

Georgia School for the Deaf Finds Economical Way to Air Condition Dorms

MODULAR VAV TERMINAL FROM ACUTHERM KEY TO NEW SYSTEM

In an era of constantly shrinking budgets, schools are hard pressed to maintain facilities at a reasonable level, much less improve them. When the Georgia Board of Education, decided to air condition two student dormitories at the Georgia School for the Deaf (GSD) in Cave Spring, Georgia it sought recommendations from Britt Alderman Associates, a 45-year-old prestigious Atlanta-based consulting mechanical engineering firm. The goal was to provide maximum comfort at minimum cost.

"We relied on special modular VAV diffusers from Acutherm to provide individual temperature control in the dorm rooms," says Davis Yaun, Britt Alderman's project engineer. "We brought the entire project in for approximately \$8.26 per square foot. That's considerably less than it would have cost to provide individual temperature control with other systems."

Old Buildings, Special Needs

The one-story brick dormitories were built in 1964-65 and had seen very little

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improvement in the ensuing years. Each of the identical 8,600-square-foot buildings contains 236 rooms, each shared by two students. Each room has an exterior exposure with a large (5'6" X 3'8") window, which results in significant fluctuations in the heating and cooling requirements throughout the day.

Previously, the dorms were heated with a perimeter hot water convector system. The only air conditioning, other than heating, was a central attic fan drawing air through corridor doors and open windows. This provided little, if any, relief from the hot, humid Georgia summers.

When GSD requested recommendations for retrofitting the two dormitories, it specified three key points. First, engineers were expected to design a highly efficient, low-maintenance system that would provide maximum comfort for the students.

The second requirement was that sensors and controls — for example, thermostats — be "vandal-resistant". As with most student bodies, GSD has its share of

students who take things apart and don't always reassemble them correctly.

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Davis Yaun

Finally, the project had to meet cost requirements. While no maximum budget was mandated, the original estimate for the entire project was \$160,000.

Alternative Design Concepts

Yaun was intrigued by the GSD project. As a world-class consulting engineering firm, Britt Alderman has designed conventional, medium-pressure, fan-powered VAV box systems for many large clients, including the Riverwood Office Complex in Atlanta, The Renaissance Center in Detroit, and



many large bank buildings. Yaun had frequently specified Therma-Fuser VAV terminals for certain parts of these large projects. For GSD, he suspected that Therma-Fuser VAV might be the answer for the entire installation.

Yaun developed a base system, then spun off three alternatives. The base system called for retaining the existing hot water heating system and adding two-cooling-only, air-cooled split system air conditioners in the attic. Each system would include a conventional constant volume supply air distribution system and a ducted air return. This would create two multi-room cooling zones.

The first alternative called for replacing the base plan cooling-only air conditioners with heat pump units, providing two multi-room heating/cooling zones. While this option added efficient backup for the aging hot water heating system, it did not address the concerns regarding student comfort and out-of-reach controls.

The second alternative replaced the conventional constant air volume diffusers with Therma-Fuser VAV cooling-only units. This would deliver two master cooling control zones, and 24 individual room sub-zones.

Finally, Yaun strongly recommended modifying the base plan to include a combination of thermally powered, heating/cooling Therma-Fuser units (TF-HC) plus heat pump units. This alternative provided a much higher comfort level for the students. The control problem was eliminated because the thermostats are located in the TF-HC unit itself. The costs of the plan were also acceptable to GSD.

The VAV System

The total cost to retrofit the two dormitories with air conditioning



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came in at \$142,000, including electrical and duct work. Electrical costs were minimized (\$24,000) because Therma-Fuser modules require no electrical or pneumatic connections. The units are simply linked to a runout from the main duct and used to replace a tile in the ceiling grid. This had the added benefit of not disturbing students who might be studying in their rooms.

"The only time the contractor had to go into the students' rooms was to drop the Therma-Fuser module into the ceiling grid," says Yaun. "It was quick and simple."

The new modular VAV systems for the two dorms are identical. Each building has two air handling units in the attic. Each unit conditions two exposures within the building (south and west, and north

and east) and is located approximately halfway between the two exposures. A main supply duct, maintained at low pressure, delivers air to 24 runouts linked to the Therma-Fuser modules. Acutherm's Pressure Independence Module (PIM) handles static pressure build-up in the system. Return air is ducted back into the air handling units.

According to Yaun, the TF-HC Therma-Fuser module is a low-maintenance, self-regulating VAV terminal. It contains its own temperature sensing control system, pre-set at the factory to the desired

temperature. When it senses a deviation in that temperature, it responds by either closing off the flow of air or delivering more air to the dorm room. The temperature seldom deviates more than one degree from the set point, thereby maintaining a comfortable temperature for the occupants of the room.

"This was the first project where Britt Alderman used Therma-Fuser modules throughout," says Yaun. "It has proven highly successful. Therma-Fuser modules deliver what Acutherm promises, and they are also one of the lowest maintenance VAV systems we've come across. After two full years of operation, there hasn't been a single problem. This was a great solution to a complex problem. We will continue to specialize in unique projects of this type."



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