

Health Is in the Air

Strategies for reduction in
the spread of infectious aerosols



Bard[®]
SINCE 1914

Climate Control Solutions

Solutions for Healthy Classrooms

Every classroom is its own ecosystem

Whether the requirements are heating and cooling capacity for a space or substantial fresh air ventilation with filtration, there are advantages to maintaining optimal conditions for each classroom.

With each classroom being its own ecosystem, utilizing a single packaged vertical unit (SPVU) offers numerous advantages versus traditional heating and cooling technologies.

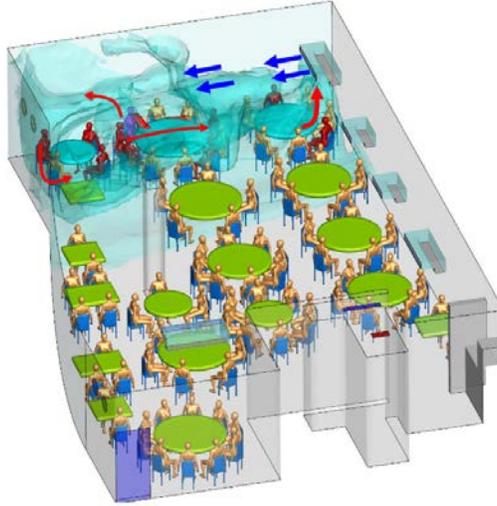
Bard's individualized comfort systems whether exterior or interior mounted, provide each classroom with precise humidity and ventilation control, quiet operation and energy savings.

HVAC systems role in reducing the spread of the spread of infectious particles

HVAC systems play a vital role by providing regulated fresh air during classes as well as outside air during unoccupied times. This is beneficial to insure the classroom can be purified before and after class.

How does a virus spread?

Studies indicate individuals infected with a virus expel heavy droplets of aerosols that fall and land on surrounding surfaces or persons.



Infectious particles also break up into smaller airborne particles that can drift for hours in confined spaces. Because of the density of some classrooms during occupied times, it is imperative to take the necessary steps to reduce the concentration of infectious particles.

Effective means to offer cleaner air in classrooms

Ventilation helps by exhausting stale classroom air and bringing in fresh outdoor air in a controlled sequence.

Filtration helps by capturing contaminants, including virus-sized particles. High filtration products such as MERV13 are recommended.

Humidity Control helps by keeping humidity in the space within recommended ranges. Controlled humidity shortens the life of infectious aerosols.

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.

UVC-LED technology produces light at optimal disinfection wavelengths to deactivate microorganisms.



Filtration

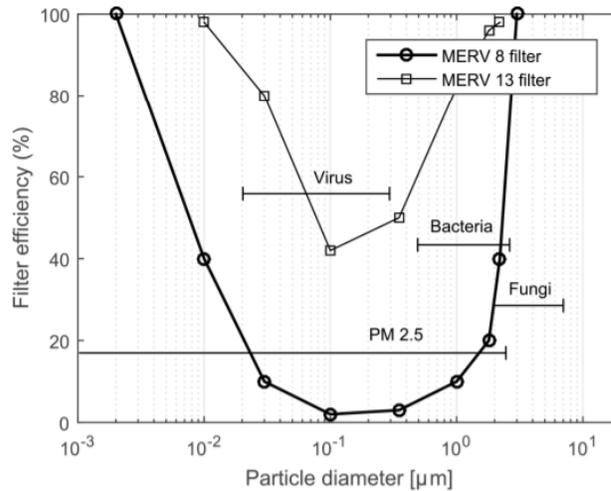
Filtration Benefits

Filtration provided by heating, ventilating, and air-conditioning systems can reduce the airborne concentration of SARS-COV-2 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. Some single unit per classroom HVAC systems are not designed to push air through restrictive high MERV filters. If this is the case, portable HEPA air cleaners may be considered for occupied spaces. (Source: ASHRAE)

How Does Bard Solve This?

- 1 Bard systems are designed with large filters and low pressure drop.
- 2 Indoor blower systems are also designed to automatically adjust airflow for proper system operation, even with high MERV filters.
- 3 Filters are easy to reach and change both with inside mount units or outside mount units.
- 4 Indoor blowers are designed with ultra quiet continuous fan operation for constant filtration of classroom air.
- 5 MERV 13 and higher is preferred based on the recommendations from AHRI.



MERV rating for filters

MERV ratings indicate the percentage of particles and size of particles filters can capture when passing through the filter. The chart above shows standard MERV 8 filters are less effective in capturing small virus size particles. MERV 13 filters are more effective filtering out very small particles that might otherwise recirculate throughout the classroom.

Before upgrading to higher efficiency filters a qualified HVAC technician should check the blower system to confirm it will operate with higher MERV filters, especially after the filters are in operation for some period of time. Owners should inspect higher MERV filters more often. These filters load faster than low efficiency filters.

A typical Bard 3.5 ton system installed in a 950 sq. ft. classroom can filter the entire volume of classroom air, four times each hour if continuous fan mode is energized.

Develop standards for frequency of filter replacement and type of filters to be utilized. Select filtration levels (MERV ratings) that are maximized for equipment capabilities. Use MERV 13 if equipment allows, while assuring the pressure drop is less than the fan's capability.

The chart below illustrates the low initial resistance of large face area filters installed in Bard equipment. The blower systems are also designed to overcome resistance through high MERV filters and/or duct work.

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.

Model	Blower motor	Max ESP	Filters	rated airflow	fpm/filter	initial filter resistance
I30H	EC Constant Airflow (2)	0.5	24x30x2	900	90	0.08
I36H	EC Constant Airflow (2)	0.5	24x30x2	1150	115	0.08
I42H	EC Constant Airflow (2)	0.5	24x30x2	1300	130	0.08
I48H	EC Constant Airflow (2)	0.5	24x30x2	1500	150	0.09
I60H	EC Constant Airflow (2)	0.5	24x30x2	1700	120	0.09
W30HB	EC Constant Torque (1)	0.5	16x30	1020	306	0.20
W36HB	EC Constant Torque (1)	0.5	16x30	1125	337.5	0.21
W42HC	EC Constant Torque (1)	0.5	20x20	1350	408	0.29
W48HC	EC Constant Torque (1)	0.5	20x20	1600	480	0.37
W60HC	EC Constant Torque (1)	0.5	20x20	1800	540	0.37

Ventilation

Ventilation Benefits

A fresh supply of outside air can dilute contaminants in the classroom. Bard systems are designed to bring in specific amounts of fresh outside air as determined by the design requirements and local regulations. The amount of fresh air can be increased to assist in diluting contaminants including virus particles.

The effect of additional outside air must be measured to assure existing systems can maintain comfort conditions and energy usage is not overly impacted. Bard systems are able to flush the air in each classroom prior to occupants arriving or after they have departed. Each system can flush air throughout the night if desired.

Ventilation should be adjusted to meet the needs of each classroom, possibly with less or more students. Each ventilation system can easily be changed and verified.

Bard systems accomplish all this while keeping all classroom and outside air contained in each space. Minimal air is recirculated throughout the building.

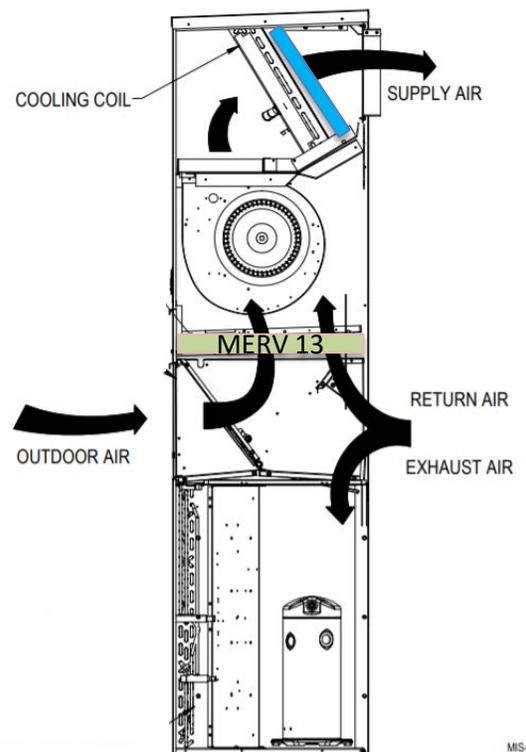
How Does Bard Solve This?

- 1 Each Bard classroom system manufactured with a ventilation package is designed to deliver specific amounts of outside air and also exhaust stale classroom air without mixing with air from any other space.
- 2 Each system is designed to heat or cool the classroom and neutralize the hot, cold or humid outside air maintaining comfort conditions during all seasons: summer, fall, winter and spring.
- 3 Most existing Bard systems without a ventilation package can be retrofitted to add ventilation with a slide-in ERV option. ERV stands for Energy Recovery Ventilator. This means it pretreats outside air, removing most of the heat and moisture in cooling season and injecting heat in heating seasons. You must consult with your local Bard System specialist to determine if a field-installed ERV package is available and what the proper settings are.

Increasing outside air during classroom hours must be carefully researched by HVAC professionals. Your local Bard expert can help with this also.

The side-view illustrates a Bard system that can include high and low capacity heating and cooling for peak and off peak conditions.

Automatic humidity control can also be factory installed for maintaining comfortable and healthy humidity levels in the space.



“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



Humidity Control

Humidity Benefits

ASHRAE recommends maintaining 30-60 % RH in occupied spaces. 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 airborne virus alive longer. Low humidity levels also assist virus particles to survive longer.

How Does Bard Solve This?

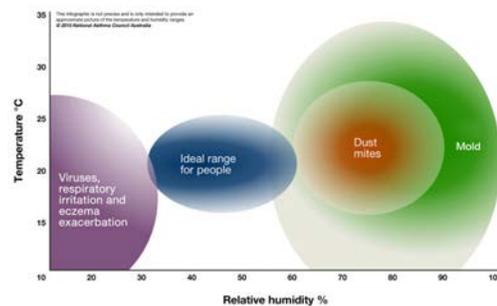
Bard systems can actively reduce high humidity with factory-installed humidity controls as well as energy recovery ventilators, ultimately reducing the amount of moisture in the outside air before it enters the conditioned space.

Equipment with humidity control requires an additional humidity sensor that energizes the unit in dehumidify mode, when humidity

levels exceed set point.

Equipment with humidity controls must be installed at the time of manufacture.

Equipment with a ventilation package should include humidity control if possible. During warm or moderate weather, fresh air holds enough moisture to raise humidity in the space above acceptable levels.



Conclusion

Bard classroom systems are designed to meet all recommendations by industry and health experts to reduce the spread of infectious aerosols floating in the space.

Whether it's ventilation, filtration, or sterilization, Bard offers solutions to meet the needs of the classroom. Bard systems optimize energy efficiency while operating each classroom independently.

Bard Manufacturing has built a reputation of quality, durability, reliability and innovation over its 107 year history.

Resource Information

- www.ahrinet.org
- Harvard School of Public Health
- www.bardhvac.com
- National Asthma Council Australia
- Ashrae.org

Additional Info

Contact your Bard representative for more information on how Classroom Preferred™ can make the grade for your school.

Supply Air Path

Supply Air Path Benefits

Per ASHRAE recommendations, supply air should be routed in a path above the breathing zone if possible.

What does this mean?

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 or germs exhaled by students.

Bard Systems can be adjusted to deliver air at ceiling height and disperse throughout the space with a lower velocity.

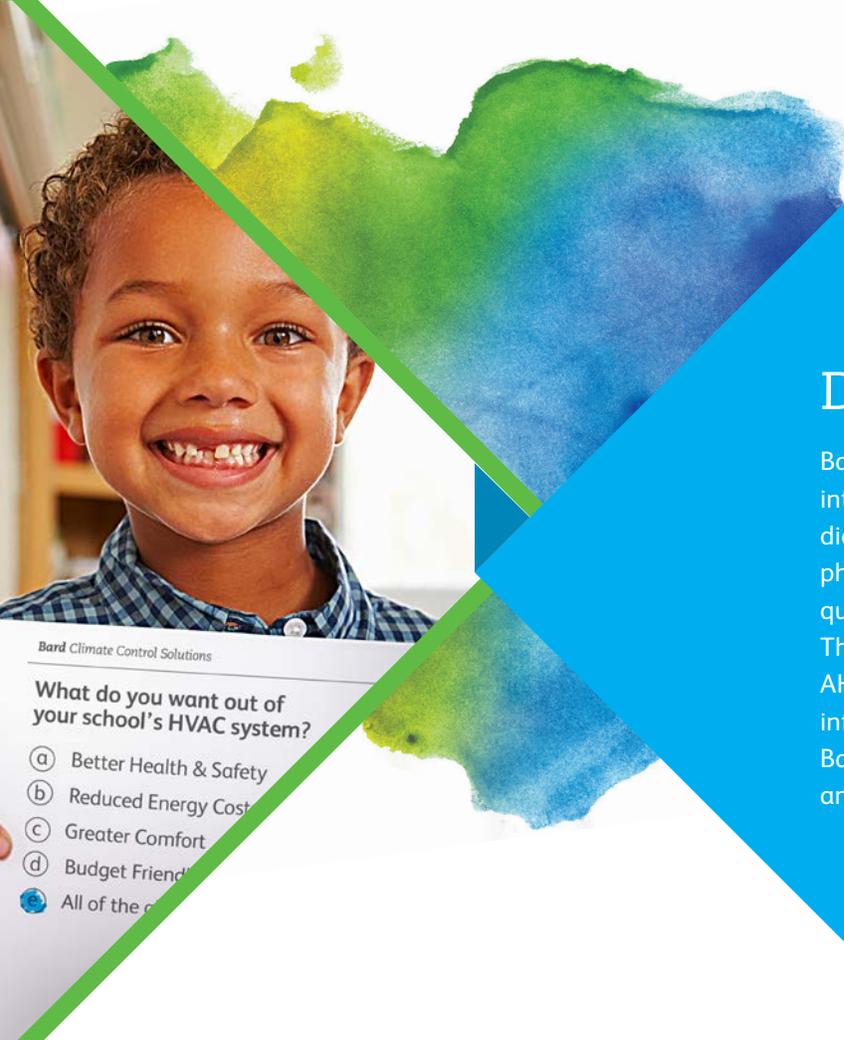


More info

There's a reason why we call our school systems Classroom Preferred™. It's because districts across the country have realized all the advantages of Bard's unique solution and are now choosing us over other options. In fact, we're the world's largest manufacturer of wall-mounted heating and cooling equipment. Please check out our additional information regarding school products:

- Classroom Preferred™ Brochure
- *The Ideal Solution For Climate Control In Schools* Video
- www.bardschools.com

BardHVAC.com



Disclaimer

Bard HVAC is not a medical expert. The content is not intended to be a substitute for professional medical advice, diagnosis or treatment. Always seek the advice of your physician or other qualified health provider with any questions you may have regarding a medical condition. These recommendations were made with the guidance of AHRAE information regarding the reduction in spread of infectious aerosols at the time of writing this publication. Bard is not responsible for the claims of external websites and education companies.



Bard Manufacturing Company, Inc.
1914 Randolph Dr., Bryan, OH 43506
419-636-1194

www.bardhvac.com
sales@bardhvac.com