA—Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis

MTF—Medical Treatment Facility

OPR—Office of Primary Responsibility

OSHA—Occupational Safety and Health Administration

Attachment 2

IAQ GUIDE FOR FACILITY MANAGERS AND SUPERVISORS

Figure A2.1. IAQ Guide for Facility Managers And Supervisors.

A healthy indoor environment is one in which the surroundings contribute to productivity, comfort, and a sense of health and wellbeing. The indoor air is free from significant levels of odors, dust, and contaminants and circulates to prevent stuffiness without creating drafts. Temperature and humidity are appropriate to the clothing and activity of the building occupants.

The definition of good indoor air quality includes:

Introduction and distribution of adequate ventilation air; control of airborne contaminants; and maintenance of acceptable temperature and relative humidity.

Good air quality is an important component of a healthy indoor environment!

A practical guide to IAQ cannot overlook the temperature and humidity factors, because thermal comfort concerns underlie many complaints about poor air quality. Furthermore, temperature and humidity are among the many factors that affect indoor contaminant levels. It is important to remember that while occupant complaints may be related to time at work, they may not necessarily be due to the quality of air. Other factors such as noise, lighting, ergonomic stressors (work station and task design), and job-related psychological stressors can (individually or in combination) contribute to the complaints.

Failure to respond promptly and effectively to IAQ problems can have consequences such as:

Increasing health problems such as cough, eye irritation, headaches, and allergic reactions, and in some rare cases, resulting in life threatening conditions (such as carbon monoxide poisoning or Legionnaire's disease).

Reducing productivity due to discomfort or increasing employee absenteeism.

Accelerating deterioration of furnishings and equipment.

Straining relations between tenants, employers and employees.

Opening liability problems due to insurance policies' tendency to exclude pollution-related claims.

Provision of good air quality requires conscientious effort by both building staff and occupants. The commitment to address IAQ problems starts with the building owner or facility manager, the person who has an overview of the organization, sets policy, and assigns staff responsibilities. You have the authority to see that an IAQ policy is articulated and carried out; the ability to identify staff with skills that enable them to react promptly and effectively to complaints; and the incentive to initiate a program that will prevent indoor air problems in the future. As you decide how best to respond to the challenge of preventing and resolving IAQ issues in your building, it will be helpful to keep in mind the following thoughts:

It is important to establish a process that encourages an active exchange of information.

Without an open communications policy, an atmosphere of distrust may be created that complicates your efforts to diagnose and correct problems.

Facility staff members are in a position to notice malfunctioning equipment or accidental events that could produce indoor air quality problems.

They can play a critical role in identifying problem situations and averting IAQ crises. On the other hand, if staff members are not aware of IAQ issues, their activities can also create IAQ problems.

Facility staff members are often instructed to keep energy costs to a minimum.

Changes in building operation intended to save energy have sometimes contributed to IAQ problems (for example, by reducing the flow of outdoor ventilation air without taking action to maintain the quality of the recirculated air). The correction of IAQ problems has sometimes led to reduced energy use due to the efficiency associated with a cleaner and better-controlled HVAC system. The energy needed to condition and distribute ventilation air is only a small part of total building energy consumption and is overshadowed by other operating costs. Attempting to limit operating costs by reducing ventilation can be false economy if it leads to problems such as increased occupant complaints, reduced productivity, and workers' absence.

An IAQ problem may be the direct or indirect result of an apparently minor modification.

Actions such as the placement of interior room dividers, acquiring new office equipment, and personal activities such as cooking can have an impact on indoor air quality. Communication between building occupants and building management concerning their mutual responsibilities is a critical element in the management of indoor air quality.

IAQ in a large building is the product of many influences, and attempts to bring problems under control do not always produce the expected results.

Some IAQ problems are complex and may require the assistance of outside professionals. When contracting for services, you need to be an informed client to avoid unnecessary costs and delays in solving the problem and comply with applicable procedures and regulations in procuring your requirement. If there is a reason to believe that an IAQ problem may have serious health implications, BE should be contacted as soon as possible. Many IAQ problems are not difficult to correct and can be solved with in-house expertise. However, gathering congruent information about the problem and identifying appropriate corrective actions are likely to require a coordinated effort by people with a variety of skills. Be prepared to answer the following:

What is the problem?

Where is the problem?

Who is affected?

When does the problem occur?

Note that the development of health effects on an individual who is exposed to chemical, physical, and biological stressors depends on factors including genetics, gender, personal habits, diet, age, and health status. After a telephone interview, it will be determined if an investigation of the building is necessary. The inspection will start with the administration of a health effects questionnaire. Results will be analyzed and a building evaluation will usually be accomplished. If characterization of contaminants is needed sampling may be performed. Final evaluation and analysis is then accomplished to generate a report outlining apparent causes of reported symptoms and recommended corrective actions.