

Opening Doors for Healthier Learning Environments with VRF

Healthier Air. Healthier Schools. Healthier Minds.

Students spend around 15,600 hours of their life inside school buildings.¹ When the air they breathe inside those spaces can directly impact their wellbeing and comfort, it's critical to keep air quality top of mind.

Is your facility's HVAC system doing its part in fostering healthy and clean learning environments? Fortunately, there's an option that makes improving and maintaining indoor air quality easier than ever: VRF (Variable Refrigerant Flow).

What is

VRF?

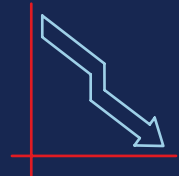
Simply put, VRF is a unique HVAC system that uses refrigerant and smart technology to heat or cool commercial spaces. It's easy to install, use and maintain—the entire system can be run from a central location. And, it's flexible and efficient; ideal for various project and facility types and buildings with a range of heating and cooling needs.

Whether you have a single school building or a large campus, a VRF system can help you improve indoor air quality—for long-term, positive impacts to the health, wellbeing and productivity of students and faculty alike.

There's a Big Need for Improved Air Quality in Schools



Nearly **50M students and 6M adults** work and learn in ~100K school buildings across the U.S.²



Air quality directly affects cognitive function—poorly ventilated classrooms show a **5% decrease** in 'power of attention'.³



Air pollutant concentrations can be **2-5x higher** inside vs. outside.⁴

¹ Harvard Healthy Buildings Program. (2017). Schools for Health: Foundation for Student Success.

² Filardo, M. (2016). State of School Facilities.

³ Coley, D., et al. (2007). The Effect of Low Ventilation Rates on the Cognitive Function of a Primary School Class.

⁴ United States Environmental Protection Agency. The Inside Story: A Guide to Indoor Air Quality.

VRF Systems Provide Many Benefits for K-12 Schools

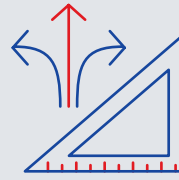


Zoned Comfort Control

Configure specific zones across a variety of spaces, including classrooms, offices, gyms and more.

With remote controls and in-zone sensors, you get more flexible control options and timely alerts for better comfort, maintenance and efficiency.

All with a single system that uses a BACNet® Interface to seamlessly integrate with any building automation system (BAS). Schools on i-Vu® can access all Toshiba Carrier equipment across zones for a real-time, consolidated view of usage and other operating conditions.



Construction Flexibility

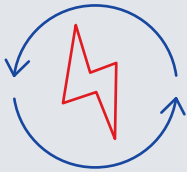
With no ductwork and a streamlined installation process, VRF systems are great for various architecture styles, space challenges and project types—including new constructions and retrofits.

Now, you can leverage the first ever rooftop unit that uses VRF technology—the 40QQ-E—to provide Title 24 compliant outside air circulation with a much lighter footprint.

And don't worry. Our experts make the entire process easy, from design to installation to ongoing support.



40QQ-E rooftop unit

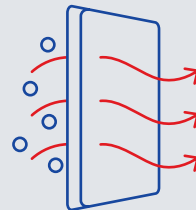


Energy Efficiency

VRF heat recovery systems reuse energy from one zone (like a sunlit auditorium) to move air to other locations that need it (like a cold office).

Heat and cool individual zones simultaneously and control the refrigerant flow to each accordingly for greater operational efficiency.

And, gain energy savings that contribute to LEED (Leadership in Energy and Environmental Design) certification along the way.



Air Filtration

For every hour increase in the air exchange rate in schools, there's a 12% decrease in sick days.¹

VRF systems satisfy several air quality regulations, including those for outside air circulation, indoor ventilation and MERV13 filtration requirements for K-12 schools.

You can also supplement your system with the Carrier OptiClean™ portable air scrubber for an added HEPA filter that's simply plugged into a basic electrical outlet.

Healthier Schools Start with Better Indoor Air

Now more than ever, it's important to protect the health and wellbeing of students, teachers and staff. Fortunately, this is very doable, no matter your space type, challenges or needs.

Contact your local Toshiba Carrier distributor today to learn more about VRF and get started.

carrierVRF.com

¹ Kolarik, B., et al. (2015). Ventilation in Day-Care Centres and Sick Leave Among Nursery Children.

