

GOING WITH THE FLOW: VRF 101



Balancing tenant comfort, building requirements, and HVAC efficiency is a tricky act for property owners and building operators. And in pursuit of technologies that can satisfy these opposing needs, many are turning to VRF solutions.

“The term VRF – or variable refrigerant flow – refers to the capability of an HVAC system to control the amount of refrigerant flowing to each of the indoor units/evaporators,” explains Syed Abid, Commercial Sales Manager - HVAC Division, Mitsubishi Electric Sales Canada (MESCA). “This enables the use of multiple evaporators of differing capacities and configurations, individualized comfort control, simultaneous heating, and cooling in different zones with heat recovery from one zone to another.”

The benefits of VRF have been well documented since the technology’s introduction. Today, VRF technologies have evolved well beyond their initial designs to provide a “smarter,” more adaptable and efficient alternative to traditional HVAC systems. Herein, it pays to recognize the key benefits VRF can offer:

Going With The Flow:

Conventional HVAC equipment operates at either full capacity or not at all, drawing maximum power when it is in operation. VRF systems, however, are equipped with an inverter compressor that enables the equipment to adjust its power intake or output for the load requirements internally.

“The beauty of a VRF system is that it is an inverter-driven system with a variable response mechanism,” says **Pushpinder Rana, Commercial Product Manager with MESCA.**

“Practically, what that means is that in response to varying ambient and load conditions, the system can detect when it has satisfied the heating and cooling needs for the building and slow itself down so that it’s not constantly drawing the same amount of power.”

High COP:

Coefficient of Performance (COP) is an agreed-upon metric for measuring HVAC equipment performance. To that end, Syed Abid, Commercial Sales Manager, HVAC Division, with MESCA, notes, “VRF is the most efficient technology with COP levels ranging from 3 to 5, and that is even higher in Simulations Heat Recovery Mode.”

Heat Recovery:

Traditional heat-pump systems can heat or cool an environment at any given time, but not both. VRF solutions, on the other hand, possess heat recovery technology that captures and redistributes heat to areas of the building where it’s needed. This enables HVAC systems to effectively heat and cool different parts of a building at the same time.

“Let’s say you have an office in winter which needs heating, but you also have a server room which needs 12 months of cooling. That’s an environment where you need cooling and heating at the same time, which cannot be done with conventional heat pumps,” offers Rana, explaining, “With heat recovery, you are recovering heat from one zone and dissipating it in another zone. Effectively, you’re providing heating and cooling at the same time. You don’t need a separate, dedicated system for each, so you can imagine the huge energy savings and the efficiency that is generated.”

Greater Control:

VRF technologies can be easily integrated with many building management systems (BMS) and 3rd party equipment. What’s more, they can be controlled centrally, individually, or even remotely through the advanced, yet user-friendly cloud-based applications on smart devices. This boosts accessibility and user-friendliness for HVAC system stakeholders.

Up to Standards:

VRF technologies are designed to current ASHRAE standards and industry codes. What’s more, they can help building stakeholders achieve Passive House requirements and Green Building Certifications such as LEED and Zero Carbon.

Total Lifetime Cost:

Though the upfront investment in VRF technology may be more than traditional HVAC systems in some cases, VRF systems offer valuable long-term savings.

“It comes down to the total cost of ownership,” says Rana. “You may have a higher initial cost with VRF technology, but it offers such long-term operating and maintenance cost savings that it pays out over the long run and with an acceptable break-even point.”

High Capacity:

VRF systems have a significant capacity range, offering upwards of 500 tonnes depending on the model. Eco-friendly: It goes without saying that greater flexibility, control, and the ability to recover and redistribute heat means less energy. That translates to lower energy bills and overall greener operations.

Application:

VRF technologies are successfully serving key verticals and applications such as hospitality, institutions, medical services, residential, commercial, industrial, and more across the globe.

Gaining Traction:

While the advantages of VRF technology are many, the appetite for such solutions has taken time to grow. This has changed in recent years as more and more building stakeholders see VRF solutions in action and gain insights from their industry partners.

For its part, says Abid, “MESCA trains contractors and industry on how to install the system, take them through the start-up, and make the most of the technology. We also run a design program for engineers to teach them how to design VRF systems to meet the exact needs of today’s clients.”

Moreover, he adds that MESCA provides similar training to building owners and developers and offers facility tours to existing installations where they can ask questions and get answers. Overall, the outreach has helped raise levels of awareness for what is proving to be a more efficient, cleaner, and adaptable technology.

“In the past, contractors were not all that familiar with the concept of VRF and had the perception that the installation was too complicated,” notes Abid. “Now, in 2020, almost every contractor is very familiar with VRF. They see all the benefits while recognizing the ease of installation.”

*Learn more about VRF technology and MESCA’s VRF solutions.
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