V3 BETA STANDARD

2023

Indoor Air Quality Assessment Protocol

Indoor Air Quality Assessment Protocol

Directions:

To confirm that the attached Indoor Air Quality Assessment Protocol is implemented within the project, provide a policy detailing each of the following components as it applies to the project. Project Teams must use the document as guidance to detail all of the following components implemented in the project. Official protocols must include protocol implementation dates and be on company letterhead.

Establish a protocol for indoor air quality (IAQ) assessment that outlines all of the following:

SECTION 1: Implementation

A qualifying Indoor Air Quality (IAQ) Assessment Protocol must apply to the following:

MULTI-TENANT BASE BUILDING

Applies to all spaces under the control of building management within the building(s), including common elevator banks on tenant floors.

SINGLE TENANT BUILDING

Applies to all spaces under the control of the tenant within the building(s).

COMMERCIAL INTERIOR

Applies to all spaces under the control of the tenant.

SINGLE TENANT RETAIL

Applies to all spaces under the control of the tenant within the building(s).

MULTI-TENANT RETAIL

Applies to all spaces under the control of building management within the building(s), including common elevator banks on tenant floors.

MULTIFAMILY RESIDENTIAL

Applies to the entire building, including all spaces under the control of building management within the building(s), including common elevator banks and selected dwelling units.

SENIOR HOUSING

Applies to all spaces under the control of building management within the building(s), including common elevator banks and selected dwelling units.

SECTION 2: Air Quality Metrics

See IAQ assessment parameter chart below for required levels of each metric.

Indoor air quality assessment must include the following metrics:

☐ The following air quality parameters must be monitored following the protocols under Section 3 to confirm compliance with the recommended parameters:

- PM2.5
- CO2
- Temperature

☐ A minimum of three of the following air quality parameters may be monitored OR tested (as listed) following the protocols under Sections 3 and 4:

- TVOC or VOC
  - TVOC (monitored or tested)
  - All individual VOCs (tested):
    - Acetaldehyde
    - Acrylonitrile
    - Benzene
    - Naphthalene
    - Toluene
- Relative Humidity (monitored or tested)
- Ozone (tested)
- CO (tested)
- Formaldehyde (tested)
- Nitrogen Dioxide - NO2 (tested)

SECTION 3: Monitoring Protocol

Air quality monitoring must be conducted:

- ☐ To continuously show monthly averages and peaks lasting for more than one hour during work hours while HVAC systems are operating at design parameters.
- ☐ On each floor, every 3,500 square feet (or 325 square meters) or per Air Handling Unit (AHU) zone, whichever is more stringent.
- ☐ Using monitors that meet all of the following requirements:
  - Has a data output of at least once every 5 minutes
  - Has a data loss rate of 10% or less
  - Has a minimum operating range for temperature of 0 - 40 °C (or 32 - 104 °F).
  - Has a minimum operating range for relative humidity of 5-85% RH, non-condensing
  - Requires permanent installations within 3-8 feet from the ground
  - Is calibrated and confirmed functional without defect prior to shipping.

SECTION 4: Testing Protocol

Air quality testing must be conducted:

- ☐ annually post-occupancy in all required areas outlined in Section 1.
- ☐ after any construction and major renovations prior to occupancy within all required areas outlined in Section 1.
- ☐ post occupancy following all long-term shutdowns of the HVAC system (2 weeks or more), within all required areas outlined in Section 1.
- ☐ on each floor, every 3,500 square feet (or 325 square meters) or per Air Handling Unit (AHU) zone, whichever is more stringent.
- ☐ within a sample of 15% of all dwelling units, based on the total number of units (for multifamily residential and senior housing projects, only).
- ☐ on 25% of all tenant occupied floors, based on the total number of floors, for multi-tenant projects.
- ☐ over a period of at least 24 hours.
- ☐ to show the average levels measured for each required zone.
- ☐ during work hours while HVAC systems are operating at design parameters.
- ☐ in the breathing area between 3 to 8 feet from floor level.
- ☐ using one of the following testing methods as applicable and as outlined in the IAQ assessment parameter chart below

SECTION 5: Air Quality Improvement Protocol

If the recommended limits for air quality metrics are not met after assessment, a protocol to improve the air quality will be implemented that includes the following:

- ☐ Ventilation improvements, such as:

- Natural ventilation, such as windows and doors
- Mechanical ventilation enhancements

☐ Air cleaning or purification systems, such as:

- Particle removal, HEPA cleaning
- Gaseous pollutant removal
- UV-C Sanitation
- Electronic air cleaners

☐ Mechanical improvements, such as:

- Upgrading HVAC unit
- Upgrading HVAC ductwork
- re-commissioning/rebalancing of ventilation systems

☐ Occupancy management, such as:

- Reduce occupancy levels
- implementing/optimizing a demand-controlled ventilation system.

	INDOOR AIR QUALITY ASSESSMENT PARAMETER CHART							
	Parameter		Assessment Type	Threshold	Testing Process	Testing Specifics	Monitoring Process	Improvement Specifics
ALL REQUIRED	PM2.5		Monitoring	less than 12 µg/m³	N/A	N/A	IAQ Sensor	HEPA
	CO2		Monitoring	less than 1000 ppm.	N/A	N/A	IAQ Sensor	Carbon filters
	Temperature		Monitoring	maintained within from 68-79F (20-26C)	N/A	N/A	IAQ Sensor	
CHOOSE THREE	TVOC OR VOCs	TVOC	Testing or Monitoring	less than 500 µg/m³ or 132.73 ppb (ug/m3 = ppb * 3.767)	ISO: 16000-6 (TVOC), EPA Compendium Methods IP-1, EPA Compendium Methods TO-1, TO-11, TO-15, or direct reading	N/A	IAQ Sensor	Photocatalytic Oxidation, Bipolar Ionisation, Carbon filters
		VOC (all individual VOCs are required)	Testing	Acetaldehyde: 140 ug/m3 or lower	– DNPH-coated silica adsorbent via pumped or passive sample – HPLC-UV (EPA compendium IP-6) pumped sampling analysis	60 minute sample	N/A	Photocatalytic Oxidation, Bipolar Ionisation, Carbon filters
			Testing	Acrylonitrile: 5 ug/m3 or lower OR Caprolactam: 2.2 ug/m3 or lower	pumped sampling	60 minute sample	N/A	Photocatalytic Oxidation, Bipolar Ionisation, Carbon filters
			Testing	Benzene: 10 ug/m3 or lower	pumped sampling	60 minute sample	N/A	Photocatalytic Oxidation, Bipolar Ionisation, Carbon filters
			Testing	Naphthalene: 9 ug/m3 or lower	pumped sampling	60 minute sample	N/A	Photocatalytic Oxidation, Bipolar Ionisation, Carbon filters
			Testing	Toluene: 300 ug/m3 or lower	pumped sampling	60 minute sample	N/A	Photocatalytic Oxidation, Bipolar Ionisation, Carbon filters
	Relative Humidity		Testing or Monitoring	between 30-60% for temperatures 1 degree Fahrenheit or higher; between 20-60% for temperatures 0 degrees Fahrenheit or below	handheld device, direct reading	2 readings a minimum of 2 weeks apart	IAQ Sensor	Humidifier, Dehumidifier
	Ozone		Testing	less than 0.07 ppm	diffusion tube	2-4 week exposure	N/A	Carbon filters
	CO		Testing	less than 9 ppm	handheld device, ISO 4224, EPA Compendium Methods IP-3, direct reading	2 readings a minimum of 2 weeks apart	N/A	Carbon filters
	Formaldehyde		Testing	less than 20 ug/m3 or 16 ppb	methods in accordance with IP-6, ISO 16000-3, ASTM D5197, or NIOSH 2016	breathing zone (3-8 feet above finished floor), test 2 times per location (at least 60 minutes apart within a 24 hour period) and report the average levels measured for each zone	N/A	Photocatalytic Oxidation, Bipolar Ionisation, Carbon filters
	Nitrogen Dioxide (NO2)		Testing	less than 0.2 ppm 8-hour TWA (pulled from ACGIH) OR annual average of less than 40 ug/m3 or 21 ppm (pulled from WHO)	diffusion tube	2-4 week exposure	N/A	Carbon filters