SECTION  – indoor air quality (iaq) testing

1. General

SPEC NOTE: Coordinate with Mechanical Engineer on the Project, to ensure that information provided by the Contractor meets the requirements of their scope of work.

* 1. Summary
     1. This Section provides requirements for Baseline Indoor Air Quality (IAQ) testing for maximum indoor pollutant concentrations for this facility.
     2. Testing results that meet the credit requirements indicate that the project has implemented a successful construction IAQ management plan; low –emitting materials have been specified; cleanup has been thorough; and the HVAC systems are providing adequate ventilation.
  2. Reference STANDARDS
     1. American Society for Testing and Materials (ASTM):
        1. ASTM D5149–02(2016), Standard Test Method for Ozone in the Atmosphere: Continuous Measurement by Ethylene Chemiluminescence.
        2. ASTM D5197–16, Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology).
     2. International Organization for Standardization (ISO):
        1. ISO 16000-3, Indoor air–Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air—Active sampling method.
        2. ISO 16000-6, Indoor air–Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS or MS-FID.
        3. ISO 4224 Ambient air—Determination of carbon monoxide—Nondispersive infrared spectrometric method.
        4. ISO 7708 Air quality—Particle size fraction definitions for health-related sampling.
        5. ISO 13964 Air quality—Determination of ozone in ambient air—Ultraviolet photometric method.
     3. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
        1. ASHRAE 52.2-2017; Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
        2. ASHRAE 60.1-2019; Ventilation for Acceptable indoor Air Quality.
        3. ASHRAE 90.1-2019; Energy Standard for Buildings Except Low-Rise Residential Buildings.

SPEC NOTE: Edit the following paragraph – Remove “LEED” if this is not a LEED Project. Check with the DM if the Consultant (Gensler) is responsible for approval. Edit as necessary.

* + - 1. Submit a test plan to the [LEED] Consultant for approval, including:
         1. The testing procedures.
         2. Schedule of testing.
         3. Instrumentation to be used.
         4. Sampling methods and procedures to be used.
         5. Proposed testing locations.
    1. Test Reports:

SPEC NOTE: Edit the following paragraph – Remove “LEED” if this is not a LEED Project.

* + - 1. Prepare and submit to the [LEED] Consultant, test reports showing:
         1. The testing procedures
         2. Test date(s) and scope.
         3. Results and location (with respect to floor area), of each test.
         4. A summary of HVAC operating conditions.
         5. Descriptions of any discrepancies and recommendations for corrective action (as applicable).
      2. In the event that any non-compliant test results occur, the Contractor must provide a written report to the Owner describing the source(s) of the non-compliant condition(s) and the corrective action(s) taken, as well as results of retesting.
  1. Sequencing and Scheduling

SPEC NOTE: Edit the following paragraph – Remove “LEED” if this is not a LEED Project.

* + 1. The Contractor shall hire an independent contractor, subject to approval by the [LEED] Consultant, with a minimum of five (5) years’ experience in performing the types of testing specified herein, to test levels of indoor air contaminants for compliance with specified requirements.
    2. Identify, program, and schedule all IAQ testing in advance of the test period.
    3. IAQ testing shall take place after the installation of all interior finishes and furniture.

1. Products

Not Used

1. Execution
   1. Indoor Air Quality Testing
      1. Projects also following the requirements of Section 01 35 46 – Indoor Air Quality (IAQ) Procedures should replace all filtration media after the final cleaning and complete the air test and balancing of the HVAC system before beginning the baseline IAQ testing.
      2. A space may be excluded from the credit requirements provided:
         1. It is rarely or never occupied.
         2. It can be excluded from ventilation requirements under ASHRAE 62.
         3. It is mechanically or physically separated from any occupied spaces.
      3. Conduct the air sample testing as follows:
         1. All measurements must be conducted prior to occupancy, but during normal occupied hours with the building ventilation system started at the normal daily start time and operated at the minimum outdoor air flow rate for the occupied mode throughout the test.
         2. All interior finishes and furniture must be installed.
         3. The number of sampling locations will depend on the size of the building and number of ventilation systems. Include areas with the least ventilation and greatest presumed source strength. For each portion of the building served by a separated ventilation system, the number of sampling points must not be less than:
            1. 1 per 465 square meters for office environments AND
            2. At least one test for each contiguous floor area AND
            3. At least one test per ventilation unit
         4. Air samples shall be collected between 0.9 and 1.8 metres (3 and 6 feet) from the floor to represent the breathing zone of occupants.
         5. Test must occur during normal occupied hours, with the HVAC system starting at the normal start time and delivering outdoor air at the minimum rate.
         6. Gravimetric method must be used for testing.
         7. Conduct IAQ testing in one outdoor location, at a minimum.
            1. Outdoor location(s) should be in proximity to outdoor air intakes to accurately represent outdoor air entering the building.
   2. Targeted Pollutants and Maximum Concentrations
      1. Testing shall focus on levels of the following contaminants, with maximum concentrations as listed:
         1. Formaldehyde: < 27 Parts per billion
         2. Total VOC’s (Volatile Organic Compounds): < 500 µg/m³
         3. Particulate Matter (PM10): < 50 µg/m³
         4. Ozone: <0.075 ppm
         5. Carbon Monoxide:
            1. 9 parts per million indoors AND
            2. No greater than 2 parts per million above outdoor levels
   3. Where maximum concentrations are exceeded:
      1. All locations must pass IAQ testing before occupancy.
      2. Conduct an additional flush-out with outdoor air and after any other necessary corrective actions are taken and retest the noncompliant concentrations. Repeat until all requirements are met.
      3. The locations of failed tests must be flushed for a minimum of twenty-four (24) hours before being retested.

END OF SECTION