



HEALTH IS IN THE AIR

Improving Indoor Air Quality for Enhanced Learning

INDOOR AIR QUALITY

- In 2014, the National Center for Educational Statistics surveyed a sample of school districts and estimated that the average age of the nation's main school buildings was 55 years old – putting the average date of construction for our nation's schools at 1959.
- Nearly one-fourth of the nation's schools have one or more buildings in need of extensive repair or replacement and nearly half have been reported to have problems related to indoor air quality (IAQ).

IAQ ENHANCED CLASSROOMS GOALS

- **Improved Cognitive Performance:** Ensuring effective ventilation rates have been shown to lead to an 8% improvement in academic performance. Higher ventilation rates are also associated with higher standardized test scores and improved concentration. Humidity control plays another critical role in improved performance
- **Reduced Absenteeism:** Better IAQ reduces respiratory issues, asthma incidents, and the spread of airborne diseases, directly reducing student and staff sick days. This can lead to increased attendance, which helps school funding stability.
- **Health Equity:** Overall more healthy, active, and engaged student body

HEALTHY CLASSROOM STRATEGIES

HEALTHY CLASSROOM STRATEGIES

- Ventilation
- Filtration
- Humidity Control
- Supply Air Path
- Sterilization

VENTILATION

- Ventilation brings outside air in and distributes that fresh air into the space. It also removes stale and contaminated air in a controlled sequence.
- Benefits
 - A fresh supply of outside air can dilute contaminants in the classroom. HOWEVER, the effect of additional outside air must be measured to assure existing systems can maintain comfort conditions and energy usage is not overly impacted. – ie. Too much humidity or temperature control issues
- Ventilation should be adjusted to meet the needs of each classroom, possibly with less or more students. – ie. CO₂ monitors to regulate outside air per the demand
- Increasing outside air during classroom hours must be carefully researched by HVAC professionals to avoid compromising other factors of climate control.

VENTILATION

- “Devices that simply recirculate the same indoor air without filtering it or replacing it with fresh air are not helpful in reducing any airborne virus present in the room.” Source: Harvard School of Public Health

FILTRATION

- Filtration is a mechanical way to clean the air by passing it through filters that catch and stop unwanted particles. Helps by capturing contaminants, including virus-sized particles.
- Benefits
 - Filtration provided by heating, ventilating, and air-conditioning systems can reduce the airborne concentration of [viruses] and thus the risk of transmission through the air particles. (Source: Harvard School of Public Health)
- Upgrading to MERV-13 (or higher) filters is recommended if it does not adversely impact HVAC operation.

FILTRATION



Develop standards for frequency of filter replacement and types of filters to be utilized.

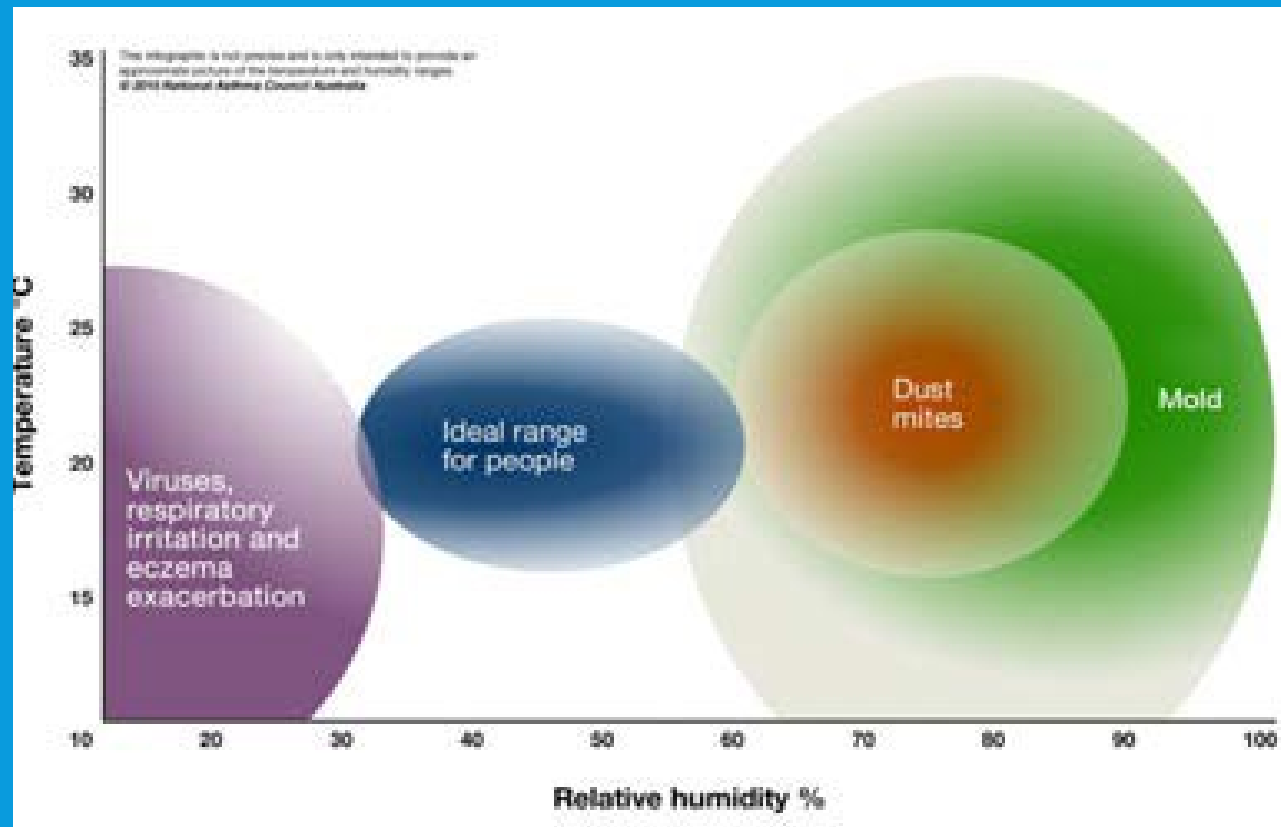
Select filtration levels (MERV ratings) that are maximized for equipment capabilities.

Any HVAC System with supply/return duct should be checked by local HVAC experts to measure the air resistance through the duct, before upgrading filters.

HUMIDITY CONTROL

- Keeping humidity at acceptable levels in classrooms is critical for comfort and also for decreasing the possibility of unhealthy pathogens developing in the space.
- High humidity levels encourage growth of mold and mildew and keep an airborne virus alive longer! Low humidity levels also assist virus particles to survive longer.
- Benefits:
 - Humidity Control helps by keeping humidity in the space within recommended ranges. Controlled humidity shortens the life of infectious aerosols.

HUMIDITY CONTROL



ASHRAE recommends maintaining 30-60% RH in occupied spaces.

SUPPLY AIR PATH

- Per ASHRAE recommendations, supply air should be routed in a path above the breathing zone if possible.
- Benefits
 - Supply air path helps by directing high velocity HVAC supply air away from the breathing zone, reducing the spread of airborne particles around the room.
- Health experts recommend airflow from HVAC registers and grills; do not push high velocity air across the breathing zone of occupants. This cause's greater dispersion of virus and germs exhaled by students.

STERILIZATION

- Benefits
 - Sterilization eliminates microorganisms.
- UVC-LED Light is a type of ultraviolet germicidal irradiation (UVGI) that disinfects the air through short wavelength ultraviolet light.
- Bipolar ionization systems create negatively and positively charged oxygen ions. The negative ions contain an extra electron, whereas positive ions are missing an electron resulting in an unstable condition.
 - This is an emerging technology, and little research is available that evaluates it outside of lab conditions. As typical of newer technologies, the evidence for safety and effectiveness is less documented than for more established ones, such as filtration. Bipolar ionization has the potential to generate ozone and other potentially harmful by-products indoors, unless specific precautions are taken in the product design and maintenance. If you decide to use a device that incorporates bipolar ionization technology, EPA recommends using a device that meets UL 2998 standard certification (Environmental Claim Validation Procedure (ECVP) for Zero Ozone Emissions from Air Cleaners).
- Air purifiers use HEPA technology to remove common airborne allergens.

REVIEW

HEALTHY CLASSROOM STRATEGIES

- Ventilation
- Filtration
- Humidity Control
- Supply Air Path
- Sterilization

QUESTIONS?
EXPERIENCES? CHALLENGES?



THANK YOU

info@AirMechanicalSolutions.com

540.344.9253