

# IEQ New Construction and Renovation

## Description

**OBJECTIVE** The objective of this policy is to establish minimum requirements to be following on new construction and renovation projects in order to maintain satisfactory indoor environmental quality conditions before, during and after the project.

**POLICY** Effective management of the indoor environmental quality (IEQ) in buildings is essential to the maintenance of occupant health, comfort and productivity. The purpose of this policy is to provide guidelines that will assist in minimizing the negative impacts of new construction or renovation on adjacent occupied spaces and to ensure acceptable IEQ conditions in newly constructed or renovated spaces.

In some instances this policy varies from other more traditional guidelines such as local codes. It is the intent that when this policy is at variance with other accepted standards, the more stringent shall apply.

Requests for exceptions or variations to this policy should be brought to the Environmental Health and Safety (EH&S) division for discussion and approval. Please contact the EH&S IEQ Coordinator at (352)392-1591 with questions regarding this policy.

This IEQ policy applies to all projects involving new construction, renovation or remodeling. Renovation or remodeling projects that do not involve the installation of or extensive modifications to an HVAC system are exempt from the sampling requirements contained in this document.

**AUTHORITY** By authority delegated from the University President, the Vice-President for Business Affairs is responsible for the safety of all University facilities. Under this authority, policies are developed to provide a safe teaching, research, service, housing and recreational environment.

**RESPONSIBILITIES** Environmental Health and Safety EH&S is responsible for maintaining oversight for policy adherence on affected projects.

EH&S will review plans and project specifications to determine whether IAQ baseline sampling is required.

EH&S will investigate any concerns dealing with indoor environmental quality issues during a construction or renovation project and will work to resolve the concerns to the satisfaction of all affected parties.

**Project Designers, Architects and Project Managers** Professionals responsible for project design, initiation and oversight must review the project activities with respect to their effect on the indoor environmental quality as it relates to University staff, faculty, students and project employees.

Design professionals and project managers need to make sure the requirements of this policy are followed and arrange to any required air sampling.

**REQUIREMENTS** Submittals are to be provided to Environmental Health and Safety by the design architect/engineer or

other party responsible for the oversight of the project, in accordance with the schedule indicated in this policy.

When sampling for IEQ parameters is required, it is the responsibility of the design architect/engineer or project manager to arrange for the pre-occupancy sampling by EH&S or by a qualified outside firm. If sampling is to be done by an outside firm, the sampling plan must be developed by an American Board of Industrial Hygiene (ABIH) Certified Industrial Hygienist (CIH) and submitted to EH&S for review and approval before the field work is conducted.

EH&S can perform the required sampling for a fee that is typically charged against the project budget.

Time to collect and analyze the required samples must be accounted for in the project schedule. Depending on the size of the project, sampling will typically take at least a day to complete and up to 14 days to receive results and to complete a final report. Sampling cannot occur until there is an accepted test and balance of the HVAC system and until all installation of building finishes including the furniture is complete.

[/su\_spoiler] [su\_spoiler style="fancy" icon="chevron" title=" Design Phase Requirements "] All HVAC related design is expected to comply with the requirements contained in Division 15 of the UF Design and Construction Standards.

[\_su\_spoiler style="fancy" icon="chevron" title=" Filters and Other Air Cleaning Devices "] Pleated, extended surface area filters must be provided in air handling units. Filters must meet a minimum dust spot efficiency of 80% (MERV 13). Greater filter efficiencies may be required for some applications. Ultraviolet light (UV) lighting arrays may be used to control microbial growth in drain pans and on coil surfaces in an air handler. UV-C systems must be specifically designed for use in an air handling unit.

The use of other types of in line air cleaning or treatment devices must be reviewed and approved by EH&S prior to installation. Examples of such devices include but are not limited to negative and/or positive ion generators or electrostatic precipitators.

Devices specifically designed to purposely emit ozone into the air stream of any space are prohibited. [/\_su\_spoiler] [/\_su\_spoiler] [su\_spoiler style="fancy" icon="chevron" title=" Construction Procedure Requirements "] [\_su\_spoiler style="fancy" icon="chevron" title=" Protection of Materials "] All stored materials must be protected from moisture and microbial growth. Any water damaged materials are to be discarded and replaced.

Installed air handling equipment must be protected from dust, insect, vertebrate, moisture and microbial contamination. Air handling equipment, including ductwork, which becomes contaminated during construction must be cleaned or replaced prior to start-up.

Duct supply air systems shall not be operated without filters in place. Filters used in air handling equipment operating during construction shall have a minimum dust spot efficiency of 35% (MERV 8 or 9). All filter media shall be replaced with 80% (MERV 13) filters before the serviced space is occupied. After the building or renovated area is fully weatherized and before interior finishes are applied, the HVAC system should be operating and the drywall and plaster should show a moisture content of less than 40 on the appropriate moisture meter reference scale. Examples of meters typically used to measure moisture content include but are not limited to models manufactured by Delmhorst and Tramex.

Alternatively, before applying interior finishes, the HVAC system should be run 24 hours per day for a minimum of 3 days at a stable temperature and at a relative humidity below 60%. The HVAC system will remain in 24 hour operation throughout the installation of finishes.

Vinyl wallpaper and other water impermeable coverings or coatings shall not be permitted on the interior side of exterior walls.

Preference is to be given to the use of low volatile organic compound (VOC) emitting paints, glues, carpets and other furnishings and fixtures.

All construction and renovation projects are expected to meet or exceed the recommendations contained in the most recent edition of the SMACNA document "IAQ Guidelines for Occupied Buildings under Construction."

Construction and renovation projects adjacent to occupied spaces present additional IEQ concerns. It is not uncommon for odors, noise and dust from projects to create problems for the adjacent occupants.

Exposures to even low levels dust or chemical contaminants can cause or aggravate asthma, allergies, headaches and mucous membrane irritation in building occupants. The following specific recommendations are intended to prevent these problems.

Areas under renovation shall be separated from adjacent occupied areas by full height hard wall barriers. The barriers are intended to block the transmission of dust, odors and other contaminants from the work area to the occupied spaces.

The work area shall be maintained at a slight negative pressure relative to the adjacent occupied space. Negative pressure can be achieved through adjustment of the HVAC system or by the addition of additional exhaust ventilation in the work areas.

A test and balance of the HVAC system will be required following project completion when pressure adjustment is made through manipulation of the HVAC system.

Regular (daily) housekeeping shall be performed to prevent the tracking of dust and debris from the work area into occupied spaces.

Odor or contaminant producing equipment set-up outside of the interior work area must be located away from outside air intakes or building entrances. Examples of such equipment include roofing tar pots, portable gas or diesel powered engines and portable lavatories.

Workers involved with the project must follow the requirements of the University’s smoking policy.

Material Safety Data Sheets (MSDS) shall be maintained on site for all chemical products used during the renovation or construction process.

IEQ Commissioning Requirements “] Baseline Sampling Parameters “] It is the policy of the University to require the monitoring of several specific IEQ parameters that are considered reliable indicators of occupant comfort in a building. This monitoring is required for all new construction and for any renovation project that involves the installation of a new HVAC system or major modifications to an existing system. The monitoring results will establish baseline levels for the measured parameter in the building and help to identify any major IEQ problems prior to occupancy.

The specific parameters to be measured, their maximum allowable concentrations and the acceptable monitoring methods are noted in Table 1. A minimum of one sample set is required to be run for each occupied floor or for each 25,000 square feet of floor area. A sample set is defined as the collection of three formaldehyde samples and one each of the other listed and applicable parameters. Sample duration shall be for 4 hours. Shorter sampling durations and variations in sampling methods may be allowable but approval must be received from EH&S on a case by case basis. The use of colorimetric indicator tubes for sample collection is not permitted. All samples shall be collected between 3 feet and 6 feet from the floor to represent the breathing zone of the occupants.

Parameter	Maximum Allowable Concentration	Monitoring Method
Formaldehyde	0.027 parts per million (ppm)	NIOSH 2016
Particulates (PM10)	50 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ )	Direct Reading Instrument or NIOSH 0600
Total Volatile Organic Compounds (TVOC)	500 $\mu\text{g}/\text{m}^3$	EPA TO-15
Carbon Monoxide (CO)	4.0 ppm	Direct Reading Instrument
*4-Phenylcyclohexene (4-PCH)	6.5 $\mu\text{g}/\text{m}^3$	Listed OSHA Method

\*4-PCH monitoring is only required if latex backed carpeting is installed

Table 1 Baseline Sampling Parameters

Sampling is to be conducted prior to the occupancy of the building. The HVAC system must be operating in its normal design mode and all furnishings should be in place during sampling. Any touch-up painting or the use of materials containing volatile organic compounds including custodial cleaning products should cease at least 24 hours prior to sampling. The sampling techniques are sensitive to

even low levels of chemicals which may result in reported concentrations that do not accurately reflect conditions in the building.

The vacuuming or sweeping of floors should cease at least 2 hours prior to the start of particulate monitoring.

Once an area is occupied, it becomes important to maintain optimal indoor environmental quality conditions in order to provide for occupant health and comfort. Several parameters can be monitored to provide a basic indication of the state of conditions in the space. These parameters, noted on Table 2, are expected to be maintained within an occupied space following completion of the construction or renovation project.

Parameter	Acceptable Levels
Carbon Dioxide	
Carbon Monoxide	
Relative Humidity	40% – 60%
Temperature	68°F – 74°F Winter Range 70°F – 78°F Summer Range

Table 2 Indoor Comfort Parameters

Indoor radon levels should also be measured following occupancy of a new building. Levels are expected to be below 2 picocuries per liter (pCi/L). Radon sampling can be arranged by contacting the EH&S Radiation Safety office.

This policy provides some basic guidelines that when followed, should minimize the chances of indoor environmental quality issues during construction and renovation projects. The data collected during the commissioning process serves to provide baseline information that demonstrates that a work area meets minimum IEQ standards at the time of occupancy. This information will also be useful should IEQ concerns develop in the future.

Any concerns or questions regarding this policy or IEQ issues in general should be forwarded to the EH&S IEQ Coordinator at (352)392-1591.