Cut defrosting time from days to hours...or even minutes!

GEA ColdSteam M and GEA ColdSteam T

engineering for a better world

GEA Food Solutions

GEA ColdSteam M and GEA ColdSteam T

Historically, the meat processing industry has used fresh meat as raw material. In recent years, frozen meat has become increasingly important as it is usually cheaper and more widely available than fresh meat thanks to being sourced on the global market. In addition, the demand for fresh meat often exceeds market availability or growth plans. This makes using frozen instead of fresh meat increasingly attratcive for meat processors. However, using frozen meat rquires an optimized defrosting process. GEA provides the solution: defrosting under vacuum.

Vacuum Defrosting, rapid and efficient

GEA applies defrosting under vacuum in both tumblers and mixers. Steam is injected into a vacuumized chamber containing blocks or pre-ground frozen meat. Due to the vacuum, the temperature of the steam is only slightly higher than room temperature, which means the meat is not scalded, damaged or altered, and its color, binding properties and structure remain perfectly intact. This means a meat processor can respond quickly to orders, as well as defrost meat 'on-demand'.

Fast defrosting under vacuum increases operational flexibility as it reduces lead-time in the production process. Compared to traditional defrosting techniques such as tempering chambers or microwave systems, vacuum defrosting delivers consistent results without incomplete defrosting or hot spots. In other words, it enables meat processors to satisfy the increasingly higher demands of their customers.

The general benefits of vacuum defrosting

- Significant reduction of defrosting time
- Increased yield, no weight loss through purge (drip loss)
- Low cost of ownership: Low operating costs, simplified logistics, energy saving
- Increased operational flexibility, faster reaction to customer demands
- Greater purchasing freedom on the global market for frozen meat
- High food safety: Fast process in a controlled environment
- Hygienic design

GEA offers two ColdSteam defrosting solutions

GEA ColdSteam M

The GEA ColdSteam M is based on the GEA UniMix V side-by-side mixer. It defrosts pre-ground or crushed frozen meat for further processing in around 10 minutes.

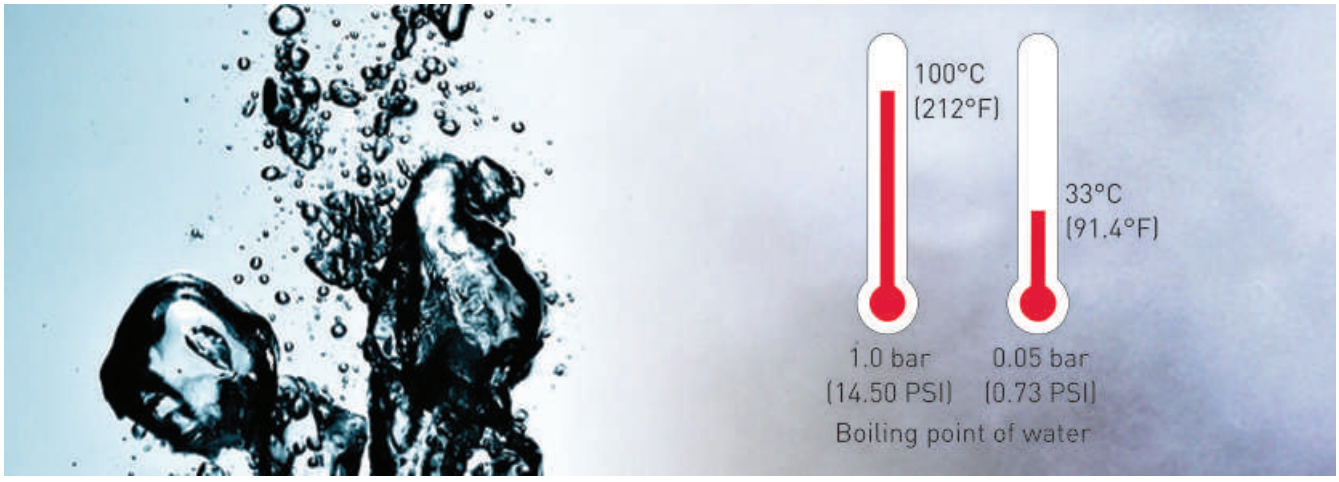
GEA ColdSteam T

The GEA ColdSteam T is based on the GEA ScanMidi tumbler. It defrosts whole muscle and bone-in products in 6 to 8 hours, depending on the type of products.

Both machines can also be applied for regular mixing or tumbling and massaging, and are not limited to defrosting. Please note that there are specific requirements for the steam system needed in vacuum defrosting.

Defrosting with steam under vacuum

At normal atmospheric pressure (1.0 bar), water boils at 100°C (212°F). In a vacuum, it boils at a lower temperature. In a 95% vacuum (0.05 bar), for example, the boiling point of water drops to 33°C (91.4°F). The resulting steam is also at this temperature, so does not scald or damage the meat, nor cause denaturation of proteins. The steam condenses on the cold meat, and efficiently transfers its thermal energy, significantly speeding up the defrosting.



GEA ColdSteam M defrosting in a mixer

Frozen pork flank in fist-sized chunks before being fed into the GEA ColdSteam M.

Defrosted lean pork flank after being steamed in a vacuum. Condensate (8%) is fully absorbed by the meat.

The unwanted effect on lean pork flank after being steamed WITHOUT a vacuum.

GEA ColdSteam M - Cut defrosting time from days to minutes

The GEA ColdSteam M spectacularly reduces defrosting time from days to minutes! It is based on a GEA UniMix V side-by-side mixer, which has been enhanced with steam injection, vacuum pump, weighing system, PLC controller and other hardware required for defrosting.

The benefits of GEA ColdSteam M include:

- **Extremely fast defrosting**
  Typically 10 minutes.
- **Substantial reduction in manual handling**
  Frozen meat blocks can be pre-ground directly from the freezer, and then transferred to the GEA ColdSteam M.
- **Increased capacity**
  Faster defrosting results in more production time.
- **Automated process with a high degree of control**
  Temperature of the defrosted material is accurately controlled.
- **Further processed products are ready for forming**
  Normally there is no need for external N_2 or CO_2 cooling after defrosting. The process can be configured so that the defrosted meat retains the right degree of crystallization and appropriate temperature for further processing. This results in large cost savings in infrastructure and consumable coolants.

Frozen blocks of poultry, beef or pork:

- Formed poultry
- Formed beef and pork
- Reformed ham
- Sausage/fine emulsions

Process characteristics:

- Frozen blocks are pre-ground to fist-sized chunks
- Product structure must allow size reduction (pre-ground)
- Recipe must allow between 6 and 8% added water

GEA ColdSteam T defrosting in a tumbler

Frozen blocks in the tumbler.

Defrosted meat with consensate.

After marination.

GEA ColdSteam T - Defrost bone-in and whole muscle products in hours

The GEA ColdSteam T significantly reduces defrosting time to well less than half that of conventional defrosting techniques. It is based on a GEA ScanMidi tumbler, customized for defrosting with a steam expander, extended cooling/heating jacket plus cooling/heating in the carriers, integrated vacuum pump and weighing cells.

The GEA ColdSteam T benefits include:

- **Substantial reduction of defrosting time**
  Approximately 50% of the time for conventional defrosting.
- **No drip loss**
  No weight loss through purge.
- **Substantial reduction of manual handling**
  Frozen blocks of meat can be processed directly out of the freezer.
- **Increased capacity**
  Reduced defrosting time results in more production time.
- **Automated process with a high degree of control**
  Temperature of the defrosted material is accurately controlled.
- **Three processes in one**
  Product can be marinated and massaged as well as defrosted.

Frozen blocks of poultry, beef or pork:

- Whole muscle products
- Bone-in products
- Ham, bacon

Process characteristics:

- Frozen blocks are loaded directly into the tumbler
- Recipe must allow between 3 and 5% added water

Individual Quick Frozen (IQF) for:

- Bone-in products
- Skin-on cuts
- Seafood

Process characteristics:

- IQF products are loaded directly into the tumbler
- Recipe must allow between 3 and 5% added water

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GEA Group is a global mechanical engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX Europe 600 Index.

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