

EA- CREDIT - CONSTRUCTION

INTENT

To promote the well-being of construction workers and building occupants by minimizing indoor air quality problems associated with construction and renovation.

POTENTIAL TECHNOLOGIES & STRATEGIES

By implementing SMACNA IAQ strategies, projects will capture dust and other airborne pollutants, keep contaminants and toxic substances out of building systems, and prevent mold and other damage to building materials. Additionally, projects must protect absorptive material from moisture damage, prohibit smoking during construction inside the building and near entrances, and ensure that any permanent air handlers operated during construction meet filtration requirements.

CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT PLAN

REQUIREMENTS

Develop and implement an indoor air quality (IAQ) management plan for the construction and preoccupancy phases of the building. The plan must address all of the following. During construction, meet or exceed all applicable recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008-2008, Chapter 3.

IMPLEMENTATION

REQUIRED DOCUMENTATION

Documentation	All projects except Healthcare	Healthcare
IAQ management plan or detailed checklist, highlighting nonsmoking policy	X	
EQHP or detailed checklist, highlighting nonsmoking policy		X
Narrative describing protection measures for absorbent materials	X	X
Annotated photographs of indoor air and environmental quality measures	X	X
Record of filtration media	X	X

BEHIND THE INTENT

Construction activities adversely affect indoor air quality (IAQ) when they generate dust, toxic substances, or other contaminants, which can cause health problems not only for construction workers but also those who occupy the building long after construction is complete. Incorporating IAQ best practices during construction has many benefits. One is the protection of building occupants from airborne pollutants associated with the construction. Another is the protection of construction workers from toxins and dust during build-out. A less obvious one, finally, is the benefit gained when building material and HVAC equipment last longer and perform better over time.

This credit requires teams to develop and implement a construction IAQ management plan that follows the Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) IAQ guidelines. The SMACNA standard identifies major sources of construction-related indoor air pollution and spells out best practices for controlling them.

By implementing SMACNA IAQ strategies, projects will capture dust and other airborne pollutants, keep contaminants and toxic substances out of building systems, and prevent mold and other damage to building materials. Additionally, projects must protect absorptive material from moisture damage, prohibit smoking during construction inside the building and near entrances, and ensure that any permanent air handlers operated during construction meet filtration requirements.

Because of the special sensitivities of patients, health care facilities have additional requirements to address noise, vibration, and infection control that go beyond the basic SMACNA guidelines.

STEP-BY-STEP GUIDANCE

NEW CONSTRUCTION, CORE AND SHELL, SCHOOLS, RETAIL, DATA CENTERS, WAREHOUSES AND DISTRIBUTION CENTERS, HOSPITALITY

STEP 1. INTEGRATE SMACNA CONTROL MEASURES INTO PROJECT DRAWINGS AND SPECIFICATIONS

Include compliance with SMACNA guidelines and other credit requirements in drawings and specifications (see Further Explanation, SMACNA Guidelines).

- Consider how the requirements and guidelines may affect design decisions. If used during construction, the air-handling equipment must be designed to accommodate MERV 8 or higher filters. Finishes such as paints and coatings specified by the design team must be consistent with SMACNA guidelines, regardless of whether those materials will contribute to other LEED credits.
- Include SMACNA requirements in project specifications. For example, specify that air handlers and ducts be delivered to the site prewrapped in plastic, to avoid having to protect equipment after delivery.
- Review the credit requirements and SMACNA guidelines in detail with all pertinent members of the design and construction team, specifically, the construction manager, general contractor, and mechanical subcontractor(s).

STEP 2. DEVELOP INDOOR AIR QUALITY PLAN

Before construction begins, develop an IAQ management plan that meets or exceeds the credit requirements. The IAQ plan is typically prepared by the general contractor or construction manager. It includes IAQ management practices implemented during construction and preoccupancy phases and describes how each requirement in the SMACNA guidelines and credit requirements will be addressed and managed on the job site. The plan should adhere to the SMACNA guidelines and cover the following additional items:

- Specify procedures for protecting stored and installed absorptive materials from moisture damage.
- Highlight the nonsmoking policy. Prohibit the use of tobacco products inside the building and within 25 feet (7.5 meters), or more if required by the local jurisdiction, of the building entrance at all times during construction. Consider prohibiting smoking on the entire job site.

STEP-BY-STEP GUIDANCE +

- Indicate whether air handlers will be operated during construction, and specify compliant filtration procedures for permanent equipment that will be used.

A detailed checklist instead of an IAQ management plan is also acceptable.

STEP 3. IMPLEMENT INDOOR AIR QUALITY PLAN

Ensure that the IAQ management plan is in place before starting above-ground construction, storing materials on site, or roughing in mechanical systems. Take photographs of each IAQ measure for documentation.

The following best practices support successful implementation of the plan:

- Identify the key players and someone responsible for implementing the plan, such as the HVAC installer and the general contractor. Make sure they understand the requirements of the plan and help champion its goals.
- Include the IAQ management plan requirements in contract agreements with subcontractors.
- As subcontractors are selected and deployed on site, familiarize them with the plan and how it will affect their daily activities. Hold a subcontractors' orientation meeting to review the plan requirements as a group.
- Include construction IAQ progress check-ins as a regular item in weekly subcontractor meetings and safety meetings.
- Provide a copy of the plan on site, preferably posted in an accessible area. Translate the plan into the languages spoken by subcontractors and their crews.
- General contractors, construction managers, and owners should verify that the IAQ management plan is being followed on job walks, ideally daily, so that issues can be addressed with subcontractors as necessary. Creating a checklist of major items for easy reference is often effective.
- Decide whether air handlers need to be used during construction. If so, substituting stand-alone temporary air handlers or heaters may make it easier to meet the HVAC protection requirement. If permanent air handlers are used during construction, record the filtration media used to meet the documentation requirements.
- Annotate photographs to indicate each IAQ measure depicted and its general location.
- Provide photographs of the methods employed to protect stored and installed absorptive materials from moisture damage during construction and preoccupancy.



STEP-BY-STEP GUIDANCE +

HEALTHCARE

STEP 1. EVALUATE INFECTION CONTROL RISK

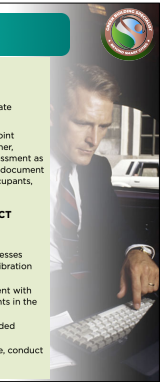
For renovations, additions adjacent to occupied facilities, or phased occupancy projects, evaluate infection control risk.

Follow the 2010 FGI Guidelines for Design and Construction of Health Care Facilities and the Joint Commission on standards to establish an integrative infection control team comprising the owner, designer, and contractor to evaluate infection control risk. Include an infection control risk assessment as part of the indoor air quality plan—known as an environmental quality management plan—and document the required precautions in the project-specific plan. The plan should take into account the occupants, patients, and programming unique to the project and the building as a whole.

STEP 2. INTEGRATE ENVIRONMENTAL QUALITY MANAGEMENT PLAN INTO PROJECT SPECIFICATIONS

Develop an environmental quality management plan (EQMP).

- Include a noise and nuisance plan based on British Standard 5228-2009. This standard addresses noise pollution and nuisance to neighboring properties, specifying reductions in noise and vibration from construction equipment and other nonroad engines.
- Limit construction noise (both the level of noise and its duration). Use construction equipment with low noise emissions or the lowest decibel level available that meets performance requirements in the British Standard.
- Construction crews must wear ear protection wherever sound levels exceed 85 dB for extended periods. Provide training and protective gear for workers.
- Limit the effects of vibration on nearby historic or otherwise sensitive buildings. For example, conduct demolition in stages rather than using a single large blast explosive.



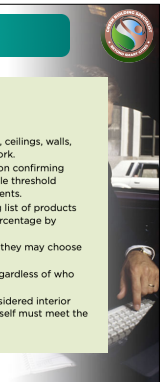
STEP-BY-STEP GUIDANCE +

Option 1. Product Category Calculations

STEP 1. IDENTIFY ALL APPLICABLE PRODUCTS

List all specified interior paints, coatings, adhesives, sealants, flooring, composite wood, ceilings, walls, thermal and acoustic insulation, and furniture, as applicable to the project's scope of work.

- During the construction submittal review process, obtain manufacturer documentation confirming compliance for each product category. All products must comply with each applicable threshold requirement. If two requirements exist, the product must comply with both requirements.
- The most effective way to track this credit is for one team member to keep a running list of products and their compliance information (e.g., VOC content, emissions testing, emissions percentage by volume), with manufacturers' documentation.
- Healthcare and Schools projects have an additional category, exterior products, that they may choose to pursue.
- Furniture is considered part of the scope if it is installed at the time of occupancy, regardless of who specified or provided it.
- Adhesives, sealants, paints, and coatings used on site with flooring products are considered interior adhesives and sealants or interior paints and coatings, as appropriate. The flooring itself must meet the requirements of the flooring product category.



STEP-BY-STEP GUIDANCE +

- Implement source-reduction strategies by providing properly graded and maintained circulation paths, establishing no-idling and sequential equipment start-up policies, and retrofitting loud equipment with noise and vibration attenuation.
- Use the Infection Control Risk Assessment Standard, published by the American Society of Healthcare Engineering and the U.S. Centers for Disease Control and Prevention, as a guideline for assessing the risk of construction activities and selecting mitigation procedures. Incorporate appropriate measures into the EQMP. Draw on both the standard and the FGI guidelines to develop the project's EQMP.
- For renovation projects with any waterproofing, asphalt roofing, roofing repair, parking lot sealing, or other outdoor activities with high VOC emissions, comply with procedures in National Institute for Occupational Safety and Health, NIOSH Publication 2003-102, Asphalt Fume Exposures During the Application of Hot Asphalt to Roofs, Sections 4 and 5, include details for compliance in the project EQMP to manage fumes and avoid infiltration to occupied spaces.
- Include compliance with SMACNA guidelines and other credit requirements in the project drawings and specifications (see Further Explanation, SMACNA Guidelines).

STEP 3. COORDINATE ENVIRONMENTAL QUALITY MANAGEMENT PLAN WITH DESIGN

- Consider how the environmental quality management requirements and guidelines may relate to design decisions.
- Decide whether air handlers need to be used during construction. If so, substituting stand-alone temporary air handlers or heaters may make it easier to meet the HVAC protection requirement. If used during construction, the air-handling equipment must be designed to accommodate MERV 8 or higher filters.
 - Finishes such as paints and coatings, specified by the design team must be consistent with SMACNA guidelines, regardless of whether these materials will contribute to other LEED credits.
 - Include SMACNA requirements in project specifications. For example, specify that air handlers and ducts be delivered to the site prewrapped in plastic, to avoid having to protect equipment after delivery.

STEP 4. IMPLEMENT ENVIRONMENTAL QUALITY MANAGEMENT PLAN

Ensure that the EQMP is in place before starting above-ground construction, storing materials on site, or engaging in mechanical systems. Photograph each measure for documentation.

The following best practices support successful implementation of the plan.

- Review the credit requirements and SMACNA guidelines in detail with members of the design and construction team, particularly the construction manager, general contractor, and mechanical subcontractors.
- Identify the key players and someone responsible for implementing the plan, such as the HVAC leader and the general contractor. Make sure they understand the requirements of the plan and help champion its goals.
- Include the AQ management plan requirements in contract agreements with subcontractors.
- An subcontractors are selected and deployed on site, familiarize them with the plan and how it will affect their daily activities. Hold a subcontractor orientation meeting to review the plan requirements as a group.
- Include construction AQ progress check-ins as a regular item in weekly subcontractor meetings and safety meetings.
- Provide a copy of the plan on site, preferably posted in an accessible area. Traverse the plan into the language spoken by subcontractors and their crews.
- General contractors, construction managers, and owners should verify that the AQ management plan is being followed on site weekly. Develop OSHA 300 to OSHA 305 to be addressed with subcontractors as necessary. Creating a checklist of major items for easy reference is often effective.

Document the implementation.

- Photograph each AQ measure and annotate the images for documentation.
- Photograph the methods employed to protect stored and installed absorptive materials from moisture damage during construction and preoccupancy.
- Record the filtration media used in HVAC equipment.

REQUIREMENTS

NC, CS, SCHOOLS, RETAIL, DATA CENTERS, WAREHOUSES & DISTRIBUTION CENTERS, HOSPITALITY

Develop and implement an indoor air quality (IAQ) management plan for the construction and preoccupancy phases of the building. The plan must address all of the following.

During construction, meet or exceed all applicable recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007; ANSI/SMACNA D08-2008, Chapter 3.

Protect absorptive materials stored on-site and installed from moisture damage.

Do not operate permanently installed air-handling equipment during construction unless filtration media with a minimum efficiency reporting value (MERV) of 8, as determined by ASHRAE 52.2-2017, with arrears (or media with SO₂—90% or higher, as defined by ISO 16890-2016, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance), are installed at each return air grille and return or transfer duct inlet opening such that there is no bypass around the filtration media. Immediately before occupancy, replace all filtration media with the final design filtration media, installed in accordance with the manufacturer's recommendations.

Prohibit the use of smoking inside the building and within 25 feet (7.5 meters) of the building openings during construction. Smoking includes tobacco smoke, as well as smoke produced from the combustion of candles and controlled substances and the emissions produced by electronic smoking devices.

MOISTURE

Moisture. Develop and implement a moisture control plan to protect stored on-site and installed absorptive materials from moisture damage. Immediately remove from site and properly dispose of any materials susceptible to microbial growth and rot, including wet, undamaged materials. Also include strategies for protecting the building from moisture intrusion and preventing occupants' exposure to mold spores.

Particulates. Do not operate permanently installed air-handling equipment during construction unless filtration media with a minimum efficiency reporting value (MERV) of 8, as determined by ASHRAE 52.2-2017, with arrears (or media with SO₂—90% or higher, as defined by ISO 16890-2016, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance), are installed at each return air grille and return or transfer duct inlet opening such that there is no bypass around the filtration media.

REQUIREMENTS+

media. Immediately before occupancy, replace all filtration media with the final design filtration media, installed in accordance with the manufacturer's recommendations.

VOCs. Schedule construction procedures to minimize exposure of absorbent materials to VOC emissions. Complete painting and sealing before storing or installing "dry" materials, which may accumulate pollutants and release them over time. Store fuels, solvents, and other sources of VOCs separately from absorbent materials.

Outdoor emissions. For renovation projects involving waterproofing, repairing asphalt roofing, sealing parking lots, or other outdoor activities that generate high VOC emissions, develop a plan to manage fumes and avoid infiltration to occupied spaces. Comply with the procedures established by NIOSH, Asphalt Fume Exposures during the Application of Hot Asphalt to Roofs (Publication 2003-112).

Tobacco. Prohibit the use of tobacco products inside the building and within 25 feet (7.5 meters) of the building entrance during construction.

Noise and vibration. Develop a plan based on the British Standard (BS 5228) to reduce noise emissions and vibrations from construction equipment and other nonroad engines by specifying low-noise emission design or the lowest decibel level available that meets performance requirements in the British Standard. Construction crews must wear ear protection in areas where sound levels exceed 85 dB for extended periods.

Infection control. For renovations and additions adjacent to occupied facilities or phased occupancy in new construction, follow the FGI 2018 Guidelines for Design and Construction of Hospitals, Guidelines for Design and Construction of Outpatient Facilities, Guidelines for Design and Construction of Residential Health, Care, and Support Facilities and The Joint Commission Standards to establish an integrative infection control team comprising the owner, designer, and contractor to evaluate infection control risk and document the required precautions in a project-specific plan. Use the Guidelines for Environmental Infection Control in Health-Care Facilities, 2003, updated July 2019, to assess risk and to select mitigation procedures for construction activities.

CONNECTION TO ONGOING PERFORMANCE

LEED O+M EQ prerequisite Indoor Environmental Quality Performance: Strategies to promote well-being of construction workers and occupants during construction activities such as formulating and implementing an indoor air quality plan can contribute to better indoor environmental quality during operations phase.



REQUIRED DOCUMENTATION

Documentation	All projects except Healthcare	Healthcare
IAQ management plan or detailed checklist, highlighting nonsmoking policy	X	
EQMP or detailed checklist, highlighting nonsmoking policy		X
Narrative describing protection measures for absorbent materials	X	X
Annotated photographs of indoor air and environmental quality measures	X	X
Record of filtration media	X	X



REFERENCED STANDARDS

ASHRAE 52.2-2017: ashrae.org

British Standard 5228—2009 (Healthcare): bsigroup.com

Infection Control Risk Assessment (ICRA) Standard, published by the American Society of Healthcare Engineering (ASHE) and the U.S. Centers for Disease Control and Prevention (CDC) (Healthcare): ashe.org/advocacy/organizations/CDC

In countries where MERV ratings are not available, filtration class used must be ISO coarse 90% or higher per ISO 16890-2016, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance instead of Class F5 per EN 779-2002.



TERMS AND DEFINITIONS

None



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