

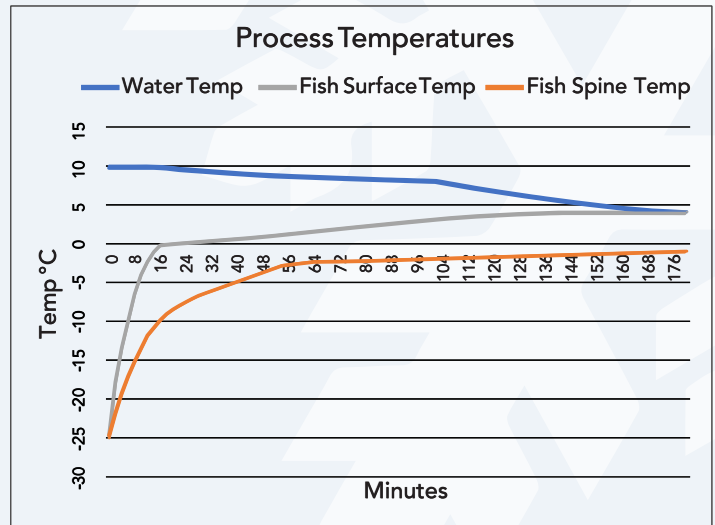
## Morris Thawing Systems (MTS)

- **Continuous Process**
- **User Defined Recipes**
- **Low Temperature Thawing**
- **Minimal Drip Loss**
- **Provides optimal temperature for processing**
- **Improves Yield**
- **Improves Shelf Life**
- **Reduces labor**
- **Saves water & energy**

## **Morris Thermal Immersion Systems for thawing and chilling seafood.**

The Morris Thawing System (MTS) provides quick and controlled thawing by using water temperature zones to optimize the warming process. Utilizing temperature zones ensures a low surface temperature when the fish exits the system, and equalizes internal temperature. Air and water agitation maximize heat transfer by separating fish and removing thermal boundary layers.

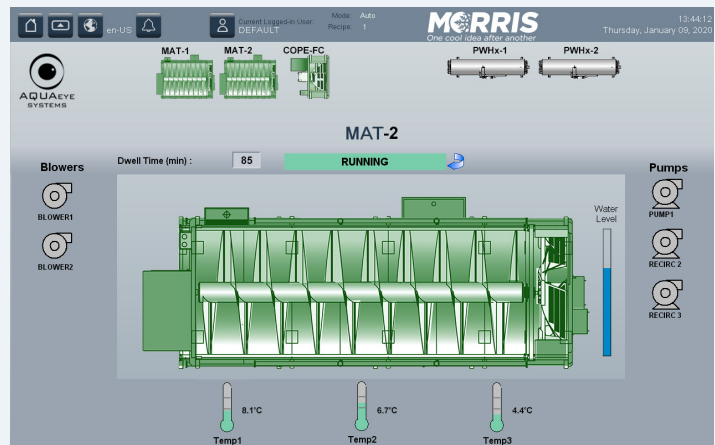
These techniques reduce drip losses and minimize bacterial growth on the fish surface. Low temperature thawing is also key to minimizing histamine levels in tuna and other pelagic fish. Fish exit the MTS at -1°C, the industry standard for producing the highest possible yield and quality.



## Controls



The AQUAeye control system provides user-defined "Recipe" control of each process. Temperature and dwell times are set based on the species, weight and throughput. This improves consistency and ensures the quality of the fish regardless of the operator. Touchscreen controls on the plant floor or remote access via VPN allows both operators and management to track process flow and review history of operations.



## Temperature Management

Process water is recirculated through heat exchangers and the water flow rate returned to specific zones along the length of the system provide precise temperature control throughout the process to meet desired product outcomes.

Each plant is evaluated to determine the best type of heat exchangers to optimize control and lowest operating costs. MTS systems operate with Morris tube-in-tube and shell and tube heat exchangers for efficient and sanitary water temperature control that can incorporate seasonal temperature changes, waste heat recovery from standing operations, steam or boilers. All heat exchangers are fully enclosed, insulated and designed for simple CIP (clean-in-place) capability for remote cleaning.



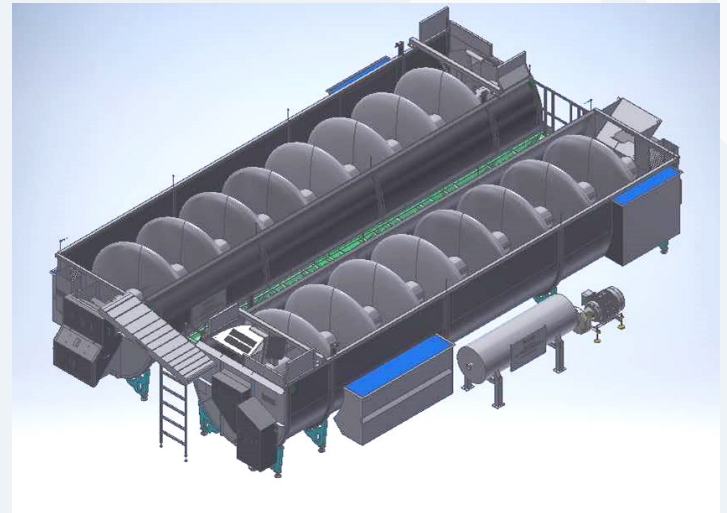
Tube-in-tube heat exchanger

## ROI

MTS systems provide consistent product temperature which has been proven to lessen drip losses and to increase processing yields from 1 to 5% when compared to inconsistently thawed fish. Consistent temperatures decrease product downgrades due to quality concerns, extend shelf life and prolong the life of equipment. A 1% increase in yield can easily provide the return on investment in less than a year for a high production facility.

## Sustainability

MTS solutions reduce water and energy use by recirculating water through the heat exchanger and thawer. Fresh water is constantly inputted into the system at rates of 0.25kg to 1.5kg per kg of fish depending upon the species of fish and what pre-processing has been done prior to entering the thawer.



Model	Stages	Installed Dimensions (m)	Capacity (kg)
MTS-8WHSS-34	1	4.0 x 11.7 x 2.8	10,045
MTS-8WHSS-34-2	2	7.1 x 11.7 x 2.8	20,090

- Dimensions include catwalk

Maximum loading is 975 kg/m.

The MTS-8WSS-34-2 provides up to 3.1 hours of dwell time for line speeds of 6,500 kg/hr.

Thawing times range from 45 minutes to up to 4 hours depending on product presentation (single or ice block), weight, line speed and desired temperature.

**Morris & Associates, Inc.**  
803 Morris Drive | Garner, NC 27529  
Phone: 1.919.582.9200  
[www.morris-associates.com](http://www.morris-associates.com)