



One of two PDQ Florida restaurant locations that helped prove Daikin Applied's solution outpaced a competitive installation in overall HVAC operation and performance.

CASE STUDY

Retail

Name

PDQ Restaurants

Location

Jacksonville, FL, USA

Building size

3,800 ft²

Issue

Determine the most effective HVAC system that delivers energy savings and comfort

Solution

(1) 6-ton, (1) 7-ton, and (1) 12.5-ton Daikin Rebel® commercial packaged rooftop units

Daikin Rebel Rooftops Surpass Expectations for Jacksonville PDQ Restaurants, Delivering 32% More Energy Savings and Better IAQ

Issues

Restaurant patrons and workers deserve the best in indoor air quality (IAQ) and comfort. At the same time, the relentless Florida heat and humidity can tax both occupant comfort and operating budgets. H2 Restaurant Partners LLC, an owner of multiple PDQ restaurants in Florida, was looking for the optimum HVAC equipment for energy savings and comfort at its stores. PDQ, which stands for People Dedicated to Quality, is a fast casual restaurant, headquartered in Tampa, FL, with more than 50 locations in eight states across the south, southeast, west, and east coast.

With the greater objective to determine the best type of HVAC equipment to use across multiple franchise locations, PDQ and H2 Restaurant Partners chose to use two newly constructed restaurants in Jacksonville, FL, as a testing ground for comparing two manufacturers of rooftop equipment.

"We wanted to track the performance of two manufacturers for a year's time to prove our prediction that the equipment at the restaurants would do what it was designed to do from both the performance and ROI-payback perspectives," says Stuart Waag, P.E., Daikin Applied representative with Carroll Air Systems Inc. in Tampa.

"Restaurants are primarily focused on indoor temperature and humidity comfort, as well as energy savings," says Steve Harvey, retail vertical market manager with Daikin Applied.

Solution

Both Jacksonville restaurants are identical in size and operating hours, and are located within five miles of each other, subject to the same weather conditions. Rooftop equipment by Daikin was tested at the

Bartram Park PDQ store. The other manufacturer's equipment was tested at the Beach and Hodges PDQ store.

"Each rooftop unit at the Bartram Park location matched the design cooling and heating capacity of the corresponding unit at the Beach and Hodges location. We looked to compare the demand and energy consumption for each location," Waag says.

The Daikin equipment was delivered to the PDQ construction site in Bartram Park in January 2014 and installed the following month. This store is cooled and heated by three Daikin Rebel packaged rooftops, single-zone constant volume heat pumps with inverter compressors and



Analysis showed Rebel units maintained desired space condition regardless of the outdoor conditions, while the other manufacturer's units often could not keep pace with the building's cooling loads.



variable speed drives that match the compressor speed to the cooling or heat load. “The indoor and outdoor fans are powered by electronic commutated motors (ECMs) that match the design airflow requirements for each fan,” Waag says.

The Beach and Hodges PDQ store in Jacksonville uses three packaged single-zone constant volume air conditioners with another manufacturer’s constant-speed compressors. Depending on the space cooling or heating load, the compressors at this store are operated in either the on or off position. The units rely on electric resistance heat with fan ECMs.

During March 2014, power meter loggers were installed on the rooftop equipment at the two locations. Data was tracked for the period from March 4, 2014, through March 3, 2015. “We monitored a number of data points on the equipment, including indoor humidity, indoor temperature and energy savings,” Waag says.

“The biggest difference between Rebel and any other commercial rooftop equipment is the inverter compressor technology,” Waag says, adding, “Rebel offers superior part-load efficiencies and indoor air comfort without the on-off cycling of the compressor, so the unit stays in the cooling mode with the evaporator coil providing constant dehumidification.” He notes the standard direct-drive, all-aluminum plenum fans on the Daikin Rebel units also contribute to energy savings and longer equipment lifecycle.

Outcome

The year-long study of the performance of commercial rooftop units serving two identical PDQ restaurants in Jacksonville revealed the Daikin Rebel equipment exceeded the competitor in both full-load and part-load efficiency. The Bartram Park PDQ witnessed greater electrical utility savings by more than 32 percent, versus the other manufacturer’s equipment.

“In addition to the energy savings realized, by tracking the data, we found that IAQ improved with the Daikin equipment. So, you actually have a better environment, in addition to saving money,” Waag says.



Rebel’s modulating inverter scroll compressor allows for superior comfort control, energy efficiency, and cost savings than typical compressors.

The analysis showed the Daikin Rebel units maintain the desired space condition regardless of the outdoor conditions, while the other manufacturer’s rooftop units, in many instances, were not able to keep pace with the building cooling loads during the hotter months.

“You can definitely tell the difference between the two stores, not so much the outright humidity, but the slight differences between having a system that is on and off versus one that is steady,” says Shane Trevelyan, operating director at the Bartram Park PDQ, who previously worked at the Beach and Hodges PDQ. “Our Daikin HVAC equipment works fantastic at Bartram Park. It’s quick to adjust during an occasional event in which a customer’s comfort level is either too warm or cool. We can conveniently adjust the comfort conditions by changing Rebel’s controller settings directly from our office,” he concludes.

H2 Restaurant Partners also counts on Daikin Rebel rooftops at several other PDQ stores in Florida. Organization-wide, PDQ Restaurants relies on Daikin Applied equipment at about a dozen stores that include Florida, Georgia, North Carolina, Nevada, and Texas locations.