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## Why Architects Love Mitsubishi Electric VRF Zoning/Ductless Technologies

Although architects strive to strike the perfect balance between innovation and comfort, oftentimes they end up with the two concepts in opposition. But with Mitsubishi Electric US Cooling & Heating Division (Mitsubishi Electric) [Variable Refrigerant Flow \(VRF\) zoning systems](#), architects can build amazing designs that maximize comfort for all inhabitants. Here's why:

### Space-saving Interior Design

Mitsubishi Electric VRF zoning systems feature modular outdoor units, smaller refrigerant lines, smaller chases, ductless indoor unit options and other contributing factors that let you reclaim up to 10 percent of the space in your building that would otherwise be sacrificed to other conventional HVAC systems. Multiple indoor unit styles are available to accommodate your interior design. The small size frees up valuable indoor space where equipment and mechanical rooms are no longer needed.



### Engineered to Handle Any Job

Whether your mechanical challenge involves providing comfort zoning for a single floor or an entire building, Mitsubishi Electric VRF zoning systems can meet your design needs. The diversity of these systems allows you to create solutions for a wide array of cooling and heating challenges. For example, Mitsubishi Electric systems can be designed to maximize the usage of hotel space by meeting the specific needs of a variety of areas. You can design to meet the diverse comfort needs for common spaces, meeting rooms, hospitality rooms, workout rooms, guest rooms and more. What makes these systems even more valuable is that, if the space usage changes, the system design can be modified to meet that space's new needs. You can easily add an indoor unit or move an indoor unit to

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reconfigure the system.

Dennis Hertlein, a partner at Surber Barber Choate & Hertlein Architects, Atlanta, and lead architect for [Hotel Indigo](#), Athens, Ga., confirms the system's flexibility in design: "In addition to the significant, core qualities of the Mitsubishi Electric VRF zoning system – superb individual room controls, the extreme quietness of the indoor fan coils, [when designing Hotel Indigo] we made every effort to create a very clean design environment for the individual rooms, hallways and public areas. The Mitsubishi system benefitted all these spaces with outstandingly clean, filtered indoor air quality and movement. Beyond this, we specified an elegant satin chrome linear air diffuser grille attached to the indoor fan coil supply duct. It is a stylish way to deliver the conditioned and dehumidified outside air that is mixed into each guest room HVAC unit via the HVAC energy recovery unit system."

For [Sfuzzi Uptown](#) in Dallas, the Mitsubishi Electric ductless system was the only one in the industry capable of overcoming the restaurant's space limitations. There was just enough room on the rooftop to accommodate the two suitcase-sized outdoor units needed to do the job, and the two indoor units were sufficiently compact to fit up in the ceiling.

### **Precise Temperature Control**

The system has technology that can scale up or down its operation to deliver and maintain precise capacity in each zone. Indoor units have built-in sensors that monitor room temperature accurately and, through microprocessor controls, communicate with the outdoor unit to deliver more or less capacity as needed. Multiple levels of user controllers are available. Control at the zone level allows for convenient operation and monitoring of the indoor unit's mode. System controllers can provide wider group control of up to 50 indoor units. The total system can be monitored and controlled through our CITY MULTI Controls Network (CMCN), where you can manage up to 2,000 indoor units from a single networked PC. The CMCN can also integrate with existing building management systems (BMS) via [LonWorks®](#) or [BACnet®](#) interfaces.

### **Outdoor Aesthetics**

Mitsubishi Electric VRF zoning systems employ compact outdoor units that can be placed in various locations depending on available space and visibility requirements. Because they are modular and lightweight, you can spread them out on a rooftop to distribute the load effectively or group them to open up other space for gardens or entertainment. For unobtrusive applications, outdoor units are typically small enough to place on the ground nearby and camouflage with hard- or softscaping. These units are so quiet they will not even be noticed while in operation.

### **Leadership in Energy and Environmental Design (LEED) Certification**

Interested in LEED certification? Mitsubishi Electric VRF zoning systems contribute multiple points in the Energy & Atmosphere (EA) and Indoor Environmental Quality (IEQ) categories for certification. Working in tandem with system controls and sensors that measure loads for each zone, the Mitsubishi Electric VRF zoning system compressor seamlessly adjusts speeds to maintain the desired comfort level, essentially eliminating duct losses that typically equal 10 to 20 percent of total airflow in a traditional ducted system. Mitsubishi Electric VRF zoning systems also consistently prove 30 to 40 percent more energy efficient than conventional HVAC systems, while also meeting [ENERGY STAR®](#) requirements and achieving the highest Integrated Energy Efficiency Ratio (IEER) ratings.

For more than 30 years, Mitsubishi Electric has been a leader in ductless, ducted and VRF solutions in the U.S, providing the flexibility architects need to meet the demands of any space, including individual comfort control and energy-efficient solutions. As with any HVAC system, however, architects should always do their homework and weigh the pros and cons of each unit type with their clientele.



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## Interview with an Architect: Tom Liebel, Marks, Thomas Architects

### VRF Zoning Technology Best Choice for Energy Efficiency

Founded in 1967, [Marks, Thomas Architects](#) offers architectural, sustainable, urban and interior design and planning. The firm is a leader in the creation of senior communities, student housing, adaptive reuse, waterfront homes, urban mixed-use communities and institutional projects. Mitsubishi Electric US Cooling & Heating Division interviewed architect [Tom Liebel](#), FAIA, LEED Fellow, NCARB, of the firm's Baltimore headquarters about his experience with Mitsubishi Electric Variable Refrigerant Flow (VRF) zoning systems.



**Mitsubishi Electric US Cooling & Heating Division (ME):** As an architect, you have specified Mitsubishi Electric VRF zoning systems for several mixed-use buildings in the Baltimore area, including the historic [Union Mill](#). What do you see as the benefit of using VRF zoning systems?

**Tom Liebel (TL):** We've been using the VRF zoning system for three or four years, and we specify it on 25 to 30 percent of our projects. The most significant benefits are in energy performance and design.

**ME:** VRF systems are very energy efficient. How has that feature proven beneficial to your firm and your clients?

**TL:** First, for a lot of the projects we do, we try to achieve LEED certification. The higher the energy efficiency of the system, the better able we are to achieve that. Second, our local utility, Baltimore Gas & Electric, offers incentive programs that reward commercial customers for using energy-efficient systems. The utility funds a portion of the difference in cost between a baseline system and a more energy-efficient system like VRF.

**ME:** How does the system help your projects gain LEED points and other green building programs?

**TL:** For LEED, the system helps us achieve Energy and Atmosphere Credits. It also helps us comply with the Baltimore City Green Building Standards. Before the city will issue a building permit, every project has to prove that it could qualify for a LEED Silver rating. LEED, of course, is the greater recognition, so many clients opt to go for the additional recognition that LEED provides.

**ME:** In what way do VRF zoning systems fit in with your design plans for the buildings you work on?

**TL:** Most of our work is on mixed-use buildings, which combine residential and commercial or retail space. A lot of these buildings are older, and they're split up

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in different ways. With a VRF zoning system, rather than having to scatter dozens of small compressors across a site, we can have fewer, larger condensing units outside. That makes it easier to design in urban areas where there's not always space available for individual pads for individual split units for individual apartments. Some of these buildings would literally need hundreds of individual mechanical units, and there's simply not room for them.

**ME:** How do you decide on a type of HVAC system for a project? What makes you ultimately decide on VRF zoning?

**TL:** We use energy modeling to confirm the long-term costs to operate the systems, and we consider owner interest. We look at three different mechanical systems to see which is most appropriate for that project. We consult with a mechanical engineer, the contractor and the owner, and then we come to a consensus for what the appropriate solution is for the project.



**ME:** Are there any challenges in working with VRF zoning systems?

**TL:** They use central units, so the owner of the building needs to submeter individual units if the tenants are responsible for paying for their own power. That's more complex than simply tying a mechanical unit to an electric meter. While VRF systems require fewer interior units, they're bigger. So instead of finding room for 100, 3-by-3-by-3-inch cubes, you have to find space for eight or 10, 4-by-5-by-8-inch boxes. We overcome that through design, by strategically placing the units.

**ME:** Have you worked on a project that presented a problem that only a VRF zoning system could solve?

**TL:** At the 80,000-square-foot Union Mill, which was converted to apartments and offices, the down-and-dirty solution would be the through-the-wall PTAC [Packaged Terminal Air Conditioner] system. But Union Mill's stone walls are 32 inches thick, and that system would have required at least 60 penetrations. When you have to go through almost 3 feet of stone, those holes are a hassle. That wouldn't have passed muster with the National Park Service because Union Mill is a historic building. With 12 to 16 units per VRF system, we wound up with far fewer holes in the building.

**ME:** What advice would you give an architect who is thinking about using VRF zoning systems for the first time?

**TL:** Get to know the system. Mitsubishi Electric's system, for example, can do submetering, which is huge. It's also one of the more efficient systems we've looked at.

Have a great Mitsubishi Electric story to tell? Please [contact us](#) to share it in an upcoming issue.



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## VRF Zoning System Creates Cooling Comfort and LEED® Silver Certification for Miracle Mile Hotel

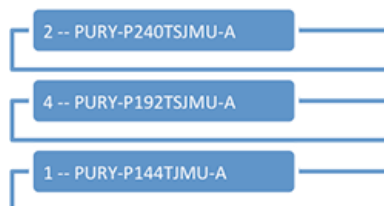
Located in the [Miracle Mile](#) between Beverly Hills and Hollywood, The Hotel Wilshire is a luxury 74-room boutique hotel re-created from a 1950s six-story medical office building. In 2008, developers Michael Orwitz and Spence Mitchum envisioned a boutique hotel in place of this dilapidated, underused medical building.



To capture their vision, Orwitz and Mitchum hired [Killefer Flammang Architects](#) (KFA), a Los Angeles firm known for adaptive reuse and sustainable design for historical buildings in the city, including other boutique hotels.

The design team set its sights on LEED Silver certification. Guest comfort and indoor air quality were achievements that fit neatly under the LEED Silver certification requirements. Mitchum wanted his design team to provide a high-quality guest experience using [Mitsubishi Electric's VRF zoning system](#), which he had successfully installed in an earlier L.A. boutique hotel retrofit.

### Heat Pumps – VRF Zoning System Outdoor Units Installed



Christine Cho, AIA, LEED AP BD+C, is KFA's chief architect for LEED certification and sustainable design. "For Hotel Wilshire, we wanted the highest number of LEED EAc1 points [Optimize Energy Performance credits]. We viewed the selection of the Mitsubishi Electric VRF zoning system as a good way to realize energy

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savings and earn key LEED credits, especially in the Energy & Atmosphere section."

Cho said the team recently achieved its energy goals with LEED Silver certification from the USGBC. These goals included 17 percent less energy use, which translates into cost savings of 19 percent. This also means the hotel meets California's tough [Title 24](#) Building Energy Efficiency Program requirements.

The hotel's general manager describes her HVAC system as seamless and silent. "As we all know, one of the most common hotel complaints is the noisy, uncomfortable HVAC system forever turning off and on in your room. In contrast, The Hotel Wilshire indoor units are so quiet and comfortable the sleeping experience here is unlike any other."



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## Mitsubishi Electric: The Leader in Most Efficient Ductless Products

Nine heating and cooling systems in Mitsubishi Electric's M-Series have been designated as [ENERGY STAR® Most Efficient 2013 products](#). For each of the past two years, Mitsubishi Electric has had the most qualifying products of any [ductless](#) manufacturer.

The following Mitsubishi Electric units qualify for the ENERGY STAR Most Efficient 2013 designation:

- [MUJ/MSY-GE cooling only](#): 9,000, 12,000 and 15,000 capacities
- [MUZ/MSZ-GE heat pump](#): 9,000, 12,000 and 15,000 capacities
- [MUZ/MSZ-FE heat pump \(Hyper-Heating\)](#): 9,000, 12,000 and 18,000 capacities

These systems' high performance provides significant annual operating savings for homeowners, offering savings in excess of 37 percent over federal minimum standards for the MUJ/MSY-GE (cooling only) systems and 30 percent or more for the MUZ/MSZ-GE (heat pump) and MUZ/MSZ-FE (heat pump—hyper-heat) systems.

According to ENERGY STAR, products certified as Most Efficient "demonstrate efficiency performance that is truly exceptional, inspirational, or leading edge — consistent with the interests of environmentally motivated consumers and early adopters."



For split-system air conditioners to be certified, they must meet or exceed 18 SEER and 12.5 EER. The three qualifying MUJ/MSY-GE systems, which range in capacity from 9,000 to 14,000 Btu, have 20.5 to 21 SEER and 12.5 to 13.6 EER ratings.

Qualifying split-system air-source heat pumps must meet or exceed 18 SEER, 12.5 EER, and 9.6 HSPF. The three MUZ/MSZ-GE and three MUZ/MSZ-FE qualifying systems range in capacity from 9,000 to 18,000 Btu and have ratings as high as 26 SEER and 15.5 EER.



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“Mitsubishi Electric is proud to be recognized two years in a row as a leader in efficient cooling and heating systems that don’t require ductwork,” says John Clements, senior product marketing manager, Mitsubishi Electric US Cooling & Heating Division. “The 2013 designations show our commitment to offering consumers and contractors the highest performing products on the market.”

For more information on the ENERGY STAR Most Efficient 2013 certification, [click here](#).



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## California Code Update Could Be Precursor for National Regulations

In January, the [California Building Standards Commission](#) announced the adoption of the 2013 California Building Standards Code, an update of the 2010 building codes that will go into effect at the start of 2014. The introduction of the 2013 code reflects the proposals made by multi-state agencies and stakeholders, including the Department of Housing and Community Development, Division of the State Architect, Office of Statewide Health Planning and Development, Office of the State Fire Marshal, Department of Public Health and the California Energy Commission.



Although the new code will not be published until July 1, 2013, California building professionals can expect to find a number of updates in the 13-volume publication. Applicable to new construction as well as additions and alterations to older buildings, the new code will call for implementation of technology practices that emphasize conservation of natural resources and stricter energy efficiency requirements. Additionally, the new rules will require new buildings to be constructed solar ready, setting standards for solar-heat-gain on windows, insulation and HVAC systems. Reduction of greenhouse gas and achievement of net zero energy levels by 2020 are some of the goals derived from the new code rules.

The code will also include revision of the California Green Building Code to now incorporate nonresidential building alterations and additions; adoption of the 2010 Americans with Disabilities Act standards by the Division of the State Architect, with California amendments; and new plumbing code provisions pertaining to graywater and rainwater catchments.

While this code will impact only buildings constructed in California, the state has a history of being at the forefront of green building regulations. Often, procedures adopted in California soon become mainstream throughout the rest of the U.S. For example, in 2008, California produced the first-in-the-nation statewide green building code, a groundbreaking move to promote sustainability and energy-efficient new technologies. Fueled by the LEED® Green Building Certification System, the state's initiative set the stage for other states to strengthen their building codes. In 2012, proving California to be a catalyst for building standards, the International Code Council (ICC) added to the existing international building, residential and fire codes by introducing its own green building code, the

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International Green Construction Code (IgCC). The IgCC is the first national model code for sustainable design for commercial and residential buildings.

If history does in fact repeat itself, California's newly adopted code could impact the future of building regulations. Unlike the purely voluntary green building programs such as LEED, the [IgCC is written in mandatory language](#) and, thus, architects will have no choice but to follow the path to sustainability.



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## 2013 AHR Expo Provides Great Exposure and Fresh Perspective



On January 28-30, the 2013 [AHR Expo](#) convened at the Dallas Convention Center. The largest event in the HVAC/R industry, the AHR Expo typically draws more than 1,900 exhibitors and more than 30,000 visitors for three days of networking, educational programs and exposure to the latest trends in the industry.

This year, Mitsubishi Electric Cooling & Heating shared a booth with Mitsubishi Electric Automation. The partnership promoted both divisions' products and compatibilities.



"We wanted to exhibit our new product, the [5-ton PUMY model](#), as well as showcase our expertise and what really differentiates us from our competitors — not just our products, but our training and service after the sale," said Keith Reihl, commercial regional sales manager for Mitsubishi Electric.

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From their vantage point, Mitsubishi Electric reps were able to experience the show from a fresh perspective, allowing them to gain insight into the latest industry trends and to take advantage of some of the more than 100 [educational sessions](#), workshops and product presentations covering everything from industry seminars to ASHRAE certification programs. In addition, the massive exposure to the tens of thousands of attendees provided great feedback for new initiatives and product enhancements to help meet the demands of this constantly growing and changing market.

Next year, the 2014 AHR Expo will move to New York, and Mitsubishi Electric will be there. We look forward to seeing you.



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## Mitsubishi Electric Expands Indoor Unit Offerings with Updated Vertical-concealed Air Handler

Mitsubishi Electric Cooling & Heating has enhanced its extensive line of commercial CITY MULTI indoor units with the updated line of [PVFY vertical-concealed](#) ducted air handlers. With its slim profile design and option for applying vertically or horizontally, the PVFY line of indoor units is ideal for installations in closets and equipment rooms, where space is limited.

Updates to the PVFY "B" generation indoor unit include:

- Improved static capacities, which allow for more flexibility with installation design.
- Additional set of contacts for economizer control.
- Third-party-certified sound power and sound pressure ratings.
- Compatibility with all current and previous CITY MULTI VRF zoning outdoor units.
- Support of dual set-point function.

With all the components, including a linear expansion valve (LEV) and controls, pre-mounted within the cabinet for easy installation, this unit is optimal for use in both retrofit and new building applications. Like the previous PVFY models, the updated air handlers can be incorporated into a full VRF zoning system design with all other Mitsubishi Electric VRF zoning indoor units. For increased flexibility, the PVFY indoor unit also has a side drain pan, allowing it to be installed in a horizontal left position.

The PVFY units feature a blower with three fan speeds for increased occupant comfort. The high-efficiency DC motor and forward-curved blower of the PVFY provide quiet and efficient operation, with sound ratings as low as 29 dB(A).

The vertical-concealed PVFY indoor units are just one of many options of Mitsubishi Electric indoor unit styles that will meet almost any building requirement or application: Seven ductless and ducted indoor unit styles include wall-mounted, ceiling-recessed, concealed and suspended, and floor-standing models. Each indoor unit style provides ultimate zoning flexibility and is compatible with [all models](#) of Mitsubishi Electric's VRF zoning outdoor units.



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