Hillphoenix
Industrial Refrigeration

Executive Summary

Angelic Bakehouse

at a glance.

Application

14,000 square feet of combined walk-in cooler and freezer.

Customer

Angelic Bakehouse, located in Cudahy, Wisconsin, is a baked goods manufacturer with a 44,000 sq. ft facility where they sprout their own grains and create their own mash before baking a low carb, high protein healthy-eating finished goods that they ship all across America.

Challenge

Angelic Bakehouse needed to increase capacity and capability while at the same time controlling costs and ensuring sustainability. Expanding their operation posed potential pitfalls as well as opportunities. Among the risks they confronted in deciding how they would take their operation to the next level was one that increasingly confounds many in similar circumstances: figuring out the right way to go and how to best pick it out among the different options available.

To get to the next level for their business, they determined they needed to install a blast freezer and accompanying refrigerated processing areas. The need for Angelic Bakehouse was to have:

- Five blast freezers
- A refrigerated packaging area
- A refrigerated dock area
- A main storage freezer

Used in the processing of various food products and fresh produce, blast freezers as the name implies, reduce the temperature of those products very rapidly, freezing them quickly in the process. Blast freezers accomplish this step in production without crystallizing moisture in the product that would otherwise form and degrade the product if its

temperature isn't reduced quickly. Properly blast-frozen products foods returned to normal temperature have virtually the same characteristics as those that haven't been frozen. The importance of performing this step correctly and effectively was critical to the quality of Angelic Bakehouse's finished product and their expanding business.

Making the right choice means having the best information. Of course, having the best information requires knowing where to go to get it. While some companies may possess that knowledge in-house, many don't. In those cases (and even for those who do, to serve as a sounding board) it's of critical importance to find someone who does know the information.

Angelic Bakehouse fortunately found its way to Zone Mechanical, a leading regional installation contractor headquartered in Alsip, Illinois.

Among the things the company knew were that they wanted a long-term solution, not just one that would get them by for the time being. Meaning that the type of system they'd choose would be one that met regulatory requirements today as well as tomorrow. It had to be a non-environmentally harmful approach that wouldn't be subject to mandates or bans down the road. The means of achieving such a goal mostly come down to a few options. This is because most of the refrigerants in use today are made up of blends of synthetic chemicals that are harmful to the environment. They are, for the most part, either destructive to the ozone layer (as measured by their potential to deplete it, or ODP) or contribute to global warming (GWP) or both.

Along with these priorities, Angelic Bakehouse wanted to go with a proven technology that could meet their specific needs without having to compromise some aspect of their operation.

Solution

Fortunately for Angelic Bakehouse, Zone Mechanical had a solution that was both helpful to the environment and proven over 20 years of successful installations in Europe and North America. Zone presented the option of an Advansor CO system from Hillphoenix. They made a compelling case to Angelic for going with the technology pointing out that CO2 is:

- A long-term refrigerant that will never have to be changed out, it's not subject to regulatory mandates or bans
- A natural refrigerant — unlike other harmful refrigerants, it is not a synthetic chemical and can mostly be found in nature
- The benchmark for other refrigerants with a GWP of 1
- Cheaper to install — smaller copper lines, and low cost of CO_2 refrigerant — means a lower cost of materials
- Legally permissible to vent to the atmosphere
- Very energy-efficient
- Not really a cause for concern over it needing at times to operate as a "high-pressure" system due to engineering and technological advances that eliminate any risks

While some in the industry might be weary that under certain circumstances the system's discharge side can reach higher pressures (typically during warmer ambient conditions) than systems with other refrigerants, it's important to note that the lines going out to the evaporator coils use standard refrigeration piping. Any higher-pressure conditions the system encounters can be easily and safely handled by any competent refrigeration technician.

Zone Mechanical pointed out that while CO_2 is certainly not new to the world of refrigeration, technological innovation, like the Hillphoenix Advansor CO2 Transcritical Booster System, brought the refrigerant to the forefront of retail, commercial and industrial refrigeration. The

company "felt good about CO_2 being an environmentally-friendly and very effective refrigerant for applications just like ours," said George Psaris, plant manager at Angelic Bakehouse.

Result

The system Zone and Hillphoenix designed, built, and installed for Angelic provides 2.3M BTUH for:

- Five blast freezers, each 12 ft. x 30 ft. having 2 Guntner high-CFM evaporator coils designed specifically for blast freezing applications (rated at 250,000 BTU each)
- A refrigerated packaging area with five center-mount, low-velocity evaporator coils to maintain 40 – 45 F° ambient temperature
- A refrigerated dock area with two medium-profile evaporators also maintaining 40 – 45 F° ambient temperature
- A main storage freezer having two large warehouse evaporator coils, each with a 130,000 BTU capacity

Installation of the new CO_2 system was quick from start to run. Zone Mechanical then followed up by conducting a comprehensive design validation test to prove that the CO_2 system did sufficiently reduce the blast freezer temperature in the required amount of time.

Ultimately, the system from Hillphoenix proved to be one that the plant manager Psaris felt good enough about to say that "we would recommend CO_2 refrigeration to any food manufacturing plant having the need to blast freeze finished product very quickly using a safe, environmentally-friendly refrigeration process."