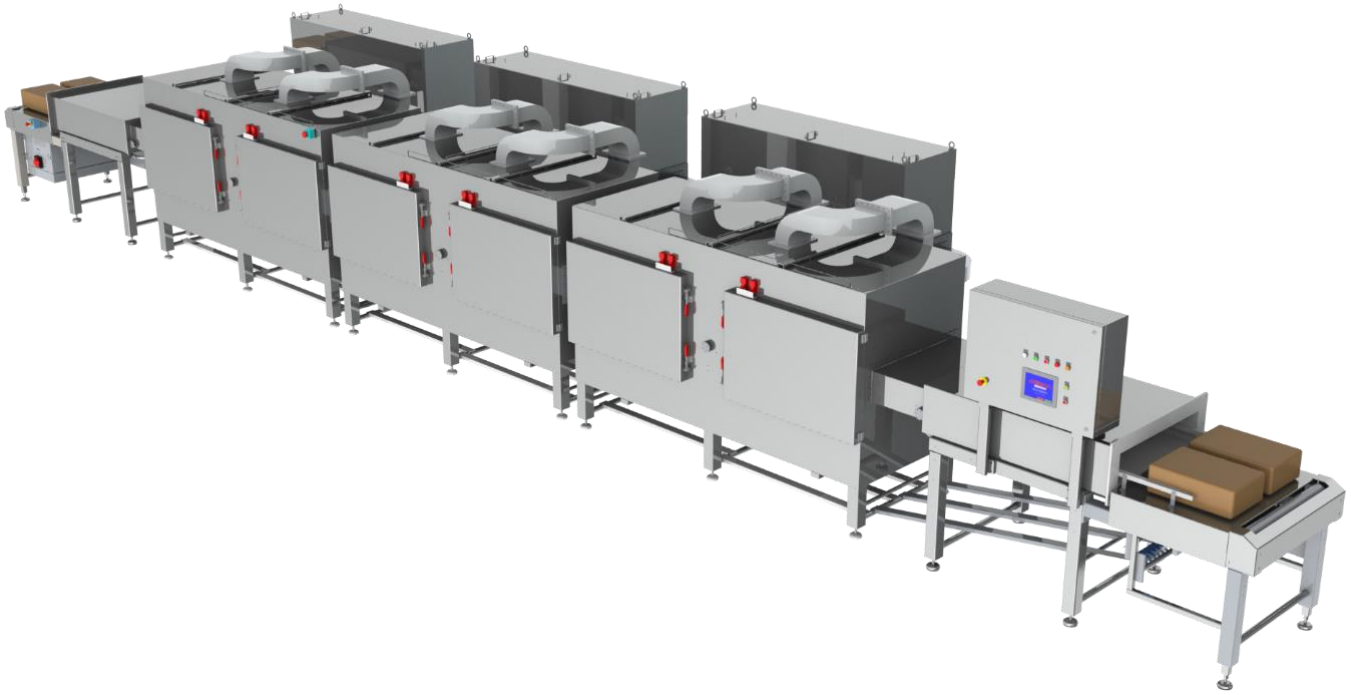


# TMW225

## MICROWAVE TEMPERING TUNNEL

The TMW225 allows deep frozen foods to be tempered or defrosted quickly. It is adapted for products like meat, poultry, fish, fruits, vegetables, cheese, butter, etc...



**The distinctive feature of the TMW 225** is the use of the microwave technology to achieve the best tempering homogeneity while maintaining a good microwave efficiency.

The large size of the cavity, the length under microwaves and the crossed coupling of microwaves above and below the blocks are a few examples of the solutions used to conciliate capacity, efficiency and homogeneity.

Possibility to choose the direction of operation and to install the generator on a platform.

### KEY BENEFITS

- **Profitable:** save money by avoiding drip losses
- **Fast:** very short time of treatment, between 5 to 15 minutes
- **User friendly:** easy loading / unloading, colour touch screen HMI, 12"
- **Homogeneous:** excellent temperature homogeneity thanks to multiple microwave inlets (above and below)
- **Reliable:** no need for regular maintenance, except daily cleaning
- **Hygienic:** no bacteriological growth, complies with all hygiene regulations and standards, keeps the organoleptic qualities
- **Flexible:** can be used for tempering packed (cardboard, plastic film ...) or unpacked food
- **Connected:** USB and ethernet connection for remote control

# TMW225

## MICROWAVE TEMPERING TUNNEL

### TEMPERING CAPACITIES

The TMW225 offers a tempering capacity between 6 t/h and 9 t/h from -18 °C to a final temperature of -4 °C / -2 °C in 95% of the block, which is the optimum temperature for processing: dicing, grinding, cutting, slicing... The capacity is calculated to temper frozen blocks with standard dimensions 600 mm x 400 mm x 200 mm and a weight of about 20 / 25 kg. If fatty products are to be processed, fat ought to be very homogeneously distributed in the block, otherwise the limit temperature for homogeneity is -4 °C.

The tempering capacity is variable and depends on the final required temperature and on the product (meat, fish, vegetables, fruits, butter, etc. Figures below show these variations.

The data in the charts are calculated for the TMW225 operating at 180 kW power, with  $t_{on}/t_{off}^1$  optimum at 95 %, for blocks with regular size and weight 25 kg (600 mm x 400 mm x 200 mm) and for a starting temperature around -20 °C / -18 °C.

The maximum microwave power which can be used in processing is limited by the products and not the tunnel. Recipes power vs. time must be chosen according to the compromise between capacity and homogeneity of heating.

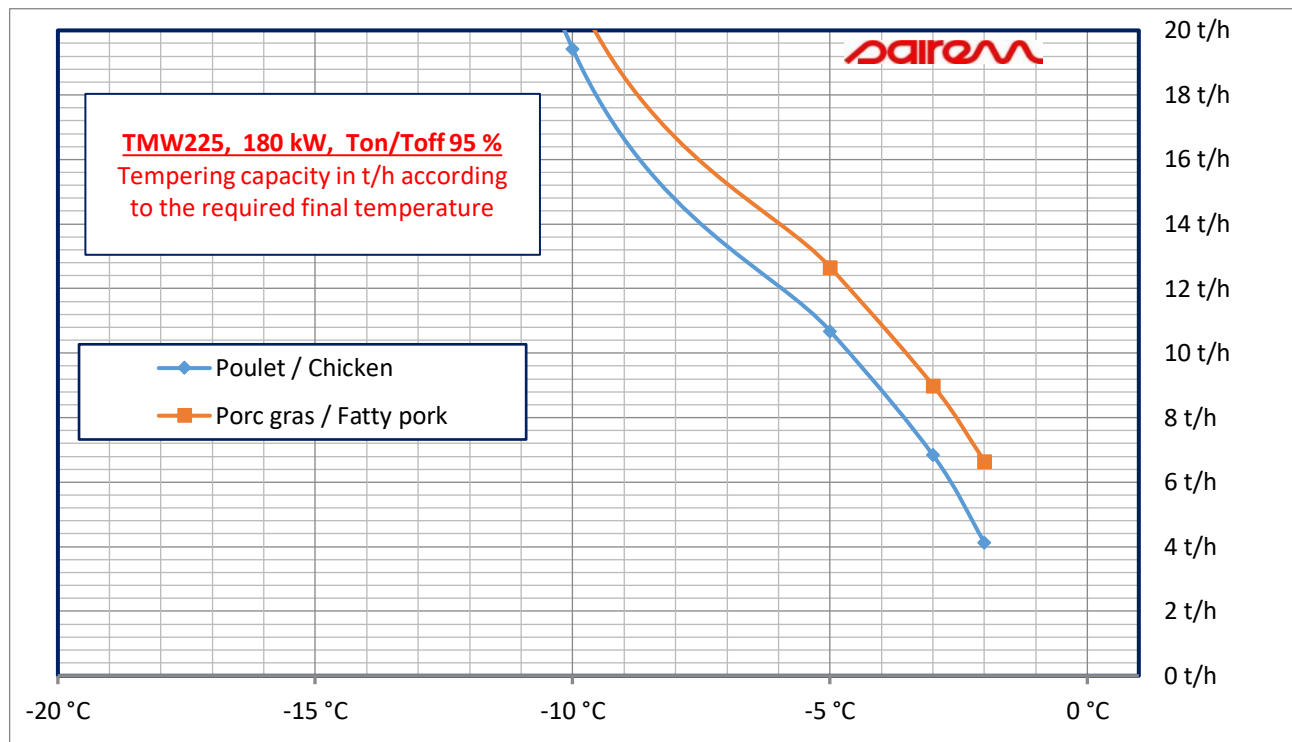


<sup>1</sup> Microwave utilization within 1 hour including loading/unloading. the optimum is 95 %.

# TMW225

## MICROWAVE TEMPERING TUNNEL

### TEMPERING CAPACITY VS. DESIRED FINAL TEMPERATURE



**Example:** Chicken  $\approx 10.8$  t/h from  $-18$  °C to  $-5$  °C or  $\approx 6.8$  t/h from  $-18$  °C to  $-3$  °C.

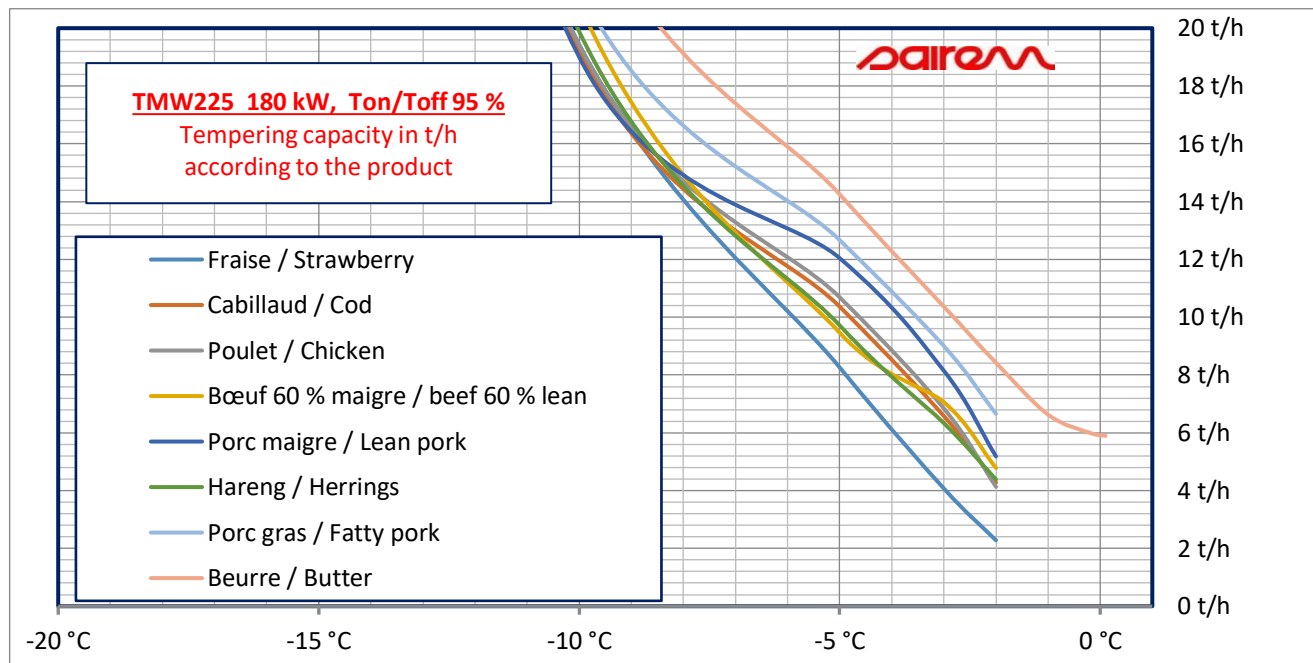
**Example:** Fatty pork  $\approx 12.7$  t/h from  $-18$  °C to  $-5$  °C or  $\approx 9$  t/h from  $-18$  °C to  $-3$  °C.

The starting temperature at  $-20$  °C or  $-18$  °C has almost no effect on the tunnel capacity if temperature is homogeneous in the whole product.

# TMW225

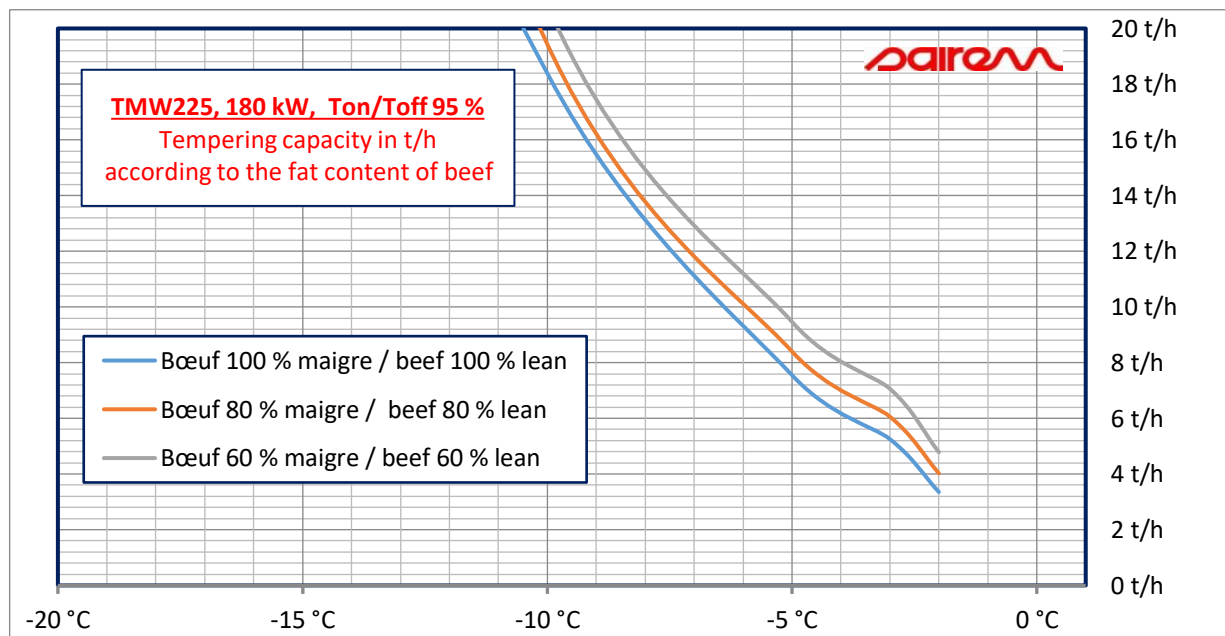
## MICROWAVE TEMPERING TUNNEL

### TEMPERING CAPACITY VS. PRODUCT TYPE



**Examples:** butter (10.2 t/h at -3°C) or beef 60 % lean (7 t/h at -3°C) for the same final temperature.

### TEMPERING CAPACITY VS. FAT CONTENT



**Example:** capacity  $\approx$  7 t/h for beef 60 % lean, or  $\approx$  5.2 t/h for beef 100 % lean from -18 °C to -3 °C



# TMW225

## MICROWAVE TEMPERING TUNNEL

### EXAMPLES OF BLOCKS PROCESSED WITH THE TMW225



#### Beef

25% fat, 25 kg  
8000 kg/h from -18 °C to -4 °C/-2 °C  
Block size: 600 x 400 x 260 mm



#### Pork shoulder

10 to 15 % fat, 25 kg  
6000 kg/h from -18 °C to -3 °C / -1 °C  
Block size: 600 x 400 x 260 mm



#### Chicken breasts

15 kg  
5000 kg/h from -18 °C to -4 °C/-2 °C  
Block size: 600 x 400 x 260 mm



#### Strawberries

100 kg bags (10 x 10 kg)  
4000 kg/h from -18 °C to -3 °C/-1 °C



#### Rhubarb

100 kg bags (10 x 10 kg)  
4000 kg/h from -18 °C to -3 °C/-1 °C



#### Broccolis

100 kg bags (10 x 10 kg)  
5200 kg/h from -18 °C to -3 °C/-1 °C

Capacity is highly variable if final temperature is -7 °C or -3 °C, or if meat is lean beef or fat pork. Such variations are linked to physical laws such as for example, latent heat of fusion. Capacity varies according to the processed product (lean beef, pork...), its fat content and the final required temperature.

All the above charts are calculated for a TMW225 operating under following conditions:

- Power of microwave generator at 180 kW
- $T_{on}/T_{off}$  at 95 %
- Blocks or products with regular mass and shape
- Blocks or products regularly placed on the belt
- Starting temperature between -20 °C and -18 °C homogeneous in all the blocks or products

# TMW225

## MICROWAVE TEMPERING TUNNEL

### KEY SPECIFICATIONS

Reference	TMW225
Construction	<ul style="list-style-type: none"> <li>• <b>Cavity:</b> 304 L stainless steel, chain conveyor belt in polyethylene, microwave door with <math>\frac{1}{4} \lambda</math> choke, microwave inlet above and below, automatic loading and unloading.</li> <li>• <b>Three microwave generators:</b> separate, cabinet is IP55 and equipped with a single 75 kW magnetron, electronic system and boards without any adjustment to make maintenance easier, high reliability.</li> </ul>
Tempering capacity	<ul style="list-style-type: none"> <li>• Depends on final temperature, product, fat content</li> </ul>
Conveyor belt	<ul style="list-style-type: none"> <li>• Flat top Intralox principle, width 900 mm, operating height 1080 mm</li> <li>• Adjustable belt speed. <b>Left to right or right to Left configurations</b></li> </ul>
Max. size of blocks	<ul style="list-style-type: none"> <li>• 600 x 400 x 210 mm, 30 kg maximum per block</li> <li>• Optional maximum height 260 mm</li> </ul>
Microwave frequency	<ul style="list-style-type: none"> <li>• 915 MHz. Other frequencies available according to regulation of each country.</li> </ul>
Microwave power	<ul style="list-style-type: none"> <li>• 225 kW maximum, adjustable from 30 W to 225 kW</li> </ul>
HMI Human Machine Interface	<ul style="list-style-type: none"> <li>• 12" touch screen, multi-lingual, remote control, control of microwave power and belt speed, 50 programmable recipes, tunnel status, faults status, etc... Microwave start, emergency stop, etc.</li> </ul>
Specific safety	<ul style="list-style-type: none"> <li>• Microwave leak detector</li> <li>• Smoke sensor: detects a fire, stops microwaves, inject water via nozzles</li> </ul>
Voltage & consumption	<ul style="list-style-type: none"> <li>• 400 V, 3-phase + earth (no neutral), 50/60 Hz, 303 kVA at full power</li> </ul>
Ramp function	<ul style="list-style-type: none"> <li>• Increase and decrease the power depending on the product's progress in the tunnel.</li> </ul>
Cooling water	<ul style="list-style-type: none"> <li>• <b>Microwave generator:</b> Min. 150 L/min with differential pressure min. 4 bar, inlet water temperature 18 °C to 22 °C, power to dissipate 45 kW; ES 2" gas female</li> <li>• <b>Microwave tunnel:</b> min. 6 L/min, max. pressure 1.5 bar.</li> <li>• <b>Optional:</b> air/water chiller or water/water chiller (precise 50 or 60 Hz)</li> </ul>
Belt washing (option)	<ul style="list-style-type: none"> <li>• Washing/drying system of belts located near the exit of the tunnel with addition of cleaning product (not provided)</li> <li>• 7 water jet nozzles on the top and 7 water jet nozzles on the bottom</li> <li>• 7 drying nozzles on the top and 7 drying nozzles on the bottom</li> <li>• Maximum water temperature 70 °C</li> </ul>
Cleaning	<ul style="list-style-type: none"> <li>• 8 evacuation holes (20 mm) under the tunnel</li> </ul>
EC standards	<ul style="list-style-type: none"> <li>• Directive : <ul style="list-style-type: none"> <li>○ Machinery Directive : 2006/42/EC</li> <li>○ Low Voltage Directive : 2014/35/EU</li> <li>○ Electromagnetic fields : 2013/35/EU</li> </ul> </li> <li>• Standards : <ul style="list-style-type: none"> <li>○ Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics - Limits and methods of measurement : EN 55011 (June 2016)</li> <li>○ Safety in electroheat installations - Part 6: Specifications for safety in industrial microwave heating equipment: IEC 60519-6:2011</li> </ul> </li> <li>• Safety of machinery - Electrical equipment of machines - Part 1: General requirements : IEC 60204-1</li> </ul>
Dimensions (W x H x D)	<ul style="list-style-type: none"> <li>• 15319 x 2225 x 3216 mm</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• 10 200 kg</li> </ul>



# TMW225

## MICROWAVE TEMPERING TUNNEL

### MAIN DIMENSIONS

