

<p style="text-align: center;">Model SPECIFICATION</p> <p style="text-align: center;">IAQ Guidelines for Occupied Buildings Under Construction</p>
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Modified by Lynn Rose from the SMACNA model specification for IAQ Guidelines for Occupied Buildings Under Construction.

E.1 PROJECT REQUIREMENTS E.1.1 Air Quality In Occupied School Areas

1. **GENERAL.** Construction activity shall be controlled to avoid causing detectable odor, dust, and other air pollutants at levels known to present risk of illness in occupied school areas. Throughout the duration of this project, the contractor shall perform the work required by the contract documents without affecting indoor air quality (IAQ) in occupied areas. Work shall be performed with special care, planning, and quality control to avoid disruption or interference with normal facility and educational operations; and to protect the health and safety of the building occupants, employees, and visitors.
2. **CONTROL MEASURES – Contractors shall:**
 - a. Conduct all construction activities with potential dust and odors or other contaminant impacts on occupied areas through the use of IAQ control measures, including use of low emitting products, equipment, or procedures, isolation of work (barriers, proper pressurization, or scheduling), and housekeeping.
 - b. Separate work adjacent to occupied school areas by barriers which prevent the penetration of dust and odors or other contaminants of concern.
 - a. Vertical barriers shall extend from floor to metal deck sealing all penetrations.
 - b. Emergency exit doors shall be self-closing and weather-stripped. Construction shall include wood stud frames and (1.6 mm) sheetrock (joints sealed).
 - c. Floor-to-floor penetrations shall also be sealed.
 - c. Maintain construction areas under negative pressure in relation to occupied areas where necessary to prevent contamination of occupied areas. This may be accomplished by supplying outside air to the occupied side or exhausting air from the construction side (with a source of make-up air).
 - d. Conduct work activities presenting a potential health hazard after normal school hours in coordination with the school principal and the Facilities Division.. Roofing, indoor cutting of steel, concrete, or masonry, vehicles powered by internal combustion engines which are operated inside the building, removal of asbestos-containing material, welding, and other activities producing significant dust, odors or fumes shall be conducted after hours, unless the contractor can demonstrate that controls will maintain acceptable IAQ in occupied areas.
 - e. Enclose openings created to the outside of the building after each work shift to protect the building interior from moisture.
 - f. Prevent their workers from entering occupied school areas.

- g. Transport trash, debris, carts, equipment, materials or supplies to and work areas without entering occupied school areas.
 - h. Store project storage materials, equipment, trash, etc. in areas designated by the Facilities Division in conjunction with the principal.
 - i. Clean work area daily to prevent the accumulation of dust or debris.
 - j. Store waste in enclosed waste containers as needed to prevent the release of dust and odors or other contaminants and to maintain compliance with applicable laws.
 - k. Take immediate measures to dry any area where flooding, water leakage, or condensation occurs. Contractor is responsible for mitigating any related damage.
 - l. Any mold growth must be remediated following approved procedures.
3. Contractor shall be responsible for providing adequate manpower, equipment, and materials at appropriate times (including nights and weekends) to meet the requirements of this section and project schedule milestone dates.
 4. If owner determine that the contractor is violating this IAQ specification or endangering school occupants, the contractor must cease operations until corrective actions are taken.

E.1.2 New Construction Acceptance (Note: can also apply to unoccupied construction)

1. New or renovated areas will not be accepted by the Owner for occupancy and normal school functions unless acceptable IAQ conditions can be demonstrated, including successful implementation of the following:
 - a. When newly constructed or renovated areas are first occupied, IAQ should be equivalent to conditions considered acceptable in other school areas.
 - b. Before occupancy, HVAC control systems must be functioning in new or renovated areas.
 - c. HVAC equipment exposed to construction must be cleaned.
 - d. All filters must be changed in the construction areas and any affected areas immediately prior to occupancy.
 - e. Construction work must be completed one week before area is scheduled to be occupied.
 - f. All exposed surfaces must be cleaned from top to bottom until no dust or debris is visible.
 - g. Provide continuous (overnight) ventilation for at least one week before and two weeks after completion of construction in each space.
 - h. Schedule any punch list work that produces odor or dust after normal school hours.
2. At least two weeks before initiating work on each major project phase, the contractor shall submit four (4)¹ copies of an IAQ Control Plan and an HVAC Protection Plan to the Facilities Division, which must be approved. Submittals shall include the following;

¹ Copies to Director of Facilities, Director of Environmental Health and Safety, Facilities Engineer and Zone Chief

- a. Listing of all products and equipment to be used, including MSDS Sheets where applicable.
 - b. Description of dusts, odors, fumes, or potentially harmful pollutants which could be released by work activities.
 - c. Description of potential pathways by which pollutants could migrate from work areas.
 - d. Description of barriers planned between work areas and occupied space.
 - e. Listing of work activities scheduled after normal school hours to avoid occupant exposure.
 - f. Justification for activities proposed to be conducted during normal school hours.
 - g. Needs for equipment and supply storage during job duration.
 - h. Procedures for daily cleaning and waste disposal.
 - i. Schedule for final cleaning and ventilation of finished areas prior to occupancy.
3. Compliance must be demonstrated with all applicable sections of this specification.
 - a. Requirements which are not applicable should be explained (e.g., a small scale job which can be completed overnight when an area is unoccupied and cleaned before the next school day may not need a barrier).
 - b. An onsite meeting shall be held with representatives from the Facilities Division to review IAQ controls and HVAC protection.

E.3 HVAC BASIC MATERIALS AND METHODS

E.3.1 Protection of HVAC Systems in Renovation Areas (Note: some sections can also be applied to unoccupied construction)

Construction operations must be conducted so as to maintain ventilation, comfort, and mechanical equipment sanitation in occupied school areas with the following measures:

1. Prior to the start of each renovation phase, the contractor shall:
 1. verify which HVAC systems are within the renovation area, and
 2. determine if any HVAC systems serve both the renovation and non-renovation areas.
2. Coordination with the Facilities Division to de-energize any HVAC systems in renovation areas.
3. Protection of duct systems, air-handling units, fan coil units, and unit ventilators that are not removed from construction dust and debris by:
 1. Sealing outlets and openings with 6-mil plastic sheeting.
 2. Wrapping stand-alone units (e.g., fan coil units and unit ventilators) with 6 mil plastic and seal with tape.
4. Modification of HVAC systems during the renovation shall remain sealed until modifications are completed, and then reopened, inspected and after modifications are completed. After dust-producing renovation work is completed:

1. Clean coils and drain pans of existing air-handling units, fan coil units, and unit ventilators that were not removed during renovation. Submit proposed cleaning products including MSDS sheets to Facilities Division representatives for approval before starting cleaning.
 2. Clean interior metal surfaces (including fans and dampers) with an approved product.
 3. HEPA Vacuum internally insulated surfaces.
 4. Repair or replace any insulation that is delaminating from unit casing.
 5. Check that all condensate drain pipes drain properly and are not blocked. Clean any blockage.
5. New air-handling units, fan coil units, or unit ventilators shall be protected from weather, dust-producing procedures, or damage.
1. Take immediate measures to dry any equipment that becomes wet.
 2. If any mold growth develops on equipment because contractor did not protect or dry equipment, contractor shall remediate the equipment following procedures approved by Facilities Division representative.
6. Operating HVAC systems should not serve both occupied and construction areas.
1. If HVAC systems serve both occupied and construction areas, ducts serving the construction areas shall be isolated from the system either by sealing openings and closing dampers, or disconnecting ducts from the HVAC system and sealing openings.
 2. If HVAC systems have direct expansion coils, it should first be determined that reduced airflow will not affect direct expansion coil operation.
7. Seal openings in non-operating ducts that interconnect construction and occupied areas with 6-mil plastic.
8. If HVAC equipment is operated in construction areas:
1. Install filters having a minimum efficiency of 30% (atmospheric dust spot efficiency test) or MERV 6 Rating on return air openings.
 2. Change filters every two weeks.
 3. Clean duct system following National Air Duct Cleaning Association (NADCA) procedures if units were operated without filtration during construction.
9. Do not allow chilled water to flow through pipes in renovation areas until the vapor retarder on pipes is completely sealed.
1. Contractor shall replace any insulation which becomes wet because of an unsealed vapor barrier.

E.3.2 HVAC Protection Plan Before beginning work on each major renovation phase, the contractor shall submit eight (8) copies of an HVAC Operation and Protection Plan, which must be approved. The submittal must include the following: Manufacturer's information of all cleaning and sanitizing products including MSDS sheets.

1. Time periods when HVAC equipment which will affect occupied areas will be shutdown. Shutdown of equipment (including central plant) shall only occur when the school is not operating (e.g., summer session or holidays). Equipment shall be operating when school is reoccupied.
2. Indicate any HVAC equipment located in the renovation area that will be operating and for what purpose. Indicate how this equipment will be protected from dust and moisture.
3. Indicate on a drawing where a duct or HVAC system which serves both renovation and occupied areas will be sealed. Location must be approved.
4. Indicate on the project schedule when HVAC equipment for each renovation phase will be fully operational. A renovated area will not be cleared for occupancy unless HVAC systems are completely functioning including, but not limited to, exhaust fans, controls, dampers, air-handling units, unit ventilators, fan coil units, etc. HVAC systems shall be capable of operating for a two- week period before occupancy to ventilate renovated spaces.