

Appendix F3

In-line air chilling systems for soft and medium scalded product

STORK
POULTRY PROCESSING

marel



More than just removing heat



Chilling poultry is about more than just removing heat. The chilling process will largely determine the appearance of your end product, its shelf life and the weight of product available for sale.

Chilling is therefore of paramount importance to your relationship with your customers and to the profitability of your business too. A correctly designed chilling system can pay back within months; an incorrectly designed system can be a costly millstone round your neck for years!

When designing a fit-for-purpose chilling system, the following key factors must always be taken into consideration:

- Accurate temperature management
- Yield
- Color
- Microbiological quality
- Tenderness and juiciness.

Stork Poultry Processing chilling technology

For many years now, we at Stork Poultry Processing have prided ourselves on being a full line supplier to the poultry industry worldwide. In this context, we have accumulated a vast store of know-how on chilling poultry. We have worked with specialist institutes in the Netherlands in the development of modelling techniques, which ensure that chilling installations are always correctly designed to meet the individual requirements of each customer. Close cooperation with leading manufacturers of chilling components has resulted in the development of hardware tailor-made for our own technology.

Correct choice of chilling environment

The type of end product required will always determine the chilling environment. An ideal chilling environment means the correct choice of air temperatures, air volumes, airflow angles and control systems.

Bacteriological growth must of course be kept to a minimum. Neck flaps and thin portions must not, however, freeze, as frozen components will eventually thaw and create drip. This will compromise both presentation and shelf life.



Mature in-line

In many markets, a chicken meal means breast fillet prepared in an almost limitless number of ways. To give consumers a tender juicy breast fillet, Stork Poultry Processing has developed its two-stage on-line Maturation Chill System, which, when used in conjunction with RapidRigor electro-stimulation technology, installed immediately after picking, will give breast fillet comparable in tenderness to that cut from a bird matured off-line. Compared to maturation off-line in a maturation store, Stork's on-line technique saves space and labor, enhances yield and improves shelf life.

Downflow 'Plus' tunnel

Techniques for first-class moistness and color

To keep all-important yield loss to a minimum and to control product presentation and color, Stork Poultry Processing has developed its 'Plus' technology. This consists of moisturizing cabinets mounted in 180° corner wheels outside the main box of the system, which apply moisture either to all inside and outside surfaces or to outside surfaces only. The mix, number and position of these cabinets in any one system will depend on the characteristics and presentation of end product required. The use of 'Plus' moisturizing technology can reduce weight loss to extremely low levels and allows you to influence the presentation and color of your end product.



A moistener and spraying cabinet keep yield loss to a minimum.

Stork Poultry Processing chilling options

Stork Poultry Processing offers three different types of in-line tunnel. Which tunnel is chosen will depend on the tasks the tunnel is asked to perform.

■ Small footprint and flexible layout

This is a single-stage, multi-tier system. The tunnel consists of the following components:

- Sigma/T90 stainless steel overhead conveyor system to which birds can be transferred automatically from the evisceration line and from which they can be transferred automatically to the whole bird distribution line. Birds enter low and leave high with conveyor runs on each tier offset to reduce to an absolute minimum any risk that birds will drip on one another.
- Evaporator/fan assemblies installed above the top tier of the overhead conveyor, which angle the correct volumes of air cooled to the correct temperature down over and around the birds. Evaporator/fan assemblies are supplied complete with all insulated pipework, valves and fittings for easy interface with the customer's own refrigeration plant.
- Moisturizing cabinets installed on 180° corner wheels outside the main box of the tunnel. The number, mix and position of these cabinets will depend on the final product presentation required.
- System controls. Plant management can simplify day-to-day operation of the tunnel by entering standard settings for light, medium and heavy birds within the weight range for which the tunnel has been designed. Automatic sequential defrost allows plants to operate double shift without any drop in performance.



Downflow 'Plus' is a single-stage multi-tier system.

InfraChill tunnel



An InfraChill tunnel is a single-stage single-tier system.

■ 'Quick' chill on a single tier only

This is a single-stage, single-tier system, which uses ducts to blow cooled air directly both into and around the bird. Forcing the cooled air both into and around the carcass reduces chill times by some 25%. InfraChill can also be supplied with 'Plus' moistening technology to reduce weight loss.

The system consists of the following components:

- Sigma/T90 stainless steel overhead conveyor system on a single tier to which birds can be transferred automatically from the evisceration line and from which they can be transferred automatically to the whole bird distribution line.
- Evaporator/fan assemblies to direct cooled air into a plenum from which it is blown forcefully into and around the birds through double-slotted stainless steel ducts. Evaporator/fan assemblies are supplied complete with all insulated pipework, valves and fittings for easy interface with the customer's own refrigeration plant.

- Double-slotted stainless steel air ducts.
- System controls. Plant management can simplify day-to-day operation of the tunnel by entering standard settings for light, medium and heavy birds within the weight range for which the tunnel has been designed. Automatic sequential defrost allows plants to operate double shifts without any drop in performance.

MaturationChill tunnel

■ An attractive in-line alternative to maturing off-line

A MaturationChill tunnel both chills and tenderizes. For optimum tenderness, a MaturationChill tunnel should follow a RapidRigor electro-stimulation system installed immediately after picking.

MaturationChill is a two-stage, multi-tier system. In the first stage, birds are chilled rapidly to inhibit the growth of bacteria. Moisture is applied to all inside and outside surfaces both to help the chill process and to keep weight loss to a minimum. In the second much longer stage, birds are chilled slowly using less cold air at lower velocities to speed up proteolytic breakdown.

The system consists of the following components:

- Sigma/T90 overhead conveyor system to which birds can be transferred automatically from the evisceration line and from which they can be transferred automatically to the whole bird distribution line. Birds enter low and leave high with conveyor runs on each tier offset to reduce to an absolute minimum any risk that birds will drip on one another.
- Evaporator/fan assemblies for each of the two stages installed above the top tier of the overhead conveyor, which angle the correct volumes of air cooled to the correct temperature at the correct velocities down over and around the birds. Evaporator/fan assemblies are supplied complete with all insulated pipework, valves and fittings for easy interface with the customer's own refrigeration plant.
- Moisturizing cabinets installed on 180° corner wheels outside the main box of the tunnel.
- System controls. Plant management can simplify day-to-day operation of the tunnel by entering standard settings for light, medium and heavy birds within the weight range for which the tunnel has been designed. Automatic sequential defrost allows plants to operate double shifts without any drop in performance.



The RapidRigor electrostimulation system contributes to optimum tenderness.

Giblets



■ Use your tunnel to chill giblets too!

An attractive 'dry' alternative to chilling giblets in water and then pumping them to their final packing destination is to let them fall onto a conveyor belt system at the points, which they arise in the evisceration department. This system then conveys the giblets through the chilling tunnel, where fans sited above the belt blow chilled air onto them. After leaving the chilling tunnel, giblets are then packed either retail or bulk.

Benefits of this method of chilling giblets, which can be incorporated into Downflow 'Plus', InfraChill and Maturation Chill tunnels, are improved product handling, better product quality and shelf life and significant water savings.



An alternative to chilling giblets in water is a conveyor belt system in the air chilling tunnel.

Information/tracking and tracing

To manage efficiently, management must have the information they need to manage on a real-time basis. Demanding retailers pressed by increasingly demanding consumers now require full traceability at all times.



Active Tension Control (ATC) offers impressive reliability.

Stork Poultry Processing Downflow 'Plus', InfraChill and Maturation Chill tunnels will usually be part of a complete in-line system, where birds hung to the killing line will stay in shackle until released as a graded whole bird or cut portions.

Stork's PDS-NT tracking and tracing system is able to keep full track of all birds by flock from hang-on in the live bird supply area right through to the portioning and de-boning departments. The chilling tunnel is an important module in this process.

A weighing re-hanger at the tunnel entry gives the weight of each bird passing into the tunnel. It can also register the end of one flock and the beginning of a new one. Stork XL 'long line' software, an important component within PDS-NT, will then track all birds, their flock numbers and their weights through the tunnel giving management instant access to detailed information on the number and weight of birds by flock in the tunnel at any one time. Management can even interrogate the tunnel to find out how many birds of a given weight range it contains. This feature is of particular value in high capacity maturation chill tunnels, which can hold up to three hours production running to up to 36,000 birds.

The weight of birds registered by the re-hanger at the tunnel entry can be compared to the weight of birds registered by the re-hanger at the tunnel exit. In this way a close eye can be kept on weight loss in the tunnel and action taken to rectify an unsatisfactory situation.

■ Overhead track and drive systems

Higher hourly volumes, increasing bird weights and the need to chill birds to very low temperatures can mean very long overhead conveyor systems. The latest maturation chill systems for the highest capacity lines will have well over 5,000 m / 16,404 ft of track in them.

It is therefore essential that drive systems for these long track lengths are fit for this exacting purpose.

It was in this context that Stork developed its ATC – active tension control – drive system. Benefits are impressive reliability, longer chain life and easier maintenance. Should a drive unit fail during production, its neighbor takes over its function immediately and automatically. The line will not stop running. The defective drive can then be attended to after production. When the time comes for the tunnel's chain to be replaced, this job does not have to be done all at once but can be done in more easily manageable sections.

Operational flexibility

Besides ensuring full product traceability and providing all-important information to management, Stork XL 'long line' software also gives additional flexibility, improved operational stability and quicker fault tracing and repair.



The weighing re-hanger gives the weight of each bird passing into the chilling tunnel.

Flexibility

Most plants will have separate overhead conveyor systems for in-line chilling and for the distribution of whole birds by quality and weight for sale whole or for portioning and de-boning. There will, however, sometimes be applications where the most efficient solution is to combine separate chilling and whole distribution bird lines into a single long line. In this situation, XL 'long line' software allows birds to be weighed in the weighing re-hanger at the tunnel entry and then unloaded automatically by weight and other parameters in the whole bird packing, cut-up and de-boning departments. A second weighing re-hanger at the tunnel exit is not necessary.

XL 'long line' software coupled to a weighing re-hanger at the tunnel entry will also allow birds to be released 'early' at any stage during the chilling process. This ability is of particular value where birds of a given size must be trussed or undergo some other manual process. These operations are very difficult if birds are too cold and too stiff.

Stability

In those many plants with weighing re-hangers at both tunnel entry and tunnel exit, XL software will allow either re-hanger to be set to distribute weighed birds to the automatic release stations in the whole bird distribution line. In this way the re-hanger at the tunnel entry can, if necessary, take over the function of the unit at the tunnel exit.

Easier fault tracing and repair

Because XL software traces each bird through the tunnel, it also keeps track of each trolley and shackle assembly. Should a trolley be missing or damaged, the position of this trolley is pinpointed. Once production has finished, XL's maintenance program ensures that the trolley is brought to a convenient position for repair or replacement. The chiller's overhead conveyor system can therefore be kept in optimum technical condition with no time wasted hunting for damaged or missing components.



Stork's product distribution system (PDS-NT) tracks all birds, flock numbers and weights through the tunnel.

More than just removing heat

Stork Poultry Processing chilling systems give you the best possible yield. Your customers benefit from optimal color, product presentation and shelf life. The consumer enjoys a top quality end product.

Which of the three systems will be chosen will depend on market requirements and your own situation.

- Stork Poultry Processing Downflow 'Plus' will be the choice of many. In different executions it can be configured to fit into most plants.
- For those of you who want a single-tier solution, InfraChill fits the bill perfectly.
- The Stork Poultry Processing MaturationChill is becoming an increasingly common sight in those markets where breast fillet is produced from a matured bird and where a tender breast fillet is the ultimate chicken eating experience.

In short, Stork Poultry Processing know-how will always guarantee the best chilling solution for your particular end product. Chilling is about more than just removing heat!



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