



# Unique sous vide/pasteurisation technology drives food safety & ROI

## Offer safer, higher quality ready-to-eat products

Consumers of all types are increasingly demanding convenient, heat-and-eat meat and non-meat protein-based meals and snacks. For many, especially those who are more health-conscious, a 'clean' label showing no preservatives is a top consideration. Others may simply want the easiest, lowest cost option. But with both segments, the pre-cooked product that looks and tastes best is typically the one that wins in the market.

This is where a new type of sous-vide cooking comes in. An innovative, horizontal counter-flow alternative to traditional, water tank or water-bath sous-vide cooking is dramatically improving the quality of pre-cooked foods. It is also eliminating the quality inconsistency that has been a challenge for food processors cooking sous vide. Marrying this novel approach with highly controlled in-package pasteurisation further fuels ROI and protects brands by minimising potentially devastating food safety issues.

## Sous vide and pasteurisation: how the concept took hold

Sous-vide (French for 'under vacuum') cooking began in scientific laboratories when researchers used precisely heated water baths to incubate live cell cultures. Later, with the advent of plastic and vacuum-sealed packaging, sous vide turned out to be a convenient way to make packaged consumer food products safer: placing sealed foods in a heated water bath made pasteurisation easier for food companies.

What food engineers and the world's top chefs have realised is that this in-package pasteurisation process can also pre-cook food perfectly. Vegetables remain crisp and proteins, in particular, are left moist, aromatic, and tender when sealed and cooked in their own juices at a temperature lower than conventional cooking.

The timing could not be better, considering the rising demand for higher quality convenience foods. Until recently, food producers had to rely on traditional water immersion/circulation equipment to achieve the sous-vide effect – but this has limited the potential accuracy and quality of the method.

## Multi-layer, horizontal cooking boosts taste and flavour

Today, sous-vide style cooking technology can use a horizontal counter-flow method and multiple heating zones to cook and pasteurise vacuum-sealed food. After packaging, the food is automatically loaded flat onto conveyor trays that move the product horizontally through a continuous water shower with several distinct heating zones. The flow volume and water temperature in these zones are automatically controlled. Each product is cooked gradually and individually for highly precise, consistent cooking quality and accuracy.

In contrast, traditional sous-vide style equipment plunges large batches of products vertically into a hot water bath, with each package experiencing different levels of heat exposure. The method can shock and damage the product and increase the likelihood of undercooking or overcooking.

The horizontal, counter-flow method takes the sous-vide concept and improves on it:

- Product lays flat and moves horizontally, not immersed.
- Organised product formation, not random.
- Ambient pressure environment, not high pressure.
- Heat exchange for individual products, not groups.
- Consistent core temperature, never fluctuating.

## Counterflow chilling and drying improves processing

The horizontal, continuous sous-vide method is enhanced by water-filled trays providing cooking energy from below the product. The trays move counter flow (cold to hot), whereas the product travels from hot to cold. In this way, the coldest product comes in contact with the coldest water, which allows for gentle and effective chilling. After the heating process, the product is rapidly chilled by an intense water shower of >1°C and supported by this controlled pool of water in the trays and brought to <5°C core temperature. After the heating and chilling process, the product is automatically moved onto a conveyor belt to an air blast station and air dried for boxing and shipping.

## Automated quality control ensures reproducibility

Delivering consistent high quality and safety is key to creating a novel, pre-cooked convenience food that attracts loyal, repeat consumers. Achieving high quality control with conventional sous-vide equipment can require more labour and cumbersome processes to manage variability in heat exposure. The innovative horizontal, counter-flow technology solves the problem by integrating features that ensure cooking accuracy and quality:

- Precision water temperature control to  $\pm 1^\circ\text{C}$ .
- PLC system that controls and monitors operations.
- Automatic process verification and parameter traceability.
- Menu driven, but designed to make variations easy.

The intelligent quality control features make a fully automated, multi-shift sous-vide cooking operation possible. The high degree of control also reduces errors and waste, while increasing uptime and yield.

## Extending shelf life – and supporting 'clean' labels

In-package pasteurisation and sous-vide cooking offer a significantly higher standard of food safety. Few to no additives are required and shelf life is extended, often dramatically. In one case a producer increased time from 40 to 65 days, while another reached up to 160 days. Complaints and returns also decrease. The horizontal, counter-flow pasteurisation method goes even further by detecting when food might be reaching a state of over or undercooking. Currently, no other sous-vide system offers this capability. There is no question sous-vide cooking is gaining in popularity, thanks to its gentle and exceptionally safe method of cooking. Producers who want the full benefits of sous-vide style and in-package pasteurisation should step up to the horizontal counterflow method with integrated quality control. Only this innovative technology delivers a range of benefits that drive up ROI: exception, reproducible quality, uncompromising safety, higher yield and lower labour and energy costs.



# Improving product image and dramatically extending shelf life

## Safer, higher quality ready-to-eat products

Consumers of all types are increasingly demanding convenient, heat-and-eat meat and non-meat protein-based meals and snacks. For many, especially those who are more health-conscious, a 'clean' label showing no preservatives is a top consideration. Others may simply want the easiest, lowest cost option. But with both segments, the pre-cooked product that looks and tastes best is typically the one that wins in the market.

This is where Provisur CookChill technology comes in. The innovative, horizontal counter-flow alternative to traditional, water tank or water-bath methods is dramatically improving the appearance and quality of pre-cooked foods. It is also eliminating the quality inconsistency that has been a challenge for food processors. Through the highly controlled in-package CookChill technology, products gain increased shelf life, food safety issues are minimised, and food processors improve their overall ROI.

## Multi-layer process boosts appearance and quality

CookChill technology uses a counter-flow method and multiple heating zones to cook vacuum-sealed food. After packaging, the food is automatically loaded flat onto conveyor trays that move the product horizontally through a continuous water shower with multiple distinct temperature zones. The flow volume and water temperature in these zones are automatically controlled. Each product is cooked gradually and individually for highly precise, consistent cooking quality and accuracy.

In contrast, traditional cooking equipment plunges products vertically into a hot water bath, with each package experiencing different levels of heat exposure. The method can shock and damage the product and increase the likelihood of undercooking or overcooking.

CookChill technology improves on this method by heating products gradually, controlling cook temperature precisely and keeping packages flat with no tumbling, rubbing or freefalling. This method uniformly minimises colour and texture change and overcooking across products.

## Counterflow heating and chilling reduces product purge

CookChill technology uses water-flooded trays to provide cooking energy from below the product. These trays move counter flow (warm to hot and warm to cold), whereas the product travels from hot to cold. In this way, the hottest product comes in contact with the hottest water and the coldest product comes in contact with the coldest water, which allows for gentle and effective heating and chilling.

After the heating process, the product is rapidly chilled by an intense water shower of  $>1.5^{\circ}\text{C}$  and supported by this controlled pool of water in the trays and brought to  $<4^{\circ}\text{C}$  core temperature. After the heating and chilling process, the product is automatically moved onto a conveyor belt to an air blast station where residual surface water is removed ahead of boxing and shipping.

By gently and precisely increasing and decreasing temperature through counterflow technology, the CookChill process minimises purge and fatty appearance within packaging that comes from products being exposed to excessive temperature. This improvement in packaging appearance is consistent across all products and packaging.

## In-package pasteurisation extends shelf life and supports 'clean' labels

Through CookChill's in-package heating and cooling, bacteria are killed and products enter a safe chilled state without the introduction of new contamination. By preparing products using in-package pasteurisation as the final 'kill step', shelf life is increased three to four times.

Extending shelf life through in-package pasteurisation leads to products that have more time to be sold in store and decreases returns due to spoilage. Because of its inherent safety, CookChill's in-package pasteurisation also decreases the likelihood of a financially devastating product recall due to contaminated products.

Additionally, CookChill's in-package pasteurisation inhibits bacteria growth without the need for preservatives such as nitrates and salt. Minimising these preservatives allows for 'cleaner' packaging labels improving the appearance of the product to customers seeking this feature.

## Automated quality control ensures reproducibility

Delivering consistent high quality and safety is key to creating a novel, pre-cooked convenience food that attracts loyal, repeat consumers. Achieving high quality control with conventional equipment can require more labour and cumbersome processes to manage variability in heat exposure. CookChill technology solves this problem by integrating features that ensure cooking accuracy and quality:

- Precision water temperature control to  $\pm 1^{\circ}\text{C}$ .
- PLC system that controls and monitors operations.
- Automatic process verification and parameter traceability.
- Menu driven, but designed to make variations easy.

The intelligent quality control features make a fully automated, multi-shift CookChill operation possible. The high degree of control also reduces errors and waste while increasing uptime and yield.

## The best choice for improving package appearance and extending shelf life

Thanks to its gentle and exceptionally safe method of cooking, CookChill technology is gaining in popularity. Producers who want the full benefits of sous-vide style and in-package pasteurisation should step up to CookChill and its integrated quality control. Only this innovative technology delivers a range of benefits that drive up ROI: reproducible quality, exceptional product packaging appearance, cleaner labels, extended shelf life, uncompromising safety, and full automation.



# Stop rising costs with automated transfer

## Easy-to-use innovation offers a range of benefits and savings

Automating the food processing line is the obvious answer to a tight labour market, hygiene risk mitigation, and offering affordable food products. But many organisations worry that sophisticated technology will require more highly skilled and costly workers.

Fortunately, processors can now easily automate a key step: the transfer of raw materials into formers and other further processing units. Innovative but simply designed automatic transfer systems reduce labour and other costs, and they can be operated by the average line worker.

## The high-cost option: moving meat tubs

The manual movement of raw meat and poultry is an especially error-prone, labour-intensive area of the plant. Heavy quantities of meat – 130kg and higher – are manually placed into tubs, wheeled through the plant, and then loaded into formers and further processing machines. Workers often overfill tubs, leading to lower yield from spillage and injury from a dangerously slippery plant environment.

One leading quick service restaurant (QSR) supplier experienced 10 falls in the tub and forming area during a 12-month period prior to automating. Workers often overload or inconsistently load formers, causing additional wear and tear, gaps, and imperfect or partially formed patties that must be discarded.

What's more, the manual process is unsustainable from a sanitation and environmental perspective. It creates numerous opportunities for cross contamination and requires substantial cleaning labour and other resources. Tubs must be washed and sanitised daily by hand. Spilled meat also ends up in plant drains, which must be treated appropriately before entering the wastewater stream. That means additional costs for labour, water and chemicals.

## How automated transfer works

The technology automatically transfers raw materials from mixing and grinding and 'feeds' it into food formers with virtually no manual touchpoints. The system connects through either conveyors or pumps and uses diverter gates with unique curvature to allow high capacity flow rates without stopping or blockage. A user-friendly interface is used to automatically monitor the hopper. The system's 'eyes' see when the former's hopper can take in more meat, so there is consistent flow and no gaps.

An installation might consist of incline belt conveyors, shuttle belt conveyors, divert belt conveyors and an automated control system that integrates with any existing automated areas, regardless of manufacturer.



## Financial, safety and sanitation benefits

The most immediate ROI from automating materials transfer is derived from the reduction in labour costs. However, businesses can recognise a range of other long-term savings, from water, medical and energy costs to avoiding legal and brand liabilities caused by a serious sanitation issue. Automating material transfer offers:

- Dramatic reduction in labour costs.
- Fewer costly falls, strains and other injuries.
- Higher production and yield; no gaps in product flow, no spillage.
- Better sanitation at less time and expense.
- Perfect-shaped patties due to efficient, controlled, consistent loading.
- Less wear and tear on forming equipment.
- Less congestion and easier traffic flow in the plant.

## Case study: QSR supplier sees big ROI from automating

A long-time meat and poultry supplier to a national QSR installed a Provisur Feed the Former (FTF) automated materials transfer system to eight beef patty forming lines. By automating the tub and former process, the company was able to move four employees to other areas where help was needed. And they did not need to hire skilled staff – operation of the FTF was integrated with existing computerised blending systems.

The supplier's production increased by 20% (while run hours decreased by one hour), and product losses decreased by 7%. To realise the same numbers without automating would have required brick and mortar changes including knocking down walls to accommodate more lines, adding labour, compressors and more. The supplier also gained efficiencies by achieving consistently perfect patty formation.

Weiler, part of Provisur, developed the Feed the Former automated transfer system. The system can be installed quickly and customised for either retrofitting existing lines or attaching to new lines. The highly flexible system works with either conveyors or pumps.