PRIMUS | THE BENEFITS OF VARIABLE RETENTION TIME (VRT) FREEZERS

INTRODUCTION

Variable Retention Time (VRT) freezers have been in use since the 1980s. Their benefits, however, are more relevant than ever. Enhanced food quality, increased speed-to-market, space maximization, reduced labor and energy savings are key considerations for all food manufacturers today, and VRTs offer solutions. This is especially true in light of the Food Safety Modernization Act (FSMA).

ADVANTAGES OF VRTS

The VRT freezing process offers several benefits that can be categorized into five areas:

Enhanced Food Quality – The strict requirements of the FSMA have underscored the importance of food safety. As the population grows and the demand for food continues to rise, how can you produce more food in less space and do it safely? VRTs are the answer. These freezers enhance product and case quality by reducing condensation and improving insulation. Increasingly, popular brands are mandating the use of VRTs to maintain their high-quality standards. Will your operation achieve success or be left playing catch-up when your customers adopt these requirements?

Increased Speed-to-Market – Speed-to-market remains a top priority for food manufacturers, and that's where VRT freezing shines. Consider the timeline of a traditional blast cell, which takes an average of 4–5 days from production to distribution. In addition to risking food quality, this extended duration can disappoint customers with aggressive speed-to-market demands. Quick-freeze modules may sound promising, but they only reduce the timeline by 1–2 days, resulting in an average of three days total. In comparison, VRT freezing can transport food from production to distribution in just 24 hours.

Space Maximization – VRTs reduce the overall building footprint required for the freezing process. Traditional blast cells and the space needed for inserting and removing slats before and after freezing occupy more space than VRTs, which can automatically feed cases. This efficient property utilization is particularly valuable in times of high real estate prices.

Reduced Labor Costs – Recruiting and retaining top talent has always been a challenge. Integrating VRT robotics/automation maximizes efficiency, safety and product quality by reducing human touchpoints and decreasing the reliance on manpower. This minimizes the challenge of recruiting for hard-to-fill roles and retaining a workforce capable of meeting aggressive speed-to-market demands.

Energy Savings – Because of the smaller building footprint, manufacturers who utilize VRTs experience overall energy savings. The VRT's control system minimizes freezer temperature fluctuations and maintains stable temperatures more efficiently than traditional blast freezing. Automation also improves energy efficiency when handling cases in and out of frozen environments. These combined efficiencies result in cost savings and a reduced carbon footprint.

CASE STUDY: CASE FARMS

Case Farms was founded in 1986 when Thomas Shelton purchased a small family-owned poultry business. Since then, the company has grown to be one of the largest poultry companies in North America, with over 3,200 employees.

Primus has successfully executed two VRT integration projects for Case Farms. Our approach is straightforward: we assess the challenge, gather data to ensure a common understanding of project goals and design requirements and leverage our industry expertise in frozen environments and technologies to develop the best-fitting solution for the owner. For our Case Farms project in Winesburg, OH, the solution comprised the following steps:

- **Convey boxes from production to the VRT**
- **Sort and organize boxes for VRT acceptance**
- **Robotically palletize products after freezing**

As importantly, we implemented start-of-the-art scanning technology into the process. In addition to complying with FSMA regulations, it allows Case Farms to have complete visibility of every case on every pallet. So, what were the results?

Highest Reliability – Because of our expertise in both frozen environments and the poultry business, Primus ensured that every piece of equipment, including controls, was perfectly suited for the environment. For instance, we opted for suction-type robotics instead of clamp-style, which further enhanced efficiency, accelerated speed-to-market and reduced maintenance downtime even with a higher product volume.

Improved Case Quality – Leakage is a common problem that affects case quality. Because blast freezers take longer, the potential for leakage is higher. Individual cases freeze faster in a VRT, reducing the opportunity for leakage and improving case integrity. The photo below demonstrates the improved case quality experienced at Case Farms Winesburg.

Reduced Labor Costs / Improved Job Satisfaction – Preparing pallets for blast freezing is one of the most challenging processes in a frozen production environment. Each pallet requires slats to be inserted between layers to create airflow around each case. Even with slats, freezing takes longer and case quality is compromised. Additionally, manually dismantling and rebuilding pallets involves physically demanding work. It is the most labor-intensive job in most facilities. By utilizing VRT automation to palletize product robotically, a significant amount of labor is reduced while eliminating physically demanding and often dangerous jobs that are difficult to fill.

Increased Volume – Case Farms' business goal was to increase its export sales by 150%. The efficiencies provided by the VRT allowed them to achieve this and do it with a smaller building footprint, a reduced reliance on manpower and higher quality standards. Additionally, the VRT reduced moisture loss from the product, enabling Case Farms to sell their product at a higher weight, thereby increasing sales per case.

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RESULTS

Integrating a VRT dramatically improved Case Farms' case and product quality while minimizing the strenuous, repetitive tasks that can hamper productivity. As a result, Case Farms is experiencing a positive return on investment.

Primus is the leading design-build-automate firm equipped to build facilities to support VRT systems. We have successfully completed more VRT projects than any other design-build company. To learn more about how Primus combines people, processes, and technologies like VRT freezing to help your food service facility thrive, please contact Ryan Jennings at 770.672.3028 or rejennings@primusbuilders.com for more information.