Effective & Efficient Cooling of Mechanically Separated Meat (MSM)

Carlos Cobian, M.Sc., MBA, P.Eng.
Director of Global Sales

Reading Time: 3-4 minutes

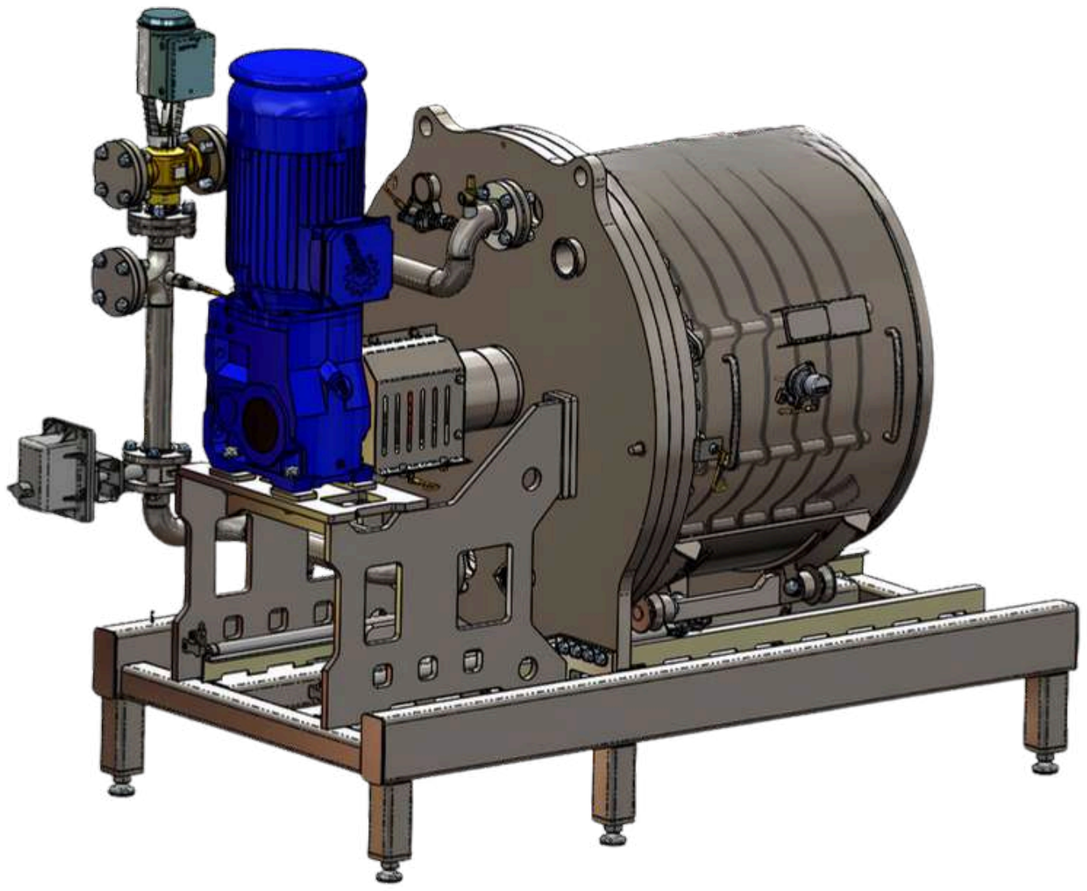
OVERVIEW

Cooling mechanically separated meat (MSM), also known as chicken paste or deboned meat, is a demanding process in food manufacturing. Traditional systems typically rely on rotary scraped surface heat exchangers (SSHEs), using 3–4 barrels and consuming approximately 80 horsepower (20 HP per barrel). These systems often require 30–40 tons of ammonia-based refrigeration at 0°F (-18°C) to cool up to 22,000 pounds (10,000 kg) of product from 50°F (10°C) to 36°F (2.2°C). This approach presents significant operational and safety challenges.

CHALLENGES WITH TRADITIONAL SYSTEMS	
High Energy Consumption	3 to 4 barrels require around 80 HP.
High Consumption of Spare Parts	Especially mechanical seals and scraping blades.
Space Requirements	Multiple barrels take up valuable floor space in the plant.
Back Pressure	High resistance against the feeding pump due to barrel configurations and the high viscosity of MSM.
Product Loss	Product left behind in each unit adds up across several barrels.
Extended Cleaning Time	Cleaning (3–4 units) is time-intensive and laborious.
Refrigerant Risk	Use of ammonia introduces hazards due to potential leaks.
Inspection Time	Inspecting 3–4 barrels after CIP is time-consuming compared to just one unit.
Health Risk	Potential migration of Chrome – Nickel plated material from the barrel to the product.

ICEGEN ENHANCED SOLUTION

ICEGEN introduces an advanced scraped surface plate heat exchanger (SSPHE) that addresses these issues with a compact, single-unit design. ICEGEN has combined the efficiency of a traditional Plate Heat Exchanger (PHE) with the robustness of a Scraped Surface Heat Exchanger (SSHE), achieving an enhanced technology with significant benefits for the end user. In the case of mechanically separated meat cooling, ICEGEN brings meaningful safety and operational improvements to food processing plants.



PROCESS FLOW

1. Chicken Parts Dumper
2. Mechanically Separated Meat Machine
3. Receiving Hopper
4. Positive Displacement Pump
5. **ICEGEN (5SPHE)** Cooling from 50°F (10°C) to 32°F (0°C)
6. Filling Station

Glycol or Ammonia Chiller @0°F (-18°C)

Coolant Loop



KEY ADVANTAGES OF ICEGEN TECHNOLOGY

Single-Unit Efficiency
- Replaces 3–4 traditional barrels with ONE ICEGEN unit.
- Reduces footprint and simplifies system layout.

Lower Back Pressure
- The system discharges into an open container, minimizing pressure against the feeding pump reducing energy.

Lower Consumption of Spare Parts
- Low RPM minimizes wear and tear on the equipment, resulting in significantly lower spare parts consumption.

Improved Product Recovery
- Minimal product loss due to compact design and low internal volume.

Energy Savings
- Operates with 20–40 HP max, cutting energy consumption by up to 50% due to lower RPM.

Superior Cooling Performance
- Capable of reducing MSGM temperature not only to 36°F (2.2°C), but further down to 32°F (0°C). This extra 4°F makes a different that the protein processors can appreciate.

Simplified Cleaning
- Only one unit to clean, reducing downtime and labor requirements.

Safe Refrigeration
- While compatible with ammonia, ICEGEN is designed to work effectively with glycol at 0°F (-18°C), reducing risk and simplifying regulatory compliance.

Modular Performance
- Additional plates can be supplied to achieve lower temperatures within the same footprint.

SUMMARY

For processors of mechanically separated meat (MSM), ICEGEN offers a transformational solution. The ability to cool MSM to lower, pumpable temperatures is highly **effective** in ensuring product quality and process flow. Achieving these results with significantly lower energy consumption and reduced CIP (Cleaning-in-Place) requirements makes the system remarkably **efficient**. Most importantly, ICEGEN achieves these benchmarks using glycol, providing a safer and more sustainable alternative to ammonia-based systems. This technology is the ideal choice for facilities looking to maximize operational output while improving plant safety.

Contact ICEGEN or your local agent to learn how we can help optimize your MSM processing line

IceGen Corp. 145 Shields Court Toronto, Ontario L3R 9T5 Canada 1-855-947-1100 info@icegen.com