FläktGroup SEMCO

SPECIALIZED HEALTHY AIR SOLUTIONS

MARYWOOD UNIVERSITY
CENTER FOR ARCHITECTURAL STUDIES

CASE STUDY

CHALLENGE:

Convert an old gymnasium into an architectural learning center, while saving energy.

When it came time for Marywood University in Scranton, Pennsylvania to construct a building for their School of Architecture, they wanted to design something that would elicit pride and excitement from faculty, students and alumni, not only for its aesthetics, but for its sustainability as well.

Marywood's School of Architecture found its home inside the restored walls of a former gym. The building serves as a hub for Marywood undergraduate and graduate architectural students, as well as a place where LEED Accredited Professional exam preparation will be offered. As part of their curriculum, architectural classes often times include lessons in sustainability, energy efficiency and indoor air quality.

APPROACH:

Chilled beams paired with FläktGroup SEMCO's Pinnacle® System

While considering the gym renovation, Marywood enlisted the help of the engineering firm, Greenman-Pedersen, Inc.. Basing it off of popular European energy-efficient designs, Greenman-Pedersen, Inc. decided to incorporate forty-two chilled beams as well as a FläktGroup SEMCO Pinnacle® primary ventilation system. The chilled beams account for 100% of the building's cooling, while the advanced heat wheel technology of the Pinnacle® dehumidifies and preconditions supply ventilation air. This is crucial to maintaining a comfortable building temperature, since chilled beams only have the capability of handling sensible loads and not latent (humid) loads.

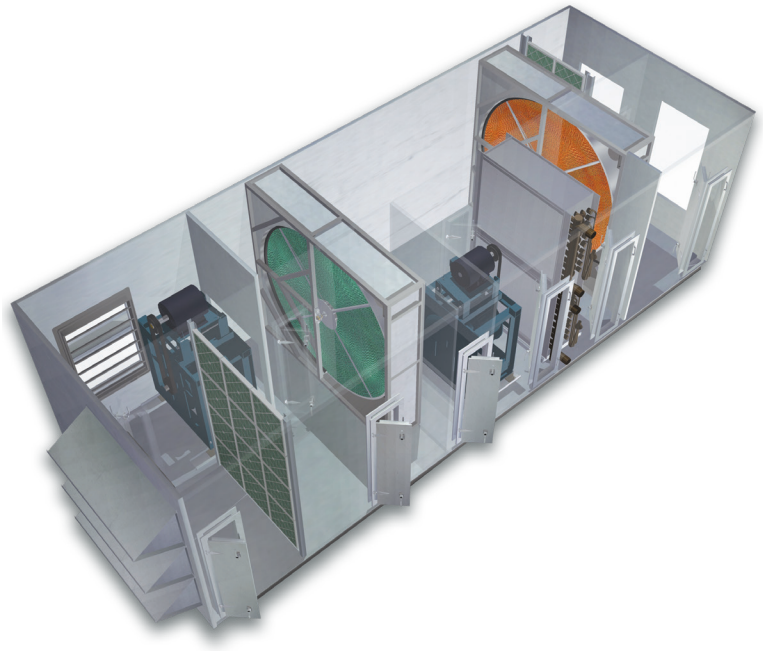
Chilled beams also became an obvious choice for the project based on the building's limited floor-to-floor space and cooling dominant load. The second floor did not exist when the building was a gymnasium, and once erected little room was left for ductwork. This prompted engineers to opt for a chilled beam and dedicated outdoor air delivery system combination partially due to the fact that with this option, large ductwork would not be required. Also, chilled beams are extremely space sufficient, requiring only ceiling space and minimal space for wiring, piping and ventilation ducting. The combination provided the best solution for not only the space dilemma, but for also providing all necessary building ventilation, and keeping humidity levels and temperatures in check. They also integrate well with the exposed steel structure and the parallel lighting units suspended from the structural deck above.

Another benefit is that passive chilled beams are whisper quiet, making them ideal for an open, educational application like the School of Architecture. In fact, the only noise associated with chilled beam cooling is the almost imperceptible flow of water through the coils.

Chilled beams reduce the energy consumption of a building in two ways:

- Due to chilled beam induction rates, ducted airflow is needed for the outdoor air requirement. This reduces the amount of system fan energy that is consumed when compared to a variable air volume — VAV system.
- Chilled beams utilize a higher chilled water temperature to cool the space, so it places less demand on the chiller plant.

"I thought it was a great idea. It seemed like an energy saver and we are very proactive in that." — Myron Marcinek, assistant director of buildings and grounds



HOW IT WORKS:

How FläktGroup SEMCO chilled beams and Pinnacle® provide the best air quality and energy efficiency combination.

The chilled beams are supplied with cold water from the campus's central chilled water system. A three-way control valve blends chilled and return water to maintain the temperature within a few degrees above dew point to prevent condensation. Typically, chilled water running through the beams is maintained between 55°F to 63°F — substantially warmer than the chilled water temperature used in a typical VAV system.

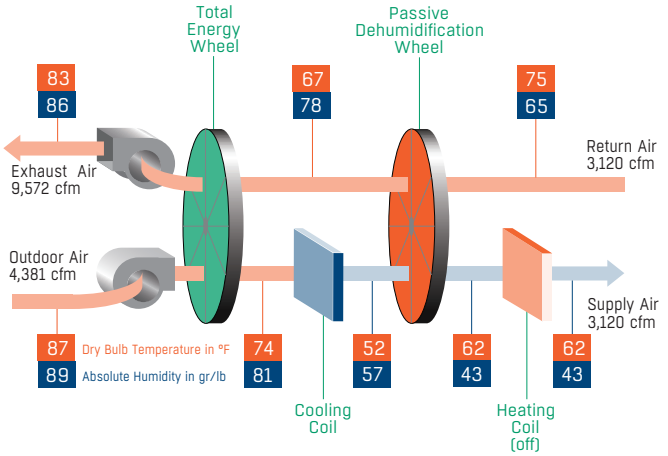
Although chilled beams offer many advantages, they cannot dehumidify air, which is why Steve Daiute, Assistant Vice President of Greenman-Pedersen, to add a FläktGroup SEMCO Pinnacle® unit to the mix. The Pinnacle® has a wide operating range that is highly customizable to any application.

"It was the only system that could provide the humidity control we desired without any active regeneration of desiccant material." - Steve Daiute

The Pinnacle's® passive dehumidification wheel, brings the dew point of the supply air far lower than any other standard air conditioning equipment is capable of doing. This deep dehumidification not only satisfies the building's latent load, but does so with much less airflow than what would be required by typical air conditioning equipment. Combining the most energy

efficient ventilation/ latent load system (Pinnacle®) with the most energy efficient sensible load system (chilled beams) was a huge win for Marywood University.

The Pinnacle® system pre-treats and dehumidifies outdoor air during the cooling season and preheats and humidifies the outdoor air during the heating season. Pre-tempering and dehumidification are both accomplished by recovering (or rejecting) heat from the exhaust air stream via the heat wheels. The Pinnacle® system responds to variations in temperature and humidity by modulating the rotational speed of the passive dehumidification wheel, and/ or adjusting the energy input to the cooling coil. The rotational speed control may also be adjusted to control the level of temperature and moisture exchanged by the passive dehumidification wheel. See the figure below for peak space latent load operation.



Peak Space Latent Load Operation

CONCLUSION:

A highly energy-efficient educational facility, earned LEED Gold certification.

The Marywood University's School of Architecture earned LEED Gold certification for their application of chilled beams and energy recovery technology. They earned several points under "LEED Energy and Atmosphere, Credit 1: Optimize Energy Performance." More importantly, the students and faculty are enjoying a healthier, more comfortable environment at a reduced carbon footprint. It is also a source of great pride for Myron Marcinek and many others at the university.

"It was a great project and learning experience," remarked Marcinek. "It's really exciting to see this change in the way we are designing our buildings."

Change would be an understatement for the Center for Architectural Studies where 83% of the construction waste was reused in some way — either for the newly-renovated building or for some other useful purpose — like salvaging fiberglass window panels from the former gym and giving them to a local organic farmer to use in building a greenhouse. It's a building that will undoubtedly inspire future architects for years to come.

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EXCELLENCE IN SOLUTIONS

FläktGroup SEMCO delivers smart, energy-efficient, air-quality solutions to support every building application. We offer our customers innovative technologies, high-quality products and outstanding performance supported by more than fifty years of accumulated industry experience. The broadest offering on the market and a strong market presence in 65 countries worldwide guarantees that we are always by your side, ready to deliver: Excellence in Solutions.

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