

## SECTION 01 35 46

### INDOOR AIR QUALITY PROCEDURES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for managing emissions and moisture control during construction.

##### 1.3 DEFINITIONS

- A. Sustainable Design Related Terminology: As defined is ASTM E 2114.
- B. Adequate Ventilation: Ventilation, including air circulation and air changes, required to cure materials, dissipate humidity, and prevent accumulation of particulates, dust, fumes, vapors, or gases.
- C. Hazardous Materials: Any material that is regulated as a hazardous material in accordance with 49 CFR 173, requires a Material Safety Data Sheet (MSDS) in accordance with 29 CFR 1910.1200, or which during end use, treatment, handling, storage, transportation or disposal meets or has components which meet or have the potential to meet the definition of a Hazardous Waste in accordance with 40 CFR 261. Throughout this specification, hazardous material includes hazardous chemicals.
  - 1. Hazardous materials include: pesticides, biocides, and carcinogens as listed by recognized authorities, such as the Environmental Protection Agency (EPA) and the International Agency for Research on Cancer (IARC).
- D. Indoor Air Quality (IAQ): The composition and characteristics of the air in an enclosed space that affect the occupants of that space. The indoor air quality of a space refers to the relative quality of air in a building with respect to contaminants and hazards and is determined by the level of indoor air pollution and other characteristics of the air, including those that impact thermal comfort such as air temperature, relative humidity and air speed.
- E. Interior Final Finishes: Materials and products that will be exposed at interior, occupied spaces including but not limited to flooring, wallcovering, finish carpentry, and ceilings.
- F. Packaged Dry Products: Materials and products that are installed in dry form and are delivered to the site in manufacturer's packaging including but not limited to carpets, resilient flooring, ceiling tiles, and insulation.
- G. Wet Products: Materials and products installed in wet form, including paints, sealants, adhesives, special coatings, and other materials which require curing.

#### 1.4 QUALITY ASSURANCE

- A. Inspection and Testing Lab Qualifications: Minimum of 5 years experience in performing the types of testing specified herein.

#### 1.5 PRECONSTRUCTION MEETING

- A. After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with University and Architect/Engineer to review and discuss the proposed IAQ Management Plan and develop a mutual understanding of detailed requirements for maintaining indoor air quality and environmental protection.

#### 1.6 SUBMITTALS

- A. Indoor Air Quality (IAQ) Management Plan: Not less than 10 business days before the Pre-construction meeting, prepare and submit an IAQ Management Plan including, but not limited to, the following:

1. Procedures for control of emissions during construction.
  - a. Identify schedule for application of interior finishes.
2. Procedures for moisture control during construction.
  - a. Identify porous materials and absorptive materials.
  - b. Identify schedule for inspection of stored and installed absorptive materials.
3. Revise and resubmit Plan as required by University.
  - a. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations.

- B. Product Data:

1. Submit product data for filtration media used during construction and during operation. Include Minimum Efficiency Reporting Value (MERV).
2. Submit air pressure difference maps for each mode of operation of HVAC.
3. Material Safety Data Sheets: Submit MSDSs for inclusion in Operation and Maintenance Manual for the following products. Coordinate with Section 01 78 23 – Operation and Maintenance Data.
  - a. Adhesives.
  - b. Floor and wall patching/leveling materials.
  - c. Caulking and sealants.
  - d. Insulating materials.
  - e. Fireproofing and firestopping.
  - f. Carpet.
  - g. Paint.
  - h. Clear finish for wood surfaces.
  - i. Lubricants.
  - j. Cleaning products.

- C. Inspection and Test Reports:

1. Moisture control inspections.

2. Moisture content testing.
3. Moisture penetration testing.
4. Microbial growth testing.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 IAQ MANAGEMENT - EMISSIONS CONTROL

- A. Provide point person responsible for the implementation and assurance that the Indoor Air Quality Plan is being implemented.
- B. University Indoor Air Quality Plan: Comply with the requirements of the University IAQ Plan, latest version, appended to this Specification Section.
- C. Flush-Out: After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total air volume of 14,000 cu.ft. of outdoor air per sq.ft. of floor area while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60%.

### 3.2 IAQ MANAGEMENT - MOISTURE CONTROL

- A. Housekeeping:
  1. Keep materials dry. Protect stored on-site and installed absorptive materials from moisture damage.
  2. Verify that installed materials and products are dry prior to sealing and weatherproofing the building envelope.
  3. Install interior absorptive materials only after building envelope is sealed and weatherproofed.
- B. Inspections: Document and report results of inspections; state whether or not inspections indicate satisfactory conditions.
  1. Examine materials for dampness as they arrive. If acceptable to University, dry damp materials completely prior to installation; otherwise, reject materials that arrive damp.
  2. Examine materials for mold as they arrive and reject materials that arrive contaminated with mold.
  3. Inspect stored and installed absorptive materials regularly for dampness and mold growth. Inspect weekly.
    - a. Where stored on-site or installed absorptive materials become wet, notify Architect/Engineer and University. Inspect for damage. If acceptable to University, dry completely prior to closing in assemblies; otherwise, remove and replace with new materials.
  4. Basement: Monitor basement and crawlspace humidity, and dehumidify when relative humidity is greater than 85 percent for more than 2 weeks or at the first sign of mold growth.
  5. Site drainage: Verify that final grades of site work and landscaping drain surface water and ground water away from the building.
  6. Weather-proofing: Inspect moisture control materials as they are being installed. Include the following:

- a. Air and weather-resistive barrier: Verify air and weather-resistive barrier is installed without punctures and/or other damage. Verify air barrier and weather-resistive is sealed completely.
  - b. Flashing: Verify correct shingling of the flashing for roof, walls, windows, doors, and other penetrations.
  - c. Insulation layer: Verify insulation is installed without voids.
  - d. Roofing: In accordance with ASTM D7186 Standard Practice for Quality Assurance Observation of Roof Construction and Repair
7. Plumbing: Verify satisfactory pressure test of pipes and drains is performed before closing in and insulating lines.
  8. HVAC: Inspect HVAC system as specified in Section 23 08 00 – Commissioning.
    - a. And, inspect HVAC to verify:
      - 1) Condensate pans are sloped and plumbed correctly.
      - 2) Access panels are installed to allow for inspection and cleaning of coils and ductwork downstream of coils.
      - 3) Ductwork and return plenums are air sealed.
      - 4) Duct insulation is installed and sealed.
      - 5) Chilled water line and refrigerant line insulation are installed and sealed.

C. Schedule:

1. Schedule work such that absorptive materials, including but not limited to porous insulations, paper-faced gypsum board, ceiling tile, and finish flooring, are not installed until they can be protected from rain and construction-related water.
2. Weather-proof as quickly as possible. Schedule installation of moisture-control materials, including but not limited to air and weather-resistive barriers, flashing, exterior sealants and roofing, at the earliest possible time.

D. Testing for Moisture Content: Test moisture content of porous materials and absorptive materials to ensure that they are dry before sealing them into an assembly. Document and report results of testing. Where tests are not satisfactory, dry materials and retest. If satisfactory results cannot be obtained with retest, remove and replace with new materials.

1. Concrete: Moisture test prior to finish flooring application as specified in Division 09.
2. Wood: Moisture test as per ASTM D4444 - Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters; unless otherwise indicated acceptable upper limits for wood products are < 20% at center of piece; < 15% at surface.
3. Gypsum Board, Gypsum Plaster, Insulation, and other absorptive materials: Moisture test with a Pinless Moisture Meter to assess patterns of moisture, if any.

E. Testing for Moisture Penetration:

1. Windows: Test as per ASTM E1105 Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference at 100 percent static-air-pressure difference specified in applicable Division 08 Sections; unless otherwise indicated, acceptable upper limits are no leakage for 15 minutes.
  - a. Number of Tests: 1 percent of openings but not less than two.

2. Horizontal Waterproofing (not roofing): Test as per ASTM D5957 Standard Guide for Flood Testing Horizontal Waterproofing Installations; acceptable upper limits are no leakage for 15 minutes.
    - a. Test frequency: 100 percent of horizontal waterproofed surfaces.
  3. Masonry: Test as per ASTM C1601 Standard Test Method for Field Determination of Water Penetration of Masonry Wall Surfaces; acceptable upper limits are no leakage for 15 minutes.
  4. Exterior Walls:
    - a. Air tightness of the enclosure test: ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization or ASTM E1827
      - 1) Air Leakage: The mean value of the air leakage flow rate calculated from measured data at 0.3 in wg (75 Pa) must not exceed 0.25 cu ft/ minute per square foot of envelope area. Measurements must be referenced at standard conditions of 14.696 psi (101.325 KPa) and 68 deg F.
- F. Testing for Support of Microbial Growth: Test and report in accordance with ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers. Indicate susceptibility of product or material to colonization and amplification of microorganisms. Identify microorganisms and conditions of testing.
1. Normal conditions: Perform testing at 35 degrees Centigrade and 50 percent relative humidity.
  2. Extreme conditions: Perform worst case scenarios screening tests by providing an atmosphere where environmental conditions may be favorable for microbial growth.
  3. Perform testing for the following:
    - a. Fireproofing material on appropriate substrate.
    - b. Ceiling tile.
    - c. Wall covering.
    - d. Other appropriate material.

**END OF SECTION 01 35 46**