

MechSE WELLness

A12 Air Filtration

Intent: Remove indoor and outdoor airborne contaminants through air filtration.

Exposure to particulate matter (PM) is associated with a host of negative health outcomes, including inflamed air pathways, respiratory illness, etc. PM of 2.5 microns or less in size is more dangerous, as it can penetrate deep into the lungs, enter the bloodstream, and cause a variety of health issues including heart disease and other cardiovascular complications. Regular filter maintenance is crucial to ensure proper air filtration and efficiency in subsequent removal of particles. Improper operation and maintenance of air filtration systems has been associated with dry eyes, skin and throat irritation, fatigue and headache, and can lead to more severe implications such as Legionnaires Disease.

Impact: Proper air filtration and maintenance will help improve and maintain highest level of indoor air quality.

Requirements for the Sidney Lu Mechanical Engineering Building:

1. Implement air filtration at all air-handling units of at least MERV 8 for an annual average outdoor PM_{2.5} threshold of 16 micrograms per cubic meter (Urbana fluctuates around 16 µg/m³).

How do we accomplish these requirements? LUMEB has air filtration installed at each respective air-handler. The air filtration is composed of two stages, with the first stage having 'bag filters' and the second stage having MERV 13 filter media. Bag filters are used in the outdoor air stream to capture dust, leaves, pollen, etc. at the outdoor air intake before introducing it into the facility. The MERV 13, exceeding the MERV 8 requirement, filters out 95% of PM₃ to PM₁₀, 85% of PM₁ to PM₃, and 50% of PM_{<1}. Recorded data of particulate matter in Champaign and Urbana show heightened levels of PM_{2.5} throughout the warmer season.



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