Building Flush

What is a Building Flush?

Flush out or building flush is a process to force air through a building just prior to occupancy to remove some of the pollutants, such as formaldehyde and other volatile organic compounds (VOC's), that seep from newly installed components, fresh paint, materials, finishes and furnishings.586 These include flooring and flooring adhesives, paints and finishes, caulks and sealants, and cabinets and work surfaces made from composite lumber products.587 The flush out process aims to improve indoor air quality (IAQ) by limiting occupants’ exposure to the most intense period of contamination, and minimizing the cross-contamination between materials.588

How to Perform a Flush

There are a host of general recommendations for performing an effective flush out of a new building. A flush out is always conducted at the end of construction to finalize a project before occupancy. The ventilation system components should be protected from contamination during construction, or cleaned.589 The building’s mechanical system can then circulate fresh outdoor air throughout the building. Flush outs should take as long as possible, suggestions often range from two weeks to 30 days, but any amount of time is better than no action being taken at all.590

In schools, for example, the US EPA recommends that the minimum volume of outdoor air needed for flush out is the amount needed to ventilate the full school at least once each hour (1 ACH, or air change per hour), 24 hours a day, 7 days a week. At a minimum level, all mechanical ventilation systems should be set to provide the largest amount of outdoor air as practical.591 It is essential that after a flush out, ventilation air filters, except filters that have only been processing outside air, are changed.592

The LEED rating system gives points by conducting a flush-out “by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of floor area while maintaining an internal temperature of at least 60° F and relative humidity no higher than 60%.” An alternate approach is available if occupancy is needed before the flush out. In that case, a minimum of 3,500 cubic feet

of outdoor air per square foot of floor area must be delivered before the space is occupied. It must be ventilated at a minimum rate of 0.30 cubic feet per minute (cfm) per square foot of outside air once the space is occupied (or the design minimum outside air rate determined in the LEED IEQ Prerequisite 1: Minimum Indoor Air Quality Performance, whichever is greater). During each day of the flush-out period, ventilation must begin a minimum of 3 hours prior to occupancy and continue during occupancy during each day of the flush out. This procedure must be followed until a total of 14,000 cubic feet per square foot of outside air has been delivered to the space.

Benefits

There is a direct link between indoor air contamination and building related illnesses. New materials usually have the highest rate of pollution release, and as such, flush outs can reduce the negative impacts on human health.\textsuperscript{593} Pollutant concentration inside a building may be two to five times higher than outside levels according to the U.S. Environmental Protection Agency. Indoor pollutants, chemical toxins, and biological agents can lead to significant health risks, including increased rates of infectious diseases, eye and respiratory irritation, allergies and asthma, chronic sinusitis, headaches, and an array of other diseases.\textsuperscript{594}

Cost

There are costs associated with building flush outs: construction management, electricity use, and lost revenue from delayed occupancy. That being said, the avoidance of illness within the building can offset these costs. Incorporating the flush out as part of the overall building schedule can avoid delays and minimize extra costs.\textsuperscript{595}

Resources

The United State Environmental Protection Agency provides a summary of VOCs \url{http://www.epa.gov/iaq/voc.html}

The Natural Resources Defense Council maintains a guide to selecting low-VOC emitting products \url{http://www.nrdc.org/enterprise/greeningadvisor/aq-low_voc.asp}

The Greenguard Environmental Institute administers independent certification programs for green products \url{http://www.greenguard.org/about.aspx}

The Sheet Metal and Air Conditioning Contractors’ National Association (SMACNA) publishes IAQ management guidelines

\textsuperscript{593} Minnesota Sustainable Housing Initiative. Knowledge Base – Flush Out. \url{http://www.mnshi.umn.edu/kb(scale)/flushout.html} (accessed June 7, 2010).

\textsuperscript{594} NYSERDA. Indoor Air Quality. \url{http://www.nyserda.org/hps/Files/air.pdf} (accessed June 6, 2010).

\textsuperscript{595} Minnesota Sustainable Housing Initiative. Knowledge Base – Flush Out. \url{http://www.mnshi.umn.edu/kb(scale)/flushout.html} (accessed June 7, 2010).