

The Big Chill: Challenges of Cost-Effective Food Freezing

Make sure you have the right food-freezing system in place

From TV dinners to organic gourmet meals, the frozen food industry has seen tremendous change over the past several decades. Despite a growing trend towards fresh foods, frozen foods have managed to remain relevant and continue to flourish. According to a recent report by Grand View Research, the industry is poised to grow to roughly \$360 billion by 2024.

This change and growth, however, is forcing manufacturers of frozen food products to stay on their toes, as they struggle to keep up with demand and maintain product quality—while still finding cost savings. A key factor to an efficient and successful food freezing operation is making sure you have the right freezing system in place. Yet selecting a quality system that preserves food in the most economical amount of time is one of the biggest challenges facing frozen food manufacturers.

Thawing out the mechanical vs. cryo debate

When it comes to food freezing, there are generally two main options to choose from: mechanical and cryogenic. Mechanical systems use a refrigerant in a closed cycle. These systems move large quantities of air to freeze the product. Cryogenic systems, on the other hand, use nitrogen and CO₂ to freeze the product. And, while the vast majority of facilities choose mechanical, Airgas' food, beverage and retail experts Bill Baker and Bill Adams say there are several factors that may make you consider cryogenic.

- **What are you trying to freeze?** The type of product can determine which mode of freezing makes the most sense. Chopped and formed proteins, for example—like burger patties or chicken nuggets—have a better appearance when frozen cryogenically. For vegetables and other products with lower price points, however, mechanical freezing should do the job just fine.
- **Is moisture loss a concern?** If moisture loss is a concern, cryogenic may be the system for you. Cryogenic freezing loses less moisture because of decreased air movement. This can save up to 5% of the product weight. Products most impacted by moisture loss include shrimp, diced poultry and cooked fillets.
- **Is time of the essence?** Keep in mind the time it takes to freeze the product. Cryogenic systems typically freeze much faster than mechanical.
- **How much room do you have?** Cryogenic systems take up significantly less space than mechanical systems, so space could be the determining factor here.
- **What else is there?** Consider what is already onsite. For example, if there's already an ammonia tank onsite, you could tap into it to gain added efficiencies.
- **How long will this product be offered?** The consumer is fickle these days, so it's important to take into consideration how long you'll be running this product. If it's short term, cryogenic is likely a good choice because it requires less capital.

The chilling effect of frozen food manufacturing

The changing marketplace provides an additional challenge for frozen food manufacturers. The

millennial generation is driving the trend towards fresh, local, healthy products, favoring products without preservatives. This movement is causing many frozen food manufacturers to rethink their product offerings. Companies are finding themselves diversifying their product lines. Some manufacturers are adding fresh products to their portfolios, while others are adding healthier products with fewer ingredients (less preservatives). Manufacturers are shifting from their traditional model to find a balance of items that are healthy, easy to prepare and tasty.

Regardless of the freezing system or product offering, Baker and Adams identify the most successful frozen food manufacturers as ones who conduct regular audits on their operations. These detailed evaluations help them ensure they have the best system in place for their products.

Review your cost to freeze regularly and compare to your baseline, including yield loss. If you notice changes, it may be time to reevaluate your process. In addition, regular audits can provide insight on factors that could impact peak capacity and help manufacturers stay ahead of it, while also allowing them to keep an eye on trends. As this industry continues to grow and change to meet changing consumer tastes, it's imperative for frozen food manufacturers to adapt to stay competitive in this growing and shifting marketplace.