

ADVISORY 29.4 BARRIERS AND ENGINEERING CONTROLS FOR THE ISOLATION AND CONTAINMENT OF CONSTRUCTION-RELATED ACTIVITIES

Construction activities, especially the demolition and renovation of occupied or partially occupied structures, have the potential to cause personal injury and adverse health effects among the occupants of the adjoining areas. Agents of concern include, but are not limited to, construction-related dust, silica, and other particulates, fumes, mist, vapors, gases, liquids, odors, organic and inorganic chemical coatings, cleaning supplies, solvents, and noise most of which are regulated by the Occupational Safety and Health Administration (OSHA), U.S. Environmental Protection Agency (EPA), or other agencies and organizations that issue health and safety guidelines such as the Ohio Department of Health (ODH), and the American Conference of Governmental Industrial Hygienists (ACGIH).

All providers of construction-related services including Facilities Management Project Services and private contractors are required to:

- Clearly detail construction area boundaries and locations of construction containment barriers on shop drawings and submit them to University of Cincinnati Construction Management (UCCM) for review prior to start of work. Drawings must depict the construction area and location of barriers to be erected to prevent the entry of dust, fumes, mist, vapors, gases, liquids, or excessive noise levels into normally occupied building spaces above, below, or adjacent to the area affected by project activities.
- Ensure that vehicles, equipment operation, and work activities performed outside the building, i.e., mixing of materials, vehicle and equipment emissions, staging of materials, etc. are conducted in a location where dust, mist, vapors, and fumes do not enter the building through outside air intakes or other building openings, e.g., windows and doors.
- Completely isolate the work area(s) from other parts of the building by providing containment systems for construction and maintenance activities that have the potential to adversely impact any surrounding occupied indoor environment and cover all HVAC inlets in the work area with polyethylene sheeting to prevent entrainment into the building system. Construction of containment barriers equipped with room pressurization monitoring equipment is required along the boundary of the construction area(s) to contain and control dust, fumes, mist, vapors, gases, liquids, and noise so as not to adversely affect the comfort, health, and safety of staff and visitors outside the boundaries of construction.
- Use qualified personnel for the construction and installation of containment barriers. Containment barriers are to be located where they will isolate the area of work from adjacent occupied spaces above and below the area of work and the containment barriers are to be relocated and modified as required to maintain the performance values specified. Containment barriers shall be maintained for the full duration of the construction project and shall be inspected daily. Providers of construction-related services will repair all rips, tears and holes in containment barriers immediately. The contained area must be continuously maintained at a negative pressure of no less than 0.005 inches of water relative to all adjacent areas for the full duration of the project. A differential pressure monitoring device must be installed within view from the outside the construction area to continuously measure and display the differential pressure between the construction space and the surrounding areas.

- Provide local exhaust ventilation to collect airborne contaminants at the source of generation inside the contained area and direct the contaminants into a suitable air-cleaning device prior to discharge outside the building, or directly outside of the building to an acceptable location for discharge. System outlet ducting shall be directed away from building HVAC system inlets or other migration pathways into the building. Provide a minimum of 6 air changes per hour in the work area, regardless of negative pressure value. Negative pressurization of the work area may be maintained through the use of exhaust fans equipped with high-efficiency particulate air (HEPA) filters. If the HEPA filtered exhaust fans were previously used for asbestos abatement activities or other construction processes, the units must be inspected by UCCM prior to use. If UCCM finds the exhaust fans have not been thoroughly cleaned, providers of construction-related services shall replace the fans immediately. Filters should be changed when loading occurs.
- Provide all required electrical service in accordance with all applicable codes and regulations to power the air filtration devices and/or other equipment necessary to maintain the isolation of the work area.
- Provide walk-off mats inside of the containment at points of egress. These mats will either be damp or covered with a tacky adhesive material to minimize the amount of dust and debris tracked outside of the contained area from shoes and boots.
- Develop a written, site-specific health and safety plan, which will be kept on site at all times. The manual should document the guidelines developed for the protection of all on-site personnel, visitors, and the public from physical harm and potential exposure to hazardous materials or wastes during construction activities.
- Submit Material Safety Data Sheets (MSDS) and technical bulletins to UCCM to be kept on record and available to the Department of Environmental Health and Safety upon request. Material Safety Data Sheets for all products used on the project shall be available for review prior to construction as required by 29 CFR 1926. Providers of construction-related services shall review the MSDS file weekly, update it as needed, and maintain a copy of all MSDS on the job site. A written description of how the product is to be used and the quantities to be used shall accompany each MSDS.
- Ensure, in accordance with University Standards, that materials used for the project are the least toxic available that will accomplish the intended performance for each application. UCCM will review the materials submitted in consultation with the Architect and the University of Cincinnati Department of Environmental Health and Safety. Providers of construction-related services shall ensure the quantities of hazardous materials used are minimized and that toxic substances are properly stored at the job site to prevent evaporation into the building environment.
- Follow product manufacturer's instructions regarding application and use of product including; thickness of application, curing time, temperature and environmental conditions for all materials that cure via a chemical or physical process.
- Provide and post appropriate signage to notify faculty, staff, students, and visitors of construction and restricted access areas, blocked corridors, and paths of emergency egress.

Should employee, student, or public access areas beyond the work areas become contaminated as a consequence of the work, providers of construction-related services shall

clean those areas to meet applicable University standards as directed by UCCM. All such required cleaning or decontamination shall be performed at no additional cost to the University.

Should occupants experience objectionable odors, noise or any adverse health effects outside the containment barrier due to construction activity, air quality tests will be performed by UCCM in consultation with the Architect and the University of Cincinnati's Department of Environmental Health and Safety to determine the origin of the problem. Construction activities causing elevations of air contaminants outside the containment barrier will be the basis for a Stop Work Order to be issued by UCCM and to remain in effect until the condition has been rectified.

All additional costs incurred due to the results of a complaint-based indoor air quality survey and all occupant relocation or early dismissal due to indoor air quality problems shall be paid for by the providers of construction-related services if values in these specifications are exceeded, or if there is documented evidence of negligence on the part of the providers of construction-related services to perform to the standards established by this Advisory.

References:

1. American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.
ASHRAE Standard 62-1989 Ventilation for Acceptable Indoor Air Quality
2. Occupational Safety and Health Administration Code of Federal Regulations:
(www.osha.gov/comp-links.html)
 - a. 29 CFR 1926.59 Hazard Communication
 - b. 29 CFR 1910.95 Occupational Noise Exposure
 - c. 29 CFR 1910.146 Permit Required Confined Spaces
 - d. 29 CFR 1910.1000 Air Contaminants
 - e. 29 CFR 1910.1200 Hazard Communication
 - f. 29 CFR 1926.57 Ventilation
3. American Conference of Governmental Industrial Hygienists
 - a. Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents
 - b. Industrial Ventilation Manual of Recommended Practice.
4. Environmental Health & Safety Advisories:
(<http://ehs2.uc.edu/Advisories.html>)
5. University of Cincinnati Standards