

# OctoFrost™

## OctoFrost™ IF Shrimp Cooker



**FOOD SAFETY** regulations which are globally imposed, like the BRC, usually set the safe minimum cooking temperatures for shrimps and prawns at 72°C or 73°C to prevent foodborne illness. This core temperature is preferably reached without overcooking the shrimps to ensure the highest product quality and lowest yield loss.

### IMPINGEMENT FLASH

Every product is surrounded by a static, so called “boundary layer” of air, which insulates it and slows down the heat transfer. The OctoFrost™ IF Cooker, by means of its **rain shower system**, breaks this static layer by impingement. This results in the fastest heat transfer through conductivity and this is the essence of the **OctoFrost™ Impingement Flash (IF) technology**.

### OCTOFROST™ IMPINGEMENT FLASH (IF) COOKER

The OctoFrost™ IF Cooker, with its first unit installed in Thailand in 2013, is the most technologically advanced shrimp cooker in the industry. Its patented 3-temperature zones avoid the overcooking of shrimp resulting in the highest yield possible. The unique **rain shower system** guarantees the quickest heat transfer, allowing accurate temperature control within 0.2°C of the set temperatures. The water falls gently over the product by means of gravitation only therefore product quality is not compromised. Additionally, the rain shower system has a product cleaning function.

The OctoFrost™ IF Cooker has 3 infeed possibilities, for the greatest flexibility in product variety: bulk, belt, and tray infeed. Additionally, a “finger-lay” infeed belt can be attached as an alternative to tray feeding for curl control.



Bulk cooking



Finger-lay cooking

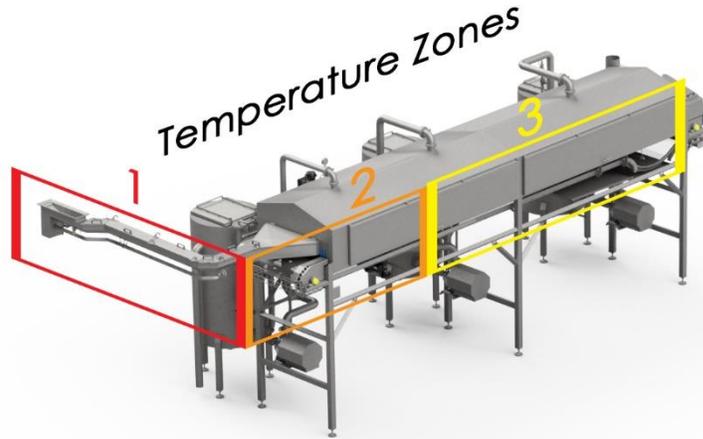
### MULTIPLE TEMPERATURE ZONES

When cooking shrimp, it is important to quickly heat the product during the first few seconds of the cooking process, especially the surface of the shrimp, to prevent melanosis (black tail, legs). The IF Cooker can accurately adjust the temperature in each of the 3 or 4 cooking zones.

## KEY BENEFITS OF THE OCTOFROST™ IF COOKER:

- The highest possible yield due to cooking in the patented three temperature zones. ‘Overcooking’ is avoided, enabling a high yield and high product quality (color, shape, texture, and bite).
- 100% food safety regarding homogeneous cooking. No ‘undercooked’ meat, no grey spots, not even with small-sized peeled shrimp (PUD).
- Full temperature control in each temperature zone due to the cross-flow water system.
- The OctoFrost™ IF Cooker is designed for all types and sizes of shrimp (including PD, PUD, HOSO, HLSO and EZ Peel).
- CIP system in place.
- Significantly faster heat transfer due to the flash impingement rain shower system.
- High volume of recirculated water over the product.
- Highly efficient energy consumption with all steam being absorbed by the cooking water (approx. 175 kg/h steam required at 1,000 kg/h input).
- Optionally, the processor can opt for a weighing belt for an even infeed into the IF cooker.
- Three infeed options that allow for great flexibility; bulk, belt, and tray infeed.
- The infeed flume creates a highly efficient heat transfer, with melanosis (black tail, legs) being reduced to a minimum.

The flume water temperature (first zone) should be set relatively high as this will coagulate the protein on the surface, trapping the moisture inside. If one would continue to cook at this temperature, however, the surface of the shrimp would overcook, reducing yield and product quality. Therefore, the cooking temperature in cooking zones two and three should be lowered.



The shrimp’s core will continue to rise in temperature whilst the surface of the shrimp is removed from the ‘overcooking zone’. The core of the shrimp will reach the required temperature for food safety and cooking quality, without overcooking the surface.

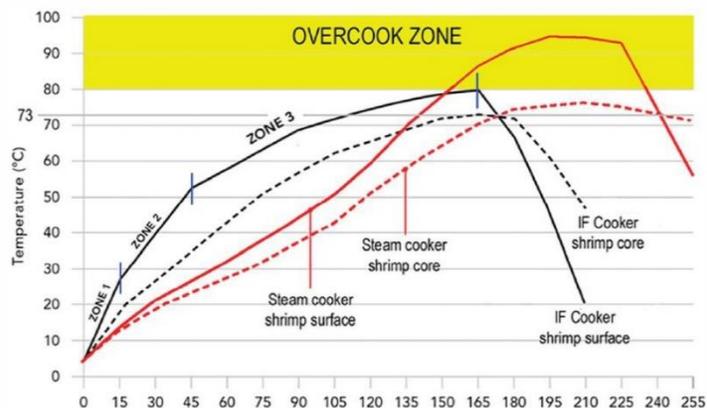
Multiple temperature zones provide optimum flexibility and control of the cooking process. These set points can be stored in a recipe in the touch panel for every single batch of shrimp. The IF Cooker provides extremely accurate temperature control in each separate zone. Control is key in cooking shrimp. This system prevents foaming, curling, and the formation of "black spots" on shrimp (melanosis).

## TEMPERATURE CONTROL

Accurate temperature control is crucial for high-quality shrimp. Traditional or forced-convection steam cookers cannot give the operator such precise control over the cooking temperatures compared to the IF Cooker. Operators of steam cookers generally overcome this by cooking longer than necessary to ensure that all shrimp reaches the required temperature and this results in overcooked shrimp.

Overcooking, curling, and therefore loss of protein of shrimp is caused by temperatures above 80°C. Steam cooking temperatures in these systems are commonly between 90°- 95°C.

Shrimp Cooking Curves: IF Cooker vs. Steam Cooker



## IF COOKER VS. OTHER TECHNOLOGIES

- at least 30% faster cooking, resulting in better product quality and shorter tunnel when compared to other cooking technologies.
- The OctoFrost™ IF Cooker has an even distribution of heat throughout the tunnel while a steam tunnel has hot and cold spots creating an un-even cooked product.
- The IF technology circulates up to 10 times more water over the product as compared to a spray water system.
- The OctoFrost™ IF Cooker uses a high volume of recirculated water, which can penetrate up to 45 mm layer of shrimp, cooking each shrimp evenly, which with steam is difficult to achieve.
- The cooker does not need a steam exhaust system as for a steam cooker, as all the steam is absorbed in the cooking water and therefore no steam escapes the cooker.
- A “steam cooker” requires temperatures of 90° to 95°C to achieve a uniformly cooked shrimp with a core temperature of 73°C. This results in high yield loss and lower product quality.

The 3-temperature zones of the in OctoFrost™ IF Cooker, however, provide optimal flexibility and control of the cooking process. The set temperatures can be stored in a recipe in the touch-panel for every single batch of shrimp. The OctoFrost™ IF Cooker accurately controls the temperature in each zone. Control is key when cooking shrimp.

## CUSTOMER BENEFITS

The OctoFrost™ IF Cooker comes with a number of benefits for the shrimp processors:

### ► High Yield and Product Quality

Optimal product quality and yield is guaranteed by quick and efficient cooking. No excessive curling, right shrimp color and bite, preserved taste and flavor are the main characteristics of the shrimp passed through the OctoFrost™ IF Cooker.



Temperature of the shrimp's surface remains below 80°C, which results in at least 1% yield gain compared to forced convection steam cooking.

Compared to traditional steam cookers, the yield gain can reach 9%.

### ► Energy Efficiency

Energy Efficiency is one of the main design criteria of the OctoFrost™ IF Cooker.



The water in the OctoFrost™ IF Cooker is heated by means of direct steam injection, which is absorbed completely into the water. A high volume of recirculated water is used which has a very low temperature-drop when exiting the cooker ( $\Delta T$  - max. 3° C), therefore very little steam is needed to reheat the water translating in

maximum energy efficiency. A 30% to 40% reduction in steam consumption can be achieved compared to traditional steam cooking technologies because there is no escape of the steam when reheating the water.

Water consumption is only caused by water pick-up on the product which usually ranges between 5% and 10% of the production capacity (e.g. for a 2000 kg/h production, water consumption would amount 140 l per hour).

Because of the recirculation system the OctoFrost™ IF Cooker uses up to 90% less water than other water cooking systems.

### ► Food Safety

The OctoFrost™ IF Cooker has been designed to exceed all international regulations on food safety and hygiene. Every part of the cooker which is in contact with the blanching water can be cleaned by CIP (Cleaning-In-Place).

**WELL-COOKED SHRIMP** is determined by:

- even infeed;
- well controlled cooking temperature;
- quick and efficient chilling of the product;
- the surface temperature not exceeding 80°C to avoid overcooking;

#### **EQUIPMENT CAPACITIES**

OctoFrost offers a capacity range of 1,000 to 8,000 kg/h for the OctoFrost IF Cooker.

Contact us for more information at [sales@octofrost.com](mailto:sales@octofrost.com)



All piping, Aisi 316 stainless steel, is *backing-gas* welded. This method ensures the highest hygienic standard possible.

The cooking process guarantees 100% food safety regarding homogeneous cooking. No 'undercooked' meat, no grey spots, even with small-sized peeled shrimp (PUD).

#### **Automatic Rejection Chute**

This safety function prevents undercooked shrimp from entering the chilling and freezing equipment in case of an unexpected temperature drop caused by a steam boiler failure. In this case, the chute will automatically discard the possibly undercooked product that is in the cooker into a rejection bin. The PLC will automatically record the rejected batch. When the temperature is up to the required level, the infeed line and the cooker will restart.