

CONSTRUCTION IAQ MANAGEMENT PLAN

During Construction

The LEED requirements with which this Indoor Air Quality Plan complies are as follows:

EQc3.1 Construction IAQ Management Plan – During Construction

Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

1. During construction meet or exceed the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3.
2. Protect stored on-site or installed absorptive materials from moisture damage.
3. If permanently installed air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grille, as determined by ASHRAE 52.2-1999.
4. Replace all filtration media immediately prior to occupancy with MERV 8 filters or higher.

OVERVIEW

The intent of this IAQ Plan is to:

1. Minimize exposure of construction workers to air pollutants;
2. Prevent air pollutants from collecting in building systems and on building materials; and
3. Prevent air pollutants caused by construction from migrating into occupied spaces.

For the purposes of this plan, air pollutants are defined as:

- Particulates;
- Volatile organic compounds;
- Formaldehyde;
- Combustion emissions;
- Airborne bacteria and micro-organisms; and
- Airborne inorganic compounds, such as ozone (from electric motors), metal fumes (from smoldering and welding), and ammonia and chlorine (from cleaning products).

The plan addresses all measures required by the U.S. Green Building Council's LEED-CI Rating System (Version 2.0) Credit EQ-3.1 (Construction IAQ Management Plan: During Construction).

PROJECT ORGANIZATION

PERSONNEL AND RESPONSIBILITIES

The following personnel will have primary responsibility for executing and monitoring the Construction IAQ Management Plan. Responsibilities are defined as the following:

Construction Manager

- Overall responsibility for the execution of the plan.
- Resolve disputes related to IAQ Management Plan execution and coordination.
- Appoint the IAQ Representative. The Representative shall be the (Field Superintendent)(Project Manager)(Other)

IAQ Representative

- Ensure that measures outlined in the IAQ management plan are being followed.

Subcontractors

- Carry out requirements of the IAQ Management Plan under the direction of the Representative.
- Discuss measures to carry out the IAQ Management Plan at all meetings with the Construction Manager and with any other subcontractors performing work affected by the IAQ Management Plan.
- Sequence work and use work methods that confirm to the IAQ Management Plan requirements.

REFERENCED STANDARDS

SMACNA IAQ Guidelines for Occupied Buildings under Construction, 1995, Sheet Metal and Air Conditioning National Contractors Association (SMACNA). The overall intent and some detailed recommendation found in these Guidelines is the basis for the Construction IAQ Management Plan.

ANSI/ASHRAE 52.2-1999; *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. These define the testing to establish MERV ratings of filters.

General Specifications for the Cleaning of HVAC Systems, National Air Duct Cleaning Association, 1997, www.nadca.com (202-737-2926).

CONTROL MEASURES

HVAC EQUIPMENT AND DUCT WORK

HVAC equipment and ductwork will be protected from dust and other pollutants via the following procedures:

Sealing Ductwork and Air Handling Equipment

- Openings into installed ductwork and air-handling equipment not in active use will be sealed using taped plastic, taped cardboard, or other reasonably air-tight coverings. Sealing will occur prior to, or immediately upon installation of the ductwork or equipment. Regular walk-throughs will be conducted by the IAQ Representative to check for damaged or displaced coverings.

Repair or replacement of damaged or displaced coverings will occur immediately upon discovery, at the direction of the IAQ Representative.

- Construction work that generates air pollution will be avoided where ductwork or air handling equipment is being installed. If visible air pollutants are present in a space where ductwork is to be installed, spot cleaning or other measures will be used to prevent ductwork or equipment contamination.

Use of Mechanical Systems during Construction

HVAC equipment and ductwork will be protected from dust and other pollutants via the following procedures:

- Exhaust and makeup air supply systems: when a system is operated during construction, its filters will be replaced upon completion of construction with MERV 13 filters.
- Central air systems will be subject to these provisions when operated during construction:
 - The central AHU will be protected with a temporary filter having a minimum rating of MERV 8, per ASHRAE 52.2-1999.
 - Distribution elements needing filters, including all return air ductwork, will be protected with temporary filters having a minimum rating of MERV 8 per ASHRAE 52.2-1999 unless otherwise noted below.
 - If used for prolonged periods, filters will be periodically inspected and replaced if dirty.
 - All components of the distribution on the return side will be protected, including but not limited to:
 - The portion of the air handler upstream of the central fan;
 - Return vents, ducts and shafts;
 - VAV box intakes; and
 - Transfer ducts.
 - Components of the distribution system on the supply side will typically not need protection except:
 - If portions of the supply system become contaminated, coarse filters will be applied to completely cover supply outlets, to prevent the distribution of particulates into building spaces.

Filter Replacement and Tracking

- MERV 8 filters used for ductwork protection will be replaced on an as-needed basis, as determined by the IAQ Representative.
- Upon completion, the MERV 8 filters used for ductwork protection will be discarded. New filters will be installed at all air handlers.
- A cut sheet for each type of temporary filter used will be filed and included in the final submittal.
- A schedule of filter replacements (showing location, time, and filter type) will be recorded and included in the final Plan documentation.

Duct Cleaning

Duct Cleaning will be considered a last resort measure in the event of a failure of other measures. If duct cleaning is needed:

- The work will be done by experienced professionals skilled in the task, using specialized equipment and following the requirements of the *General Specifications for the Cleaning of HVAC Systems* referenced above.
- If it is found that duct liner, ductwork, or equipment is too contaminated to be cleaned successfully, it will be replaced at no cost to the Owner.
- If construction is still underway at the completion of cleaning, all openings required to be sealed per this IAQ Management Plan will be resealed as soon as possible after cleaning.
- A log recording all duct cleaning that takes place during construction will be created, filed, and included in the final submittal.
- The party creating the pollution will bear the cost of cleaning, if the polluting work was done in violation of the IAQ Management Plan will be resealed as soon as possible after cleaning.
- A log recording all duct cleaning that takes place during construction will be created, filed, and included in the final submittal.
- The party creating the pollution will bear the cost of cleaning, if the polluting work was done in violation of the IAQ Management Plan and if the party was properly informed before the violation per the provisions of this IAQ Management Plan.

SOURCE CONTROL

This IAQ Management Plan is predicated on the use of low-emission interior products which comply with the following VOC limit standards:

- Adhesives, Sealants, and Sealant Primers: California's South Coast Air Quality Management District (SCAQMD) Rule #1168.
- Architectural paints, coatings, and primers applied to interior walls and ceilings: Green Seal Standard GS-11.
- Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates: Green Seal Standard GS-03.
- Clear wood finishes, floor coverings, stains, sealers, and shellacs applied to interior elements: California's South Coast Air Quality Management District (SCAQMD) Rule 1113.
- Carpet, carpet cushion, and carpet adhesives: Carpet and Rug Institute's (CRI) Green Label Plus program.
- Composite wood, agrifiber products, and laminating adhesives: Urea formaldehyde-free.

Modifying Equipment Operation

To reduce air pollution during construction:

- Electric equipment will be used instead of gasoline-powered equipment whenever practical.

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- Bottled gas will be used in place of diesel fuel whenever practical.
- Exhaust from gasoline or diesel vehicles will be kept away from air intake pathways.
- Fuel-burning equipment will be cycled off during extended periods between uses.

Changing Work Practices

All construction workers will use work practices that reduce the generation and distribution of indoor air pollutants. The Representative will conduct orientation sessions with affected construction workers and supervisors. In these sessions, the Representative will review goals covering all aspects of the IAQ Management Plan, including HVAC protection, source control, pathway interruption, use of low-VOC products, housekeeping, and flush-out.

Local Temporary Exhaust

Where available, operable vents and windows will be opened to ventilate the building during application of interior finishes when weather conditions are suitable. Spaces with fixed glazing or no windows will be ventilated by localized temporary exhaust, as described below, or by using building mechanical systems (described above).

- Any local regulations concerning the discharge of particulates will be adhered to.
- Local temporary exhaust will be accomplished using fans, duct extensions, and filters.
- Local temporary exhaust will not discharge near air intakes or other openings that lead into the building.
- When necessary to control odors, special filtration media such as potassium permanganate or activated charcoal will be used.
- Building louvers may be temporarily removed, or the installation of fixed windows delayed for the placement of exhaust ductwork.

Covering or Sealing Sources of Pollution

The following are rules that apply to materials that emit air pollution or odors:

- Containers containing wet materials will be covered whenever they are not in active use.
- Waste materials will be covered or sealed and regularly removed from the building.
- Absorptive materials or materials with an odor will be covered while moved through the building.
- Whenever possible, material containers will be disposed of with the covers on.
- Enclosed tankers will be used for built-up roofing instead of open kettles.
- Materials that require a surface coating to control pollutants or odors will be coated promptly.

PATHWAY INTERRUPTION

Measures will be implemented to close or cover pathways between spaces through which pollutants could travel.

Controlling Pollution at Entrances

Measures will be taken to prevent pollutants from being tracked into interior spaces by workers or equipment. These will include temporary walk-off mats and floor protection.

Protection of Stored Materials

Measures will be taken to minimize dust accumulation on material surfaces and the absorption of other pollutants by absorbent materials. The measures will include the following:

- Materials will be handled and stored according to the manufacturer's recommendations.
- Unwrapped absorbent materials will be shrink-wrapped if necessary.
- Highly absorbent materials like duct liner, acoustic tile, carpeting, or insulation will be stored indoors in the original packaging, or covered and sealed.
- Moderately porous materials like gypsum board will be stored indoors, wrapped or away from dust and materials prone to off-gas VOC's.
- Framing lumber will be stored indoors whenever possible. If stored outdoors, the lumber will be (1) covered with a water proof covering, (2) stored off the ground, and (3) located away from standing water.
- Dense material like glass, metal framing, ductwork and equipment will be covered and kept dry.
- If condensation forms on cold material, care will be taken not to expose it to dust or other particles. If exposed to pollution, housekeeping measures will be used promptly to clean the material before installation.

Preventing Contamination of Completed Areas from Work under Construction

When work is completed in an area, the area will be protected from pollutants generated in other parts of the building still under construction. One or more of the following methods of pathway interruption will be used:

Erecting barriers between completed areas and areas still under construction

Where present, doors and windows will be closed and locked between completed portions of the building and portions of the building still under construction. The closures will be further sealed with tape, plastic sheeting and/or sealant, if necessary.

HOUSEKEEPING

The following housekeeping measures will be employed as part of the IAQ Management Plan:

- A regular housekeeping schedule will be instituted. Cleaning measures and frequency will be selected according to the pollutants generated in a space.
- Where applicable, dust will be suppressed by the use of low-odor wetting agents and sweeping compounds.
- Low-odor cleaning agents will be used.
- Spills of water or solvent will be cleaned up immediately.
- Attention will be given to cleaning hidden or hard-to-reach surfaces, such as wall cavities, tops of door, ledges, and behind water closets.

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SCHEDULING

Construction activities shall be scheduled such that construction and move-in/occupancy do not overlap in time. Construction will be substantially complete approximately two weeks prior to occupancy thereby allowing adequate time for carpet, paint and vinyl wall covering time to off-gas.

All material deliveries will be scheduled so that materials are installed quickly and storage is minimized. Sawing, sanding, and cutting of wood and metals will be completed in the designated and unoccupied area outside the tenant space. All wood should arrive pre-finished to avoid the strong odor from coating wood within a confined space. Installation of all products requiring epoxy should be completed after-hours due to odor potential.

The main air handling unit serving the floor will be shut down during drywall sanding so as to limit contaminating the mechanical system and minimize dust migration throughout the space. Additionally the mechanical system will be covered and protected during drywall sanding. No ductwork will be installed while drywall is being sanded. Vacuum sanding equipment will be utilized to limit drywall dust.

VOC LIMIT REFERENCE GUIDE

Adhesives, Sealants and Sealant Primers: South Coast Air Quality Management District (SCAQMD) Rule #1168. VOC Limits:

ARCHITECTURAL APPLICATIONS

Indoor carpet adhesives: 50 g/L
Outdoor Carpet Adhesives: 150 g/L
Carpet Pad Adhesives: 50 g/L
Wood Flooring Adhesive: 100 g/L
Rubber Floor Adhesives: 60 g/L
Subfloor Adhesives: 50 g/L
Ceramic Tile Adhesives: 65 g/L
VCT and Asphalt Tile Adhesives: 50 g/L
Dry Wall and Panel Adhesives: 50g/L
Cove Base Adhesives: 50 g/L
Multipurpose Construction Adhesives: 70 g/L
Structural Glazing Adhesives: 100 g/L

SUBSTRATE SPECIFIC APPLICATIONS

Metal to Metal Adhesives: 30 g/L
Plastic Foam Adhesives: 50 g/L
Adhesives for Porous Materials (except Wood): 50 g/L
Wood Glues: 30 g/L
Fiberglass: 80 g/L

SEALANT PRIMERS

Sealant Primers for Nonporous Substrates: 250 g/L
Sealant Primers for Porous Substrates: 775 g/L
Other: 750 g/L

SPECIALTY APPLICATIONS

ABS Welding Compounds: 325 g/L
CPVC Welding Compounds: 490 g/L
PVC Welding Compounds: 510 g/L

Plastic Cement Welding Compounds: 250 g/L
Adhesive Primer for Plastic: 550 g/L
Contact Adhesive: 80 g/L
Special Purpose Contact Adhesive: 250 g/L
Structural Wood Member Adhesive: 140 g/L
Sheet Applied Rubber Lining Operations: 850 g/L
Top and Trim Adhesives: 250 g/L

SEALANTS

Architectural Sealants: 250 g/L
Nonmembrane Roof: 300 g/L
Roadway: 250 g/L
Single-ply Roof Membrane: 450 g/L
Other: 420 g/L

AEROSOL ADHESIVES: Green Seal Standard for Commercial Adhesives GS-36 requirements.

General Purpose mist spray: 65% VOCs by weight
General Purpose web spray: 55% VOCs by weight
Special Purpose aerosol adhesives (all types): 70% VOCs by weight

Architectural paints, coatings and primers applied to the interior walls and ceilings: Do not exceed the VOC content limits established in Green Seal Standard GS-11, Paints, First Edition, May 20, 1993. VOC limits:

Flat Paints: 50g/L
Non-Flat Paints: 150g/L

Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates: Do not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition, January 7, 1997. VOC limits:

Gloss: 250g/L
Semi-gloss: 250g/L
Flat: 250 g/L

Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements: Do not exceed the VOC content limits established South Coast Air Quality Management District (SCAQMD) Rule #1133, Architectural Coatings, rules in effect on January 1, 2004. VOC limits:

Bond Breaker: 350g/L
Clear Wood Finishes:
Varnish: 350g/L
Sanding Sealers: 350 g/L
Lacquer: 550 g/L
Clear Brushing Lacquer: 680 g/L
Concrete-curing Compounds: 350 g/L
Dry-fog Coating: 400 g/L
Fire-proofing exterior coatings: 350 g/L
Fire-retardant Coatings:
Clear: 650g/L
Pigmented: 350 g/L
Floor coatings: 100 g/L
Graphic Arts (sign) Coatings: 500 g/L
Industrial Maintenance (IM) coatings: 250 g/L
High-temperature IM coatings: 420 g/L
Zinc-rich IM primers: 340 g/L

Japans / Faux Finishing Coatings: 350 g/L
Magnesite Cement Coatings: 450 g/L
Mastic Coatings: 300 g/L
Metallic Pigmented Coatings: 500 g/L
Multi-color Coatings: 250 g/L
Pigmented Lacquer: 550 g/L
Pre-treatment Wash Primers: 420 g/L
Primers, Sealers and Undercoaters: 200 g/L
Quick-dry Enamels: 250 g/L
Quick-dry Primers, Sealers and Undercoaters: 200 g/L
Recycled Coatings: 250 g/L
Clear Shellac: 730 g/L
Pigmented Shellac: 550 g/L
Specialty Primers: 350 g/L
Stains: 250 g/L
Waterproofing Sealers: 250 g/L
Waterproofing Concrete / Masonry Sealers: 400 g/L
Wood Preservatives: 350 g/L