



Moisture in Buildings

In new construction, the primary source of moisture entering the building is most likely from the newly poured concrete slab.

The National Ready Mixed Concrete Association (NRMCA) describes the 'What' and 'How' of concrete slab moisture in their 2004 Concrete in Practice publication *CIP 28-Concrete Slab Moisture*. Potential sources of concrete slab moisture include:

- The floor slab is in contact with saturated ground. Moisture moves to the slab surface via capillary action or wicking.
- Water vapor from damp soil will diffuse and condense on a concrete slab surface that is cooler and at a lower relative humidity due to a vapor pressure gradient.
- Residual moisture in the slab from the original concrete mixing water will move towards the surface.
- It may take anywhere from six weeks to one year or longer for a concrete slab to dry out to an acceptable level under normal conditions. Reference: Bruce Suprenant, *Concrete Construction*, November, 1997.

The topic is also dealt with in depth by the U.S. Environmental Protection Agency in their publication EPA 402-F-13053. *Moisture Control Guidance for Building Design, Construction and Maintenance*. December, 2013. Topics include: moisture control in buildings, basics of water behavior, designing for moisture control, constructing to prevent moisture problems, and operating and maintaining moisture-controlled environments.

As manufacturers of HVAC equipment, Cambridge Air Solutions has no input regarding the numerous factors involved in concrete work that affect the moisture in the slab. However, when moisture problems arise, we are often involved in looking for remedies to deal with the moisture. Some of our contractors refer to the procedure "IAQA flush-out, REQEQ2,2r1", required by LEED and published by the U.S. Green Building Council. <https://www.usgbc.org/credits/reqeq22r1-0>. This flush-out, as required by LEED, is intended to rid the building of moisture as well as "off gassing" of building materials.

Requirements

Select one of the following two options, to be implemented after construction ends and the building has been completely cleaned. All interior finishes, such as millwork, doors, paint, carpet, acoustic tiles, and movable furnishings (e.g., workstations, partitions), must be installed, and major volatile organic compound (VOC) punch list items must be finished. The options cannot be combined.



Option 1. Flush-out (1 point)

Path 1. Before occupancy

Install new filtration media and perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot (4 267 140 liters of outdoor air per square meter) of gross floor area while maintaining an internal temperature of at least 60°F (15°C) and no higher than 80°F (27°C) and relative humidity no higher than 60%. **OR**

Path 2. During occupancy

If occupancy is desired before the flush-out is completed, the space may be occupied only after delivery of a minimum of 3,500 cubic feet of outdoor air per square foot (1 066 260 liters of outdoor air per square meter) of gross floor area while maintaining an internal temperature of at least 60°F (15°C) and no higher than 80°F (27°C) and relative humidity no higher than 60%. Once the space is occupied, it must be ventilated at a minimum rate of 0.30 cubic foot per minute (cfm) per square foot of outdoor air (1.5 liters per second per square meter of outdoor air) or the design minimum outdoor air rate determined in EQ Prerequisite Minimum Indoor Air Quality Performance, whichever is greater. During each day of the flush-out period, ventilation must begin at least three hours before occupancy and continue during occupancy. These conditions must be maintained until a total of 14,000 cubic feet per square foot of outdoor air (4 267 140 liters of outdoor air per square meter) has been delivered to the space.