AEROVENT
INDUSTRIAL VENTILATION SYSTEMS

Sugar Beet Processing

Project Snapshot

Industry
Agricultural

Customer
Minn-Dak Farmers Coop

Challenge
Providing a reliable and long lasting customized ventilation system that can withstand the outdoor elements, can be mounted vertically, and can properly drain.

Solution:
Aerovent VP Vaneaxial Fan with Aluminum Propeller

Result
Minn-Dak received fans that helped reduce spoilage rates and allowed beets to be processed well into the spring.

Overview

More than half of the sugar produced in the U.S. comes from sugar beets. Annually, more than 25 million tons of sugar beets are produced on 1.5 million acres yielding 4 million tons of refined sugar. Sugar beets flourish in rich soil, with a growing seasons about five months long. In the upper Midwest, harvested beets are stored outdoors where the cold winter months act as a freezer until beets can be processed. But heat can still build up inside the piles and cause excessive spoilage. Looking to reduce spoilage, Minn-Dak turned to Aerovent for a customized ventilation system that could help it increase production rates, profitability and customer satisfaction.

Challenge

There were many challenges that stemmed from the outdoor application of this project. The unpredictable weather, being the most problematic. When stored outside in frigid temperatures, beets can start to ferment and generate heat within the piles, which can quickly rot entire mounds. To reduce spoilage rates, the beet piles needed to be cooled down or ventilated. The fans supplied, were required to be mounted vertically in order for the chilled air to be blown horizontally into the centers of the huge beet piles. Being constantly exposed to outdoor elements (rain and snow) meant that the fans and ductwork supplied were also required to properly drain. In addition, uncontrollable factors like beet pile size and air temperature can make it difficult to know exactly how much energy is being generated inside the beet pile and can affect the static pressure.

Overall, the type of fan selected needed to have longevity. It was important to select the type of fan that could withstand the outdoor elements of this deep-freeze application and accommodate the variables of this installation.

VP Vaneaxial Fan

Performance
Airflow from 800 to 102,500 CFM
Static Pressure to 5" w.g.

Manufactured Sizes
12" to 60"
wheel diameters

Aerovent's advanced engineering and manufacturing capabilities, combined with our high quality industrial products, have made us the ideal solution for the world's most difficult and demanding ventilation challenges. Our impressive 85 year track record is a result of consistently applying our knowledge of fan technology to the individual needs of our customers. This expertise and dedication is what has made us a leading manufacturer of air moving equipment.

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Solution

Aerovent's solution was an extensively engineered cold-air ventilation system using 128 VP Vaneaxial fans. These were the ideal choice for this specific application, as the propeller in this type of fan works especially well in vertical installations. The fans were custom-fit with 45-degree elbows that connected to a series of horizontal ductwork running through the beet piles. The ductwork, provided by the customer, was set up around the pile site with holes drilled to capture the cold air blown by the fans into the interior of each pile. This configuration would allow the plant to deep-freeze entire beet piles (and specifically their centers) by moving cold outdoor air throughout them. Because the fans were constantly exposed to the elements, Aerovent drilled holes into the hub of fan propellers for drainage of rain and snow that could cause alignment or other problems. Once the core piles are frozen, a custom-designed metal lid closes up the fan during the off-season to keep the moisture out.

Aerovent's VP Vaneaxial fan was ideal for this application with many unpredictable factors. Performance features of this type of fan include airflow from 800 to 102,500 CFM and static pressure to 5" w.g. This gives the fan a high tolerance for pressure variations so it could accommodate the unpredictable factors in such an application. Specifically, the VP's propeller better accommodates pressure buildup, making it easier to handle the pressure and air performance requirements.

In any fan application, longevity is a key concern. Industrial fans are assumed to have a long lifespan because of the size and complexity of most installations. The heavy-duty VP fan propellers were made out of aluminum and housings were constructed of galvanized metal. This ensures corrosion resistance, longevity and the ability to endure extreme weather conditions.

Summary

Aerovent's engineering and manufacturing capabilities and quality industrial products have enabled them to provide the best solution for the most demanding ventilation problems presented by outdoor deep-freeze applications such as sugar beet processing. By supplying naturally refrigerated air through the fans and ductwork, and directing it throughout the beet piles, the processing plant has been able to keep its sugar beets at a consistent temperature well into the spring months. Aerovent's custom solution allowed the plant the capability to process almost the entire harvest over the cold-month season and keep spoilage to a minimum. From design to shipment, Aerovent's knowledge and expertise in selecting the right fan and making the appropriate modifications to accommodate each customer's unique situation demonstrates its 85 year track record and it position as a leader in the field.