

Heat Recovery, Energy Savings for Commercial Envelope Manufacturer



Project Snapshot

Industry

Paper

Customer

International manufacturer of commercial envelopes

Aerovent Representative

McCluskey & Associates, Inc.
Sewickley, PA

Application

Fans that provide ventilation and heat recovery

Challenges

Deliver efficient, reliable fans that offer ventilation and heat recovery while integrating with building controls and fitting existing roof penetrations

Solution

Customized direct drive RREH Three-Way Heat-Saver Ventilator mixing fans and belt driven BSHB Low Profile Hooded Roof Ventilators

Overview

Company growth prompted an international manufacturer of commercial envelopes to expand its operations. The company moved its product line into an existing facility in a Western Pennsylvania industrial park. The facility had to be redesigned to accommodate the company's manufacturing processes and ventilation requirements.

The newer facility accommodated most of the envelope manufacturer's production requirements, but the ceiling height, which varies throughout the building, exceeds 30 feet in most areas. To provide effective, reliable, and efficient ventilation for this type of environment, the fans selected for the project needed to supply significant air flow capacity as well as energy savings through heat recovery. Because the engineering company for the project was familiar with the product line, the firm contacted Aerovent to supply the best fans for the application.

Challenges

The project required redesigning an existing industrial space instead of constructing a new facility. The engineering firm sought to minimize the envelope manufacturer's project costs by leveraging the existing infrastructure. This challenge involved understanding the requirements of the existing equipment and operating conditions, and incorporating them into a design for the new location.

Recirculating accumulated ceiling-level heat and redistributing it to floor level was among the primary requirements of the building redesign project. To accomplish this, the ventilation fans needed to be able to supply substantial air flow capacity and needed to be versatile enough to provide 100% recirculation air, outside air with recirculation, and 100% outside air. In addition, the fans needed to fit existing openings in the roof and integrate with the building automation system (BAS) to ensure proper operation while delivering the required fan performance.



MODEL RREH
THREE-WAY HEAT SAVER/
VENTILATOR



MODEL BSHB
LOW PROFILE HOODED
PROPELLER ROOF VENTILATOR

The Aerovent Solution

Aerovent supplied nine direct drive RREH Three-Way Heat-Saver Ventilator mixing fans and nine belt driven BSHB Low Profile Hooded Roof Ventilators. The project required several sizes of each fan type. Each of the six 54-inch RREH fans supplied 40,000 CFM and the three 48-inch RREH fans supplied 25,000 CFM, both at 1 inch WC static pressure. The BSHB fan sizes range from 30 inches diameter to 50 inches diameter; horsepower of the fans ranges from 1.5 to 15; fan air flows range from 8,200 CFM to 38,000 CFM; and static pressures range from 0.25 inches to 0.50 inches WC.

The four operating modes of the RREH are:

- Supply air: 100% outside air
- Exhaust: exhausts stale or hot air
- Heat saver: recovers warm air and directs it to the work area
- Mixed air: mixes outside air with indoor air and directs it to the work area

The exhaust mode was not required because the Aerovent BSHB fans perform this function. The BSHB fans extract production and building heat while the RREH fans supply make-up air.

The RREH fan design includes modulated dampers that provide the right mix of recirculated and outside air. The control system modulates the fan dampers to maintain temperature and pressure within the building. The RREH fans were installed with variable frequency drives (VFDs). The modulating damper control sequence was interlinked with the BSHB exhaust fans through the BAS and room pressurization controls, which were provided by the contractor who installed the fans.

Results

The envelope manufacturer received effective, reliable, and efficient ventilation with sufficient air flow capacity, as well as energy savings through heat recovery. Instead of adding to the heating bill with fuel and energy costs, these fans use heat from the manufacturing process.

The RREH fans were picked because of their capabilities and features—they offer large air flow capacity and the ability to provide energy savings through heat recovery. The 54- and 48-inch sizes were selected because they can deliver the most air flow and could fit the existing roof openings. These fans were located above several manufacturing sections of the plant. The BSHB fans were selected because they satisfied the performance characteristics of the building design.

Aerovent offers versatile fans with many available options as well as the flexibility to integrate with third-party control systems. If the plant needs more exhaust capability in the future, the RREH fans can then be configured to use the exhaust mode.



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