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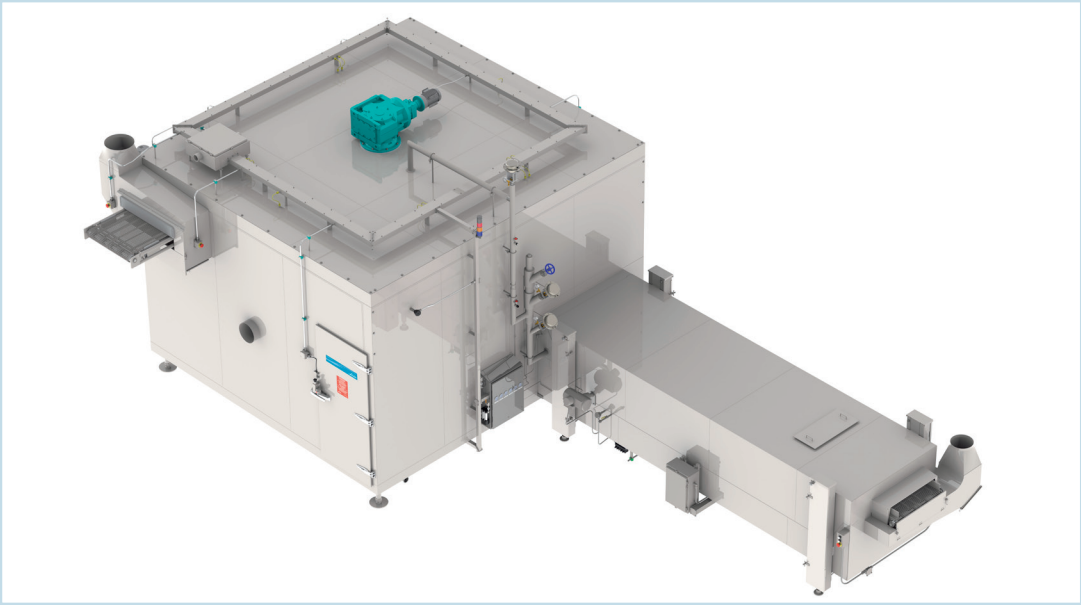
# Nitrogen Immersion-Spiral Freezers. A new family of hygienic, high-performance cryogenic freezers for mega production.



## Benefits

**New immersion-spiral freezing technology represents state-of-the-art cryogenic design, combining high-efficiency nitrogen utilization with high-volume throughput to 20,000 lbs./hr.**

- Proprietary, state-of-the-art design helps high-volume protein processors achieve highest possible production rates.
- Freezer leverages both liquid nitrogen and gaseous nitrogen phases in a unified two-stage process to maximize cryogen efficiency.
- Nitrogen bath instantly crust freezes products to lock in moisture, shape and quality; helps prevent IQF products from clumping and sticking.
- Linde's industry-leading hygienic design permits easy access to internal surfaces for cleaning and maintenance and to help meet quality assurance requirements.

## Applications

Meat and Poultry: A range of marinated, cooked and raw meat and poultry products requiring a solid freeze. This includes diced luncheon meats, beef and poultry fillets and fajita strips, as well as bone-in and boneless chicken and turkey breasts, drumsticks, wings.

Glazed and marinated products: Ideal for freezing marinated or glazed products, and for creating a highly adhesive surface for accepting a glaze post-freeze.

Seafood: Scallops, shrimp, seafood fillets.

## How it works

The two-stage immersion-spiral design instantly crust freezes with liquid nitrogen (at minus 320˚F) to lock in moisture, shape and quality, then captures gaseous nitrogen to finalize the freeze in a compact spiral freezer stage at minus 40˚F (or below).

## High-Efficiency Sustainable Design

The two-stage freezer capitalizes on the BTUs available in the phase shift as liquid nitrogen transitions to gas, capturing and recycling cold gas from the immersion stage for immediate use in the compact spiral stage. In traditional liquid-nitrogen immersion systems, BTUs are often wasted as exhaust gas. Utilizing both phases to individually quick-freeze products is about 50 percent more efficient than with liquid nitrogen alone. The spiral freezer's solid-drum design directs the flow of nitrogen vapors for high heat transfer rates.

## Linde Custom Engineering

The Linde Food Team performs in-plant assessments to identify current cost-to-freeze and works with processors to develop optimal process solutions.

## A Range of Configurations

Liquid immersion and spiral freezer stages can be configured to meet specific requirements. The spiral stage range from compact to high-production 20′ x 20′ models. High-tier clearance allows for larger products, and tiers are spaced for maximum vapor flow resulting in consistent product temperatures exiting the freezer. The proprietary design freezes products faster, provides more efficient heat transfer and reduces temperature gradients across the belt. Management control options include built-in touch screens for precise control and monitoring of operating parameters including belt speed, freezer temperature and dwell time.

## Hygienic and Safety Features

Linde has more experience in IQF food technology than any other freezer manufacturer and is a global leader in hygienic design. The new family of immersion-spiral freezers permit easy access to belts, drums, conveyors and immersion tub for cleaning and maintenance.

## Sturdy, Safe Construction

Freezers are equipped with emergency stop and electronic overload protection for safety. The sturdy Type 304 stainless steel construction and pre-wired electrical panel meet USDA standards.

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