Case Study – Wildomar Elementary School

Project Objectives

Proper sound levels are essential for the students who occupy Room 44 on the campus of Wildomar Elementary School. These students have surgically implanted hearing aids that convert sounds into electrical impulses that are transmitted by wire to their auditory nerves.

With the enhanced sensitivity these implants provide, the children’s concentration and learning were disrupted by the sound produced from the existing HVAC equipment. To give the students a quality-learning environment, the sound levels in the classroom needed to be reduced to 35 dBA.

The school turned to the experts — Carrier — who provided equipment that allowed them to meet their special acoustical requirements.

Solution

Carrier’s Comfort™ Series Packaged Heat Pump was selected to achieve the precise classroom acoustical levels set forth by the American National Standards Institute (ANSI) for Classroom Acoustics. The installation included a combination of sound damping strategies implemented at the heat pump and within all supply and return ducts. The cumulative effect was to dramatically reduce the room’s unoccupied noise levels to well below the target decibel level.

Dosimeter readings taken at Wildomar Elementary “before” were in the mid-40 dBA range (shown in red). Expert air distribution design and Carrier’s Comfort Series Heat Pump, brought the “after” readings into the low 30 dBA range (shown in blue).
At first glance, recess at Wildomar Elementary looks and sounds like any other grade school around the country. The squeals of children playing, secrets being whispered and friends just talking in the schoolyard seem pretty normal. But for a small group of Wildomar’s students, hearing these sounds is something that has never been taken for granted. They have been surgically fitted with cochlear implants, a technology that can restore partial hearing to profoundly deaf individuals.

The classroom where these students are taught is a typical, portable double-trailer style classroom that was originally heated and cooled by a large, wall-mounted unit. But whenever the unit was on, the hum from the compressor, as well as the noise produced by air flowing through a poor air distribution system, interfered with the children’s ability to hear the teacher and learn.

To better understand the problem, Riverside County school authority Tim Lopez called on David Lubman, an internationally recognized acoustical consultant with specific experience in classroom environments, to analyze the existing system and make recommendations.

With recommendations in hand, Tim Lopez contacted Sal Trujillo, Jr. of Hasco Heating and Air to make the necessary modifications. “We began by designing the air distribution in the ceiling space with more — and oversized — ducts on both the supply and return side. We also installed 24” x 24” steel high-volume supply grilles. Our goal was to supply the same volume of air, but deliver it at a slower and quieter rate,” stated Trujillo.

Although sound levels were reduced, they were still above the target of 35 dBA. It was then that Lopez and Trujillo decided to implement additional steps recommended by Lubman: that the existing wall-mounted unit be removed and a new unit installed, but located away from the building.

Trujillo contacted Dave Ellis of US Airconditioning in City of Industry, CA, who recommended Carrier’s Comfort™ Series Packaged Heat Pump. “The Comfort Series delivers everything this particular application, as well as what similar school applications, demand... low operating sound levels” Ellis explained.

David Lubman precisely monitored and recorded the classroom’s sound levels throughout the project. “A feature that makes Wildomar so interesting is that noise levels were measured both before and after the installation. The “before” levels were in the mid-40s. The “after” is in the low 30s. That’s a 10 to 15 dBA improvement. It’s really noticeable!” Lubman continued, “I’ve measured sound levels of other manufacturer’s equipment in similar applications, but none are as quiet as the Carrier unit.” Carrier Comfort Series heat pumps have sound ratings as low as 72 dBA.