

## INTERCOOL FOOD TECHNOLOGY LTD.

# Tailored Design of E-QCT & EQ

## *Enhanced Quick Chill Tunnel*

The Quick Chill Process was originally developed by DMRI in the 1970s and has been continuously researched and refined ever since. The latest advancement is known as E-QCT, developed by experts now working at Intercool. The E-QCT process consists of two equally important stages: E-QCT and EQ (Equalization). Both are critical to achieving optimal performance.

The Enhanced Quick Chill Tunnel (E-QCT) is a carcass chilling process designed to increase profitability through higher yields and improved meat quality. During the process, the pH-value of the meat drops from the time of sticking until the end of equalization—this marks the transition from muscle to meat, known as rigor mortis. A rapid pH drop can lead to quality issues. The E-QCT process applies the principles of quick chilling to minimize chill loss and carefully manage the pH development, thereby enhancing pork quality.

With E-QCT, heat extraction can be precisely tailored to meet specific product and market requirements, while also aiming for the lowest possible energy consumption. In most cases, this process can increase profit by €3 to €5 per pig carcass.



# THE E-QCT PRINCIPLE

## AN E-QCT PROCESS IS A TWO-STEP PROCESS

**Quick Chilling Phase:** In the first step, carcasses are rapidly chilled using high air velocity and low temperature. This effectively reduces the surface temperature, causing crust freezing, while the core temperature varies depending on the size of the carcass.

**Equalization Phase (EQ-Step):** The second step involves low air circulation and temperatures close to the desired cutting temperature. During this phase, the temperature within the carcass equalizes, ensuring a consistent and precise uniform cutting temperature.

## BENEFITS OF THE E-QCT PROCESS

The rapid temperature drop in the E-QCT system offers several advantages:

- **Controlled Heat Extraction:** The design ensures the temperature drop is tailored to the specific characteristics of the average attributes.
- **Bacterial Inhibition:** The low temperatures help inactivate bacteria, extending the product’s shelf life.
- **Slower pH Decline:** Reduced drip loss, reduced occurrence of PSE, and darker meat, typical 0, 5 to 1 point on the Japanese Color Scale
- **Customizable Design for Additional Benefits:**
  - Enhanced meat tenderness
  - Delayed onset of black bone development



## IMPROVED PROFIT FROM BETTER YIELD AND QUALITY

Once installed, the E-QCT solution will reduce chill loss and enhance product quality – without requiring additional resources. The resulting increase in profitability from reduced chill loss is straightforward to measure and quantify. However, the profitability gained from improved quality traits depends on your specific market conditions, making it more subjective to evaluate. The process is tailored to enhance your products in the areas that matter most to your market demands.

## E-QCT PROFIT CONTRIBUTION

Improved profit from yield:

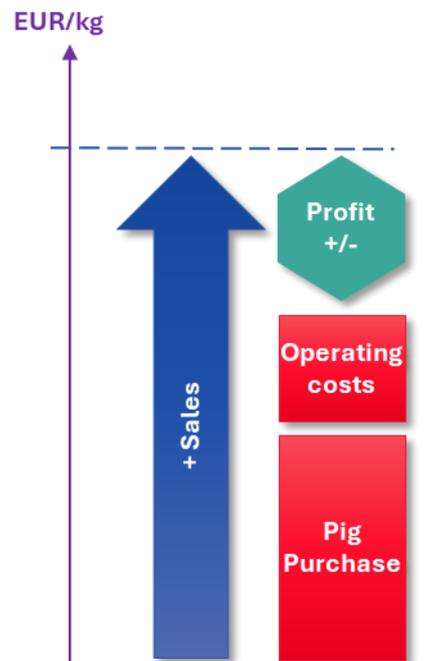
- Improved yield from reduction in chill loss, 1 to 2,5 %

= **more sellable volume**

Improved profit from improved quality traits:

- Less PSE occurrence
- Less drip loss
- Improved shelf life
- Darker meat

= **higher obtainable price/kg**



## THE E-QCT IS AN ENHANCEMENT OF THE QCT

- An intermediate deck in the E-QCT separates the process and service areas
  - Improved process efficiency
  - Reduced heat ingress reduces energy consumption
  - Better control of air stream reduces energy consumption
- Footbridge in the maintenance area and inspection hatches in the evaporators
  - Improved defrosting cycles reduces energy consumption
  - Less buildup of snow in E-QCT
  - Improved Workers Health & Safety
- Optimized fin spacing in evaporators
  - Reduces need for defrosting, thus reducing energy consumption
  - Reduces buildup of snow in E-QCT

## CHILLING PROCESS DESIGN

- Optimized to your meat quality demands
- Low chill loss
- Low drip/packing loss
- Tenderness
- Postponing of black bone development

## COOLING EQUIPMENT SPECIFICATION

- Cooling capacity
- Evaporator design and dimensioning
- Evaporator placement
- Defrosting sequence

## CONVEYOR SPECIFICATION

- Internal logistic solution
- Conveyor length, pitch, layout

## BUILDING DETAIL DRAWING AND DESCRIPTIONS

- Floor, column, wall, and roof construction
- Drains, pressure reliefs, air locks

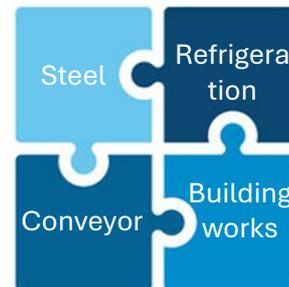
## SECONDARY STEEL DESIGN

- Avoid conflicts with building and equipment
- Placement of columns and beams according to evaporators and conveyors.

As a result of the research performed by DMRI over the years, we possess unique knowledge about the thermal processes of meat, fat, rind, and bone. This knowledge is compiled in our proprietary software, which enables us to simulate carcass chilling processes and accurately predict the resulting chill loss. This software is the backbone in our work when we design a carcass chilling process, adapted to your specific needs.

Basis for the design is the slaughter capacity and characteristics of the carcasses; hot carcass weight, lean meat percentage, and back fat thickness. The process is then optimized to optimally fit your market demands.

## STRICT INTERFACE & COORDINATION BETWEEN



# Typical Methodology & Work Plan in Building Projects

- 1** **Concept Development Plan**
- 2** **Master Plan**
- 3** **Concept Design**
- 4** **Tender Design & Document**
- 5** **Procurement**
- 6** **Construction**
- 7** **Start-up & Commissioning**

Based on your products and markets, we take a holistic approach to avoid counterproductive sub-optimization.

## Stage 1: Concept Development

This phase includes estimated CAPEX and an analysis of the impact on OPEX, ensuring the project's profitability from the outset.

## Stage 2: Master Plan

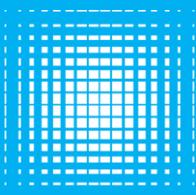
We complete the full project description, including detailed layouts and planning documentation.

## Stage 3: Concept Design

This stage provides all the necessary information to obtain comparable bids from qualified suppliers.

If desired, we can support the project through every phase, including start-up and commissioning.

When we are involved throughout the entire project and it is executed according to our specifications, we can even offer a **Chill Loss Guarantee**.



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