

Fluidization and FLoFREEZE IQF freezers: the revolution continues

QUICK READ

The “fresher
than fresh”
advantage.

While the demand for frozen foods continues to grow, increasing consumption of fresh foods poses a challenge to the frozen food industry. To remain competitive in the face of these trends, frozen food manufacturers must take advantage of the very best freezing technology available. For this reason, food manufacturers can rely on Frigoscandia Equipment FLoFREEZE® IQF freezers from FMC FoodTech offering patented “fluidized” freezing technology. Originally pioneered by Frigoscandia Equipment in the 1960s, FLoFREEZE freezers enable food manufacturers to individually quick freeze a wide range of products so they are “fresher than fresh.” FLoFREEZE freezers maintain the quality, flavor and texture of products as small as white rice or as large as corn on the cob. FMC FoodTech is poised to launch the new FLoFREEZE A series of freezers geared toward medium-scale food producers, yet delivering the same versatility, value and efficiency based on decades of excellence in the field. •

THE EMERGENCE OF THE FROZEN FOOD INDUSTRY

The introduction of frozen foods into the marketplace in the early 1930s marked a significant milestone in the food industry, offering consumers convenience, value and quality — all at a reasonable price. By “quick freezing” different foods, the frozen food industry also opened up new opportunities to consumers that previously were unavailable. Those living thousands of miles from the ocean could enjoy the luxury of cod and haddock shipped frozen from the coasts. And consumers could enjoy fresh-tasting fruits and vegetables year-round, thanks to the frozen food industry.

By the 1950s, frozen foods became a billion dollar industry. Frozen fruits and vegetables became standard food service fare at this time, and the growing popularity of television brought with it a new culinary innovation: the frozen TV dinner.

Today, frozen foods are a dietary staple in most countries around the globe. Retail sales of frozen foods in the U.S. was \$27.5 billion in 2005 — a 3.1 percent increase over the preceding year. Frozen foods account for approximately one-third of food service sales in the U.S., climbing above \$40 billion in annual sales.

In various regions throughout Europe, the consumption of frozen food has continued to climb as well. In Germany, frozen food consumption has grown at an annual rate of 2.6 percent from 2000 to 2005. Meanwhile, the market for frozen food in Russia and Eastern Europe has increased considerably more in that same period, with annual growth rates of 8.1 percent and 7.2 percent, respectively. In particular, frozen fruits and vegetables — which are among the main product applications for FLoFREEZE freezers — represent 25 percent of total frozen food consumption in Europe. As consumers become more health-conscious, the fruit and vegetable segment of the European frozen food market is expected to grow. Russia is already showing signs of this trend, with a 20 percent jump in frozen fruit and vegetable sales in 2006.

Rising living standards in emerging economies also have spurred a growing demand for convenience foods, including frozen food products. For example, from 2000-2005, China’s frozen food market grew at an impressive average annual rate of 10.5 percent. According to some sources, frozen food sales in India have grown at an estimated annual rate of 10 percent in recent years, too.



FMC FoodTech’s FLoFREEZE freezers can accommodate a range of products with varying sizes, shapes, textures and freezing requirements.

Frozen fruits and vegetables — among the main product applications for FLoFREEZE freezers — represent 25 percent of total frozen food consumption in Europe.

FROZEN VS. FRESH FOOD

Competing for the appetites of consumers

Despite the growing demand for frozen food, statistics show that fresh foods, mainly fruit and vegetables, are growing in popularity among consumers, too. For example, in the United States, per capita fresh fruit consumption was up 28 percent in 2000 compared to the 1970s, while fresh vegetable use jumped 26 percent within the same time frame. The growing consumption of, and demand for, fresh food potentially presents a challenge to the frozen food industry.

In order to remain competitive, the frozen food industry must embrace technologies which preserve the best possible flavor, texture and quality of its product offerings.

One solution might be the use of Frigoscandia Equipment FLoFREEZE® IQF freezers, especially for products that are fragile and can benefit by being individually quick frozen using the patented “fluidization” process invented and perfected by FMC FoodTech.

FLUIDIZATION AND FLoFREEZE

A “fresher than fresh” advantage

Ever since they were introduced to the marketplace, one of the biggest drawbacks of most frozen foods was their tendency to become frozen together in big blocks. The issue of “cluster freezing” — pieces of product becoming frozen together in big clumps — was particularly problematic for foods small in size and varied in shape, from peas to shrimp. Clustering also presented a challenge for “sticky” foods, like strawberries or sweet corn kernels. Consumers wishing to prepare smaller portions of frozen foods were forced to break up large clusters of frozen foods to obtain the quantity they needed. As a result of smashing these larger frozen blocks of food, the products’ shape and appearance become destroyed, thereby diminishing product quality. Additionally, clustered products take longer to thaw. At the very least, this is inconvenient for residential customers, while commercial customers must add extra time, steps and cost to contend with clustering during the thawing process.

But all of this changed in the early 1960s, when a frozen food industry leader, Frigoscandia Equipment in Sweden, invented the fluidization process for individually quick freezing (IQF) products. Fluidization involves quickly freezing each piece of product separately, using refrigerated air that is blown at a high velocity on a “fluidized” bed. Put simply, fluidization means that the product behaves like fluid, suspended on a cushion of refrigerated air as it “floats” throughout the freezing process.

Frigoscandia Equipment's introduction of IQF fluidization marked a new era in the frozen food industry.

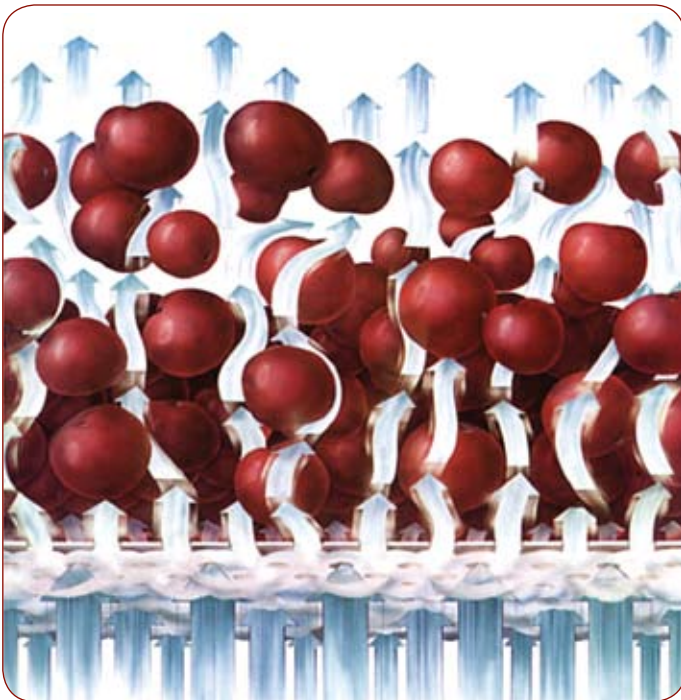
Products could be individually quick frozen just hours after they were harvested, so they would be "fresher than fresh" once they were thawed and prepared for consumption. Above all, the fluidization process could be used to freeze smaller, delicate and hard-to-handle foods of differing shapes and sizes. From fat, juicy strawberries to tiny grains of rice, the rich flavor, texture and quality of frozen foods could be preserved.

Efficient heat transfer

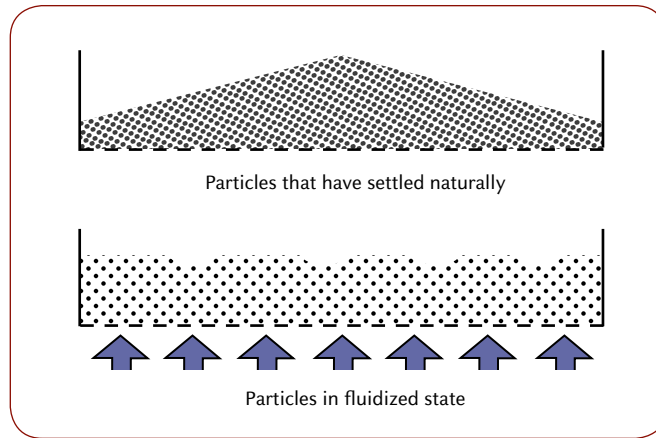
Another key reason why the FLoFREEZE® freezers delivers superior, "fresher than fresh" product quality is its high heat transfer rates — in other words, the speed with which it individually quick freezes products by rapidly removing their heat. Specifically, its higher air velocity (around 15 meters per second) results in a heat transfer coefficient that's more than three times higher than traditional linear freezers — over 75 watts of heat energy per square meter of surface area per degree, versus traditional freezers that deliver roughly 25 watts of heat energy per square meter of surface area per degree. This higher rate of heat transfer — the very heart of "quick freezing" — ensures superior, product quality.

This new technology was incorporated into the Frigoscandia Equipment FLoFREEZE® IQF freezer, the first of its kind, in 1962. Although the first FLoFREEZE freezer was developed specifically for freezing peas, food processors impressed with its performance requested new models for other kinds of vegetables, including french fries. Even today, no other freezer compares to the FLoFREEZE freezer, which is considered one of the most important innovations in the history of frozen foods. In fact, researchers at the Chalmers University of Technology in Gothenburg, Sweden, have cited the FLoFREEZE IQF freezer as one of the 10 most important Swedish inventions ever developed.

Frigoscandia Equipment, which was purchased in 1996 by FMC FoodTech, continues to lead the industry with FLoFREEZE freezers, which remain the industry standard for economy, quality, hygiene and user-friendliness.



Fluidization causes products to behave like fluid because they are suspended by refrigerated air that flows from underneath the perforated belt or tray.



Fluidization ensures the equal distribution of air pressure, causing the product to “float” evenly.

THE FLUIDIZATION PRINCIPLE

The core concept underlying fluidization is the “fluidization principle” — that the air pressure is equal to the weight of the product. This means the refrigerated airflow can be adjusted accordingly, depending on the weight, shape and size of the product.

After the product has been pre-treated (washed, blanched or precooked), it enters the freezer and is deposited onto the IQF track or tray containing thousands of perforations. Blowers underneath the IQF track or tray force refrigerated air upwards, flowing through the perforations. As a result, the airflow is evenly distributed rather than being concentrated in one section. Through fluidization, products are separated from one another and frozen more quickly. This preserves the product’s flavor and texture, while minimizing dehydration which tends to occur with slower freezing rates.

Among its many versatile features and options, the FLoFREEZE® IQF freezer can adjust the air pressure during fluidization, making it capable of freezing a wide range of food products of different weights, shapes and sizes. Studies show that fluidization significantly increases the rate of removing heat from products, compared to other types of freezing processes. By some

estimates, fluidization is three times more efficient when it comes to removing heat from food products.

There is no other process like fluidization, which is perhaps why the FLoFREEZE is the freezer of choice for food manufacturers around the world.

It should also be noted that without air flowing through the perforations which in turn “fluidize” the product during the freezing process, the product would tend to be piled higher in the center and slope down toward the sides. This lends itself to uneven freezing, as well as clustering of frozen food. This in turn would require additional steps and equipment, such as mixing devices or “cluster busters” that would constantly move the product around to prevent it from being clustered or frozen together.

Thanks to the evenly distributed airflow through the perforations, each product — whether it is a french fry, a kernel of corn or a cauliflower floret — floats along evenly, becoming uniformly, quickly and individually frozen.

This revolutionary method of individually quick freezing products has withstood the test of time for decades.

A CLOSER LOOK AT FLoFREEZE FREEZERS

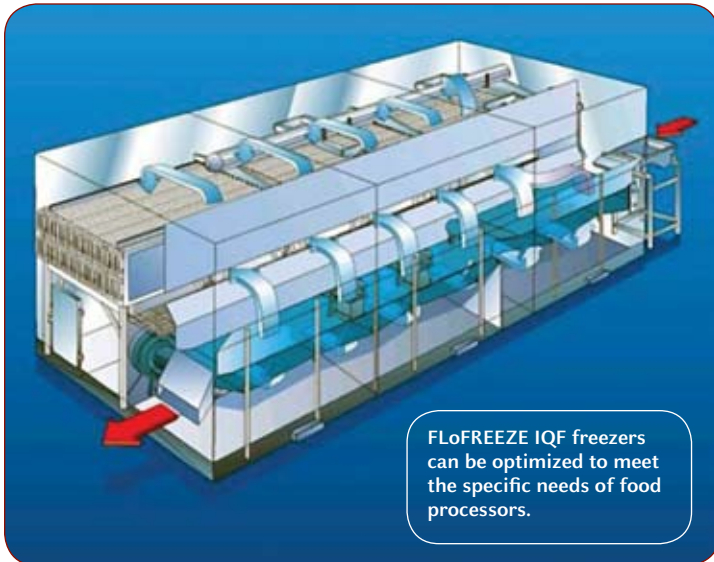
The process of fluidized freezing involves specific stages entailing different options that guarantee maximum quality, flavor, texture and moisture of the products being frozen.

FLoFREEZE® freezers are equipped with two freezing zones. The product enters the infeed and proceeds to the initial freezing zone, where the airflow is higher. At this critical stage of the process when the product is most fragile, the product is rapidly crust-frozen, locking in moisture so the product's weight, appearance and quality are preserved before it proceeds to the next and final stage of the freezing process. It is in the initial freezing stage that there is the largest temperature difference between the air and the product, which in turn increases the rate of crust-freezing.

In the final, or finish, freezing zone, which typically occupies about two-thirds of the remaining length of the FLoFREEZE freezer, the temperature is lower, so the product becomes fully frozen. And, of course, throughout the entire freezer, the product is fluidized by the blowing undercurrent of air flowing through the perforations in the belt. A weir, or retaining plate, separates the two zones, and ensures the proper holding time for products in each zone.

Both zones are independently controllable, so the airflow and temperature levels can be adjusted or "customized" for different kinds of products. This level of control is achieved by using different fans, or adjusting the speed or restricting the airflow generated by the fans, so it meets specific freezing parameters. For example, raspberries — which are considerably more delicate than, say, peas — will be crust-frozen in the initial zone using a lower airflow rate, in order to avoid damaging their delicate exterior surfaces.

Spanning the length of the initial and final freezing zones, a robust series of evaporators work continuously to remove moisture from the air. A three-dimensional airflow system "blasts" air at different speeds and in different directions, separating snow and residual moisture from the air stream before it even reaches the evaporation coils. This prolongs the amount of time the evaporators can operate without a significant buildup of snow, which ultimately must be removed when the system is taken off-line for complete defrosting.



FLoFREEZE IQF freezers can be optimized to meet the specific needs of food processors.

Efficient defrosting = maximized operation time

THE MYTH OF “SEMI-FLUIDIZATION”

The same method is used to reduce snow and frost buildup on the evaporator coils themselves. FMC FoodTech’s patented air defrost system (ADF) powerfully blows frost off the evaporator coils, which might otherwise obstruct the flow of air. Unlike conventional “wet defrost” processes which require additional time and effort to remove moisture and condensation from the coils, the patented air defrost system is completely “dry.” This means the FLoFREEZE® freezer can be operated non-stop at peak capacity for 22 hours between the times that it must be thoroughly defrosted. And, depending on the product and the production rate, it can be operated even longer — up to 36 hours — between the times it must be defrosted.

Certain types of individual quick freezing machinery purportedly utilize a “semi-fluidization” process to individually quick freeze products. While it is similar in principle to the fluidization process perfected by FMC FoodTech, semi-fluidization *partially* lifts the product with forced air during the freezing process. Because the product is only partially aloft, there is less space between each individual piece of product, thereby impeding the transfer of heat from the product. Because the product is not fully fluidized, it is not frozen as quickly and efficiently, and ultimately it has a greater tendency to be frozen together.

Simply put, semi-fluidization is not true fluidization. Instead, it is an attempt to mimic the advantages of actual fluidization, yet it fails to deliver the same results.

CAPACITY kg/h FOR EACH FLoFREEZE IQF FREEZER MODEL

EXAMPLES OF PRODUCTS	M2	M3	M4	M5	S1	S2	S3
Broccoli, cut	3500	5250	7000	8750	1200	2400	3500
Broccoli, spears	3000	4500	6000	7500	1000	2050	3000
Brussels sprouts, whole	3750	5600	7500	9350	1250	2550	3750
Carrots, sliced	3500	5250	7000	8750	1200	2400	3500
Carrots, diced	4000	6000	8000	10000	1350	2700	4000
Cauliflower, florets	3500	5250	7000	8750	1200	2400	3500
Sweet corn, cut	5000	7500	10000	12500	1500	3400	5000
Sweet corn, on the cob, whole	1500	2250	3000	3750	500	1000	1500
Green beans, cut	4250	6350	8500	10600	1450	2900	4250
Princess beans, whole	3750	5600	7500	9350	1250	2550	3750
Peas, sweet green	5000	7500	10000	12500	1500	3400	5000
French fries, +40°C, crinkle cut	3500	5250	7000	8750	1200	2350	3500
French fries, +40°C, straight cut	3000	4500	6000	7500	1000	2050	3000
French fries, +80°C, crinkle cut	3250	4850	6500	8100	1100	2200	3250
Blueberries, 12% sugar	3500	5250	7000	8750	1200	2350	3500
Cherries, pitted, -2°C to -4°C	3500	5250	7000	8750	1200	2350	3500
Strawberries	3500	5250	7000	8750	1200	2350	3500
Shrimp, peeled & cooked, +5°C	3400	5100	6800	8500	1200	2300	3400
FEATURES							
Agitator	standard	standard	standard	standard	optional	optional	optional
Pulsator	optional	optional	optional	optional	standard	standard	standard
Air Defrost System	standard	standard	standard	standard	standard	standard	standard

The FLoFREEZE M and S IQF freezers offer a wide range of freezing rates for different kinds of products.

FLoFREEZE A: A NEW GENERATION

For years, FMC FoodTech has been meeting a wide range of production needs and capacities with its M and S FLoFREEZE® IQF freezers. The FLoFREEZE M IQF freezer typically handles larger, high-volume production operations, as it has a production capacity ranging from five to 15 tons per hour (calculated using peas as the baseline product). Meanwhile, the FLoFREEZE S IQF freezer handles relatively smaller production capacities, from 1.7 tons to approximately five tons per hour.

Building on the successful track record of the FLoFREEZE M and S models, FMC FoodTech plans to launch the new FLoFREEZE A freezer in 2008. This powerful, versatile system will be especially geared for medium capacity freezing operations, yet offering all the advantages of existing M and S freezers. Eventually, it will replace the FLoFREEZE S. The new FLoFREEZE A freezer will enable smaller food producers to meet the growing demand for frozen food, as well as the growing competition from the fresh food industry.

ELIMINATING HOLES AND CORALS — THE “ENEMIES” OF FLUIDIZATION

One of the obstacles to efficient fluidization occurs when pockets of air, or “holes,” form in the fluidized product. Like a magnet attracting iron particles surrounding it, these holes attract surrounding air in the fluidized product bed, becoming increasingly larger. Consequently, the air pressure adjacent to these holes drops, causing the surrounding product to become less fluidized — which slows the individual quick freezing (IQF) rate.

Yet the agitation and pulsation features on the FLoFREEZE® freezer are the perfect “weapons” against these holes of air. By gently shaking the product back and forth horizontally and vertically, agitation and pulsation prevent these holes from forming in the first place. They help maintain a uniformly fluidized product bed, gently separating products to ensure fast, efficient individual quick freezing.

Another problem is the “coral effect,” which specifically occurs with products such as strawberries, which possess wet, sticky surfaces. “Corals” are rough, jagged patterns, similar to the appearance of sea coral. These coral patterns are created in the initial freezing zone when wet, juicy products touch the surfaces of frozen products.

Several measures can be taken to prevent corals from forming. Reducing the surface juice before the product enters the freezer can help reduce the product’s stickiness.” Another key step involves minimizing the amount of pulsation and agitation in the FLoFREEZE freezer, which can help lower the amount of contact that products have with one another. And finally, prolonging the freezing time in the initial zone will help ensure that the products are thoroughly crust-frozen, so their surfaces are harder — not sticky and prone to corals.

Specifically, the FLoFREEZE A Series will be available in different sizes, each capable of processing high value products, like cheese, or products of average value, like corn, at rates of one, two, three or four tons per hour. The one-ton capacity differential between each size of the FLoFREEZE A freezer makes it easier to integrate into existing production operations. Additionally, the smaller footprint and lower capacity will make it more affordable at lower price points, while delivering the same time-tested quality that goes hand-in-hand with FLoFREEZE® freezers.

Versatility via tracks or trays

The new FLoFREEZE A Series also offers food producers enhanced tray conveyor technology.

Earlier models of the FLoFREEZE freezer were equipped with a perforated tray system used to convey the product throughout the freezer. However, the more recent M and S models are equipped with a belt system, also known as the IQF track (described in greater detail on page 10).

The FLoFREEZE A freezer, on the other hand, can be equipped with either a unique tray or a belt system. These enhanced, improved stainless steel trays will be easier to clean and require less maintenance, as they have fewer moving parts.

Trays are generally used for freezing lighter products that are more equal in size, such as rice or peas. In contrast, IQF tracks are typically used to convey heavier and/or irregularly shaped types of food products, such as meatballs, cut sweet peppers or broccoli. For companies that freeze very small food products, such as couscous, trays are particularly advantageous. This is because the size and pattern of the trays' perforations can be customized to accommodate small products so they won't fall through the perforations during the freezing process.

The smaller footprint and lower capacity will make the FLoFREEZE A freezer more affordable at lower price points, while delivering the same time-tested quality.

CORE COMPETENCIES OF THE FLoFREEZE M, S AND A

Similar to the FLoFREEZE® A, both the M and S freezers are equipped with easy-to-use computerized preset controls, which allow equipment operators to switch from one product to another. This offers small to large food processing companies greater flexibility and value, as they can quickly, efficiently freeze a wide range of products with different parameters by simply pushing a few buttons.

Additionally, the following features and options available on the A, M and S freezers are at the very core of what enables them to deliver consistent IQF performance, 24-7.

IQF tracks

The IQF track conveyor belt system, which is standard on the M and S freezers, may also be incorporated into the new FLoFREEZE A freezer, for those planning to produce heavier, more irregularly shaped products. IQF tracks are independently controlled and made of dirt-repellant polymer. They also are modular for easy maintenance and/or replacement, and possess perforation patterns that are especially designed to maximize fluidization.

Fluidized peas move from the first, higher IQF track to the second, lower one in the initial freezing zone.



Optimized agitation IQF tracks can be optimized with a special patented agitation feature that moves the track backward and forward in short, jerky motions, as they convey the product forward through the freezer. The agitation feature improves fluidization by enhancing the track's ability to "break up" or separate products. This is particularly effective when freezing long, irregular, juicy and or sticky products, such as chunks of bananas, carrots or melon slices. The rate of agitation itself can be adjusted depending on the product's characteristics. Agitation traditionally has been offered as an optional feature on the FLoFREEZE® S model.

Patented pulsation FMC FoodTech's patented pulsation technology optimizes fluidization, and involves pulsating the airflow through the IQF track to move the product bed up and down. This vertically separates the product pieces from each other, so they aren't frozen together. As a result, these short, powerful pulsated bursts of air increase the rate of individually quick freezing each piece of product, as they are further separated from one another, enhancing the process of heat transfer. Pulsation is optional on the FLoFREEZE M model, although it should be noted that more than 90 percent of the M freezer customers have chosen the pulsation feature.

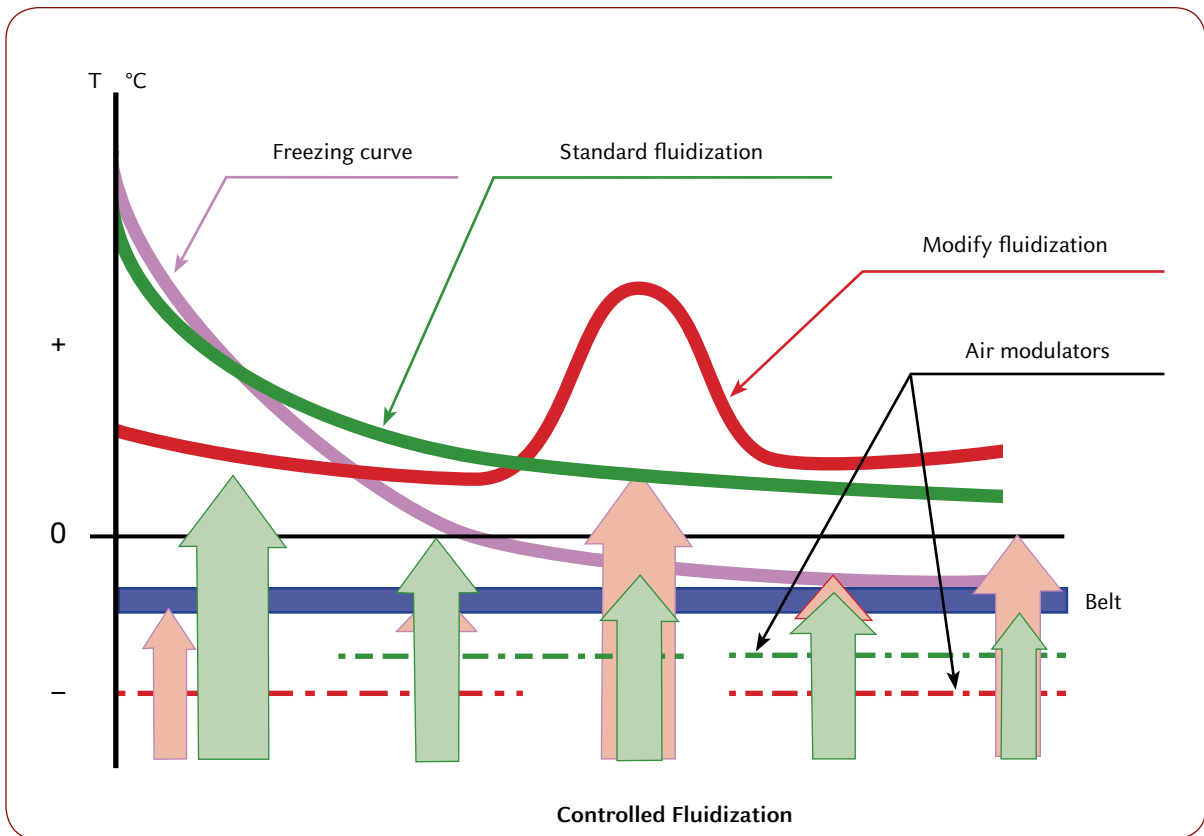
When the pulsation and agitation options are combined, they fully optimize the amount of product separation and fluidization. Additionally, they can help eliminate "holes" and "corals" (see "ELIMINATING HOLES AND CORALS — THE 'ENEMIES' OF FLUIDIZATION" on page 8).

Modulated airflow As previously mentioned, both the initial and final freezing zones of FLoFREEZE freezers are independently controlled, in order to adjust the airflow and temperature levels for different kinds of products. Like the M and the S freezers, the FLoFREEZE A will have an optional patented optimized airflow feature in the initial freezing zone. This involves the use of air modulator sheets underneath the belt or tray. Approximately 30 centimeters long, these sheets have openings of varying sizes and patterns, which will help achieve the right air speed underneath the product in specific sections of the first freezing zone. By exchanging or relocating the modulator sheets, the airflow can be increased or decreased as needed. In essence, these air modulator sheets enhance the precision of directing airflow on certain products in the first section, to achieve the right level of crust freezing and fluidization.

Optimized airflow = cost savings

Modulating the airflow is especially important for relatively fragile products like raspberries and blueberries. Soft, moist and relatively easy to crush, raspberries and blueberries are particularly problematic when it comes to retaining their shape and firmness when processed and frozen in massive quantities. By reducing the airflow so the blueberries and raspberries are not moving around as much, and by holding them in the initial freezing zone for a longer period of time, these fragile products can become “gently” crust frozen.

As a result, optimized airflow will help food processors reduce the percentage of crushed and wasted product by retaining the shape and quality of difficult products, such as raspberries and blueberries. This, in turn can help companies save thousands of dollars each year.



The addition of air modulator sheets can optimize the airflow, which modifies and enhances fluidization. The red line depicts how the airflow, and therefore fluidization, is relatively low in the first half of the freezing process, to gently freeze products such as raspberries and strawberries. Midway through the process, the red bell curve indicates airflow and fluidization is increased to speed the freezing process. The final stage of freezing involves a reduction in the airflow.

THE FLoFREEZE VALUE PROPOSITION

Cost savings, adding more value to the same product

A pound of individually quick frozen blueberries is worth more than a pound of those same blueberries frozen together in clusters.

Using FLoFREEZE® freezers translates into significant savings for food processors in the following ways.

- **Cost savings, adding more value to the same product:** As previously mentioned, FLoFREEZE IQF freezers can save money by “gently” freezing delicate products, preventing them from being damaged, crushed and ultimately disposed of. The FLoFREEZE freezer can reduce the amount of clustered product to one percent or less. This allows companies to demand higher prices for their products. This is because a pound of individually quick frozen blueberries is worth more than a pound of those same blueberries frozen together in clusters, and which may be damaged during the thawing process. FLoFREEZE freezers and the fluidization add value to the product.
- **Maximum functionality, modest space requirements:** FLoFREEZE freezers offer tremendous versatility, capable of processing a wide range of foods with unique freezing requirements. Yet the overall footprint of FLoFREEZE freezers is relatively modest in comparison to their wide-ranging functionality. This enables manufacturers to maximize the value and efficiency of their operations.
- **Hygiene-By-Design™:** Through their hygienic design, FLoFREEZE freezers reduce the amount of downtime and related lost productivity associated with cleaning. Surfaces throughout the FLoFREEZE freezers are smooth, sloped and self-draining, making it easier to wash off particles. IQF tracks on the M, S and the new A freezers are made of a special dirt-repellant polymer, while trays on the A freezers are made of easy-to-clean stainless steel.

Hygiene is further enhanced on IQF track-equipped freezers by an optional extended belt rinser (EBR). The EBR can be used between extensive cleanings, ultimately reducing the downtime required for cleaning. It will rinse and dry the first belt, also while the freezer is kept at a low temperature. Two sets of spray nozzles rinse both sides of the belt, while two compressed air jets dry the belt, using filtered air.

- **Energy efficiency:** FLoFREEZE® freezers can freeze more product per square meter than conventional freezers. Unlike conventional freezers, which freeze one “layer” of product on the belt, FLoFREEZE freezers can freeze what amounts to several layers of product which are suspended in the air during the fluidization process.

As mentioned earlier, FLoFREEZE freezers also allow for higher heat transfer rates in products. So, using the same amount of energy as a traditional linear freezer, the FLoFREEZE freezer can freeze more product faster. This adds to the energy efficiency of FLoFREEZE freezers.

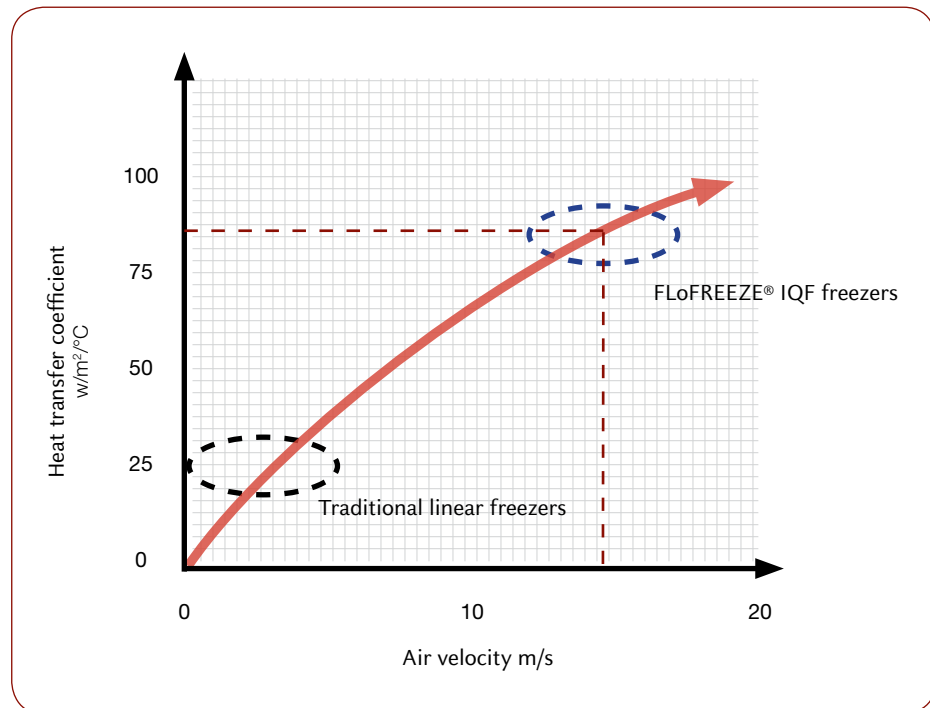
The energy efficiency of FLoFREEZE freezers also can be maximized when they are combined with FMC FoodTech’s LVS FRIGoPAK® refrigeration system. The LVS system utilizes about 15 percent less

energy than its traditional counterpart. Additionally, it requires up to 50 percent less refrigerant, and possesses a 65 percent smaller footprint. Consequently, the LVS system helps customers realize greater cost savings.

- **Continuous operation = value:** Built to last and engineered for continuous operation, FLoFREEZE freezers are meant to be used heavily especially during the peak of harvesting season, when the product must be frozen literally within hours of being harvested. One field test indicated seven units operated continuously for 99.8 percent of the time during an intensive seven-week harvesting period. This is partially due to FMC FoodTech’s patented air defrost system (ADF), which dramatically reduces the downtime required to fully defrost the freezer.

Heat transfer

Pictured, the FLoFREEZE freezer’s slightly higher air velocity (around 15 meters per second) results in a heat transfer coefficient that’s more than three times higher than traditional linear freezers — over 75 watts of heat energy per square meter of surface area per degree, versus traditional freezers that deliver roughly 25 watts of heat energy per square meter of surface area per degree. This higher rate of heat transfer — the very heart of “quick freezing” — ensures superior, “fresher than fresh” product quality.



PROVIDING SOLUTIONS, NOT JUST MACHINERY

As the demand for better, higher-quality frozen foods intensifies, manufacturers need the best machinery available to maintain and gain greater market share, especially in the face of growing competition from fresh food, and growing demand for frozen food. FMC FoodTech's FLoFREEZE® IQF freezers offer manufacturers proven, cutting-edge fluidization technology that helps meet the growing demand for frozen food, while countering competition from the increasingly popular fresh food market. Capable of freezing a range of products of different sizes, shapes and processing requirements, FLoFREEZE freezers enable manufacturers to maximize the value of their products by preventing clustering while preserving their quality, flavor, shape and texture. Simply put, FMC FoodTech doesn't only provide machinery. It provides manufacturers solutions to the ever-changing challenges of the global frozen food marketplace. ●

FMC FoodTech's FLoFREEZE IQF freezers offer manufacturers proven, cutting edge fluidization technology that helps meet the growing demand for frozen food.

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