

# TMW75

## MICROWAVE TEMPERING TUNNEL

The TMW75 allows deep frozen foods to be tempered or defrosted (butter) quickly. It is adapted for products like meat, poultry, fish, fruits, vegetables, cheese, butter, etc...



The distinctive feature of the TMW 75 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. Exists in both directions, right to left or left to right and possibility of setting up 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

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### TEMPERING CAPACITIES

The TMW75 offers a tempering capacity between 2 t/h and 3 t/h from - 20 °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 TMW 75 operating at 60 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.

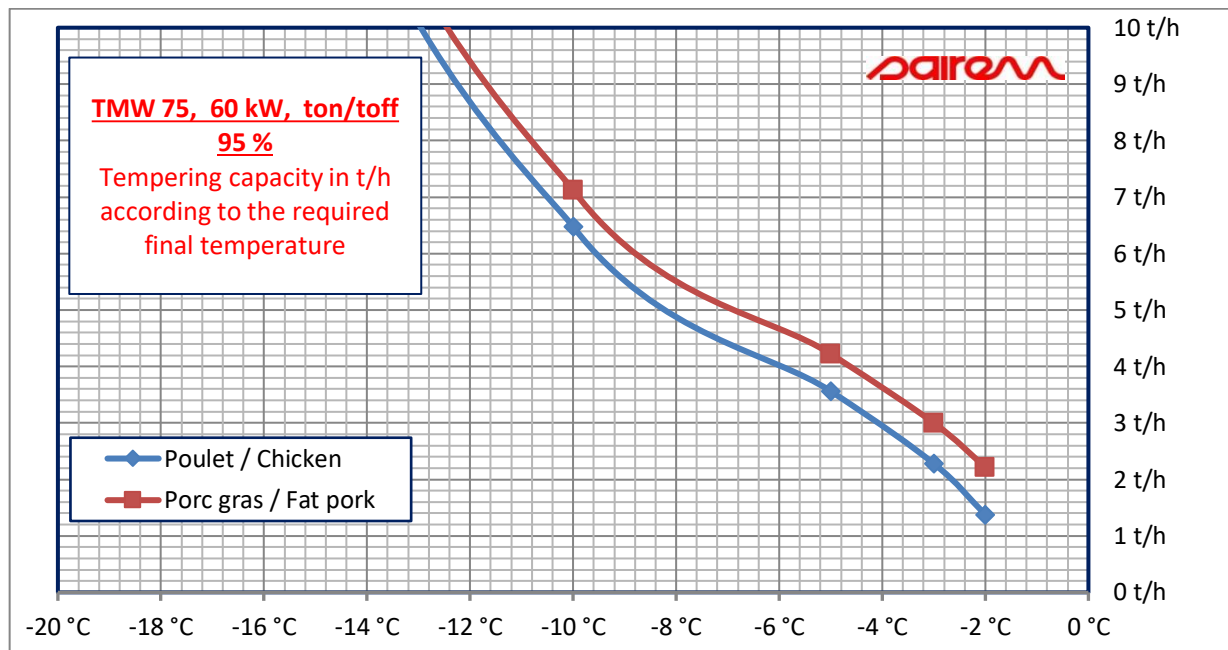
The maximum microwave power which can be used in processing is limited by the products and not the tunnel. Recipes power vs. time must be chosen according to the compromise between capacity and homogeneity of heating.

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

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### TEMPERING CAPACITY VS. DESIRED FINAL TEMPERATURE

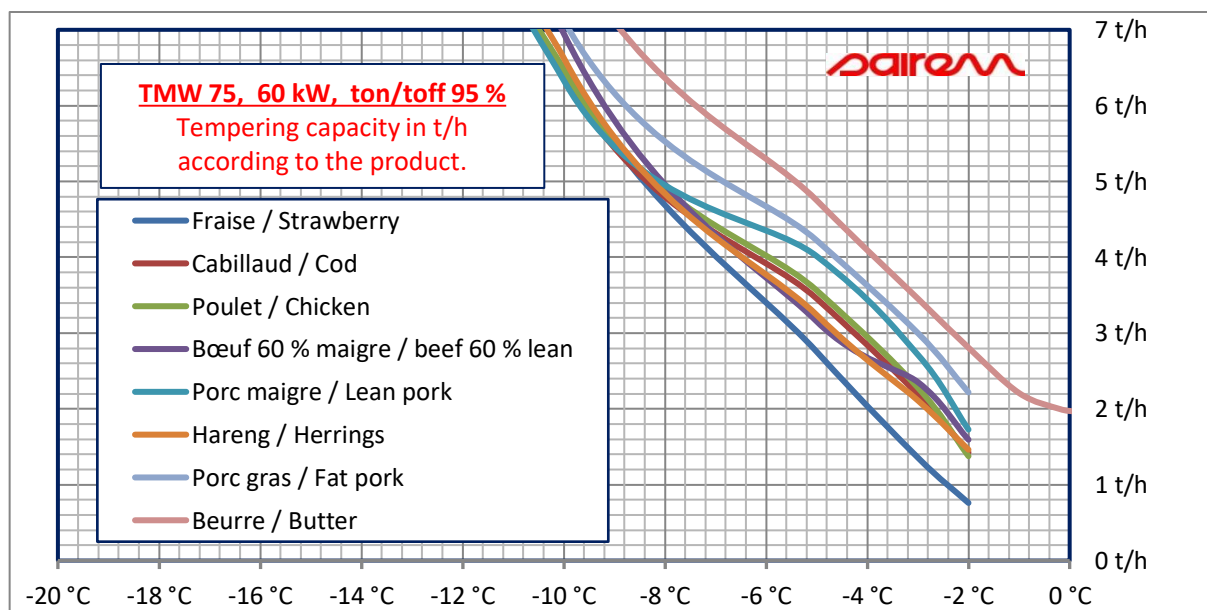


**Example:** Chicken  $\approx$  3.6 t/h from  $-18^{\circ}\text{C}$  to  $-5^{\circ}\text{C}$  or  $\approx$  2.3 t/h from  $-18^{\circ}\text{C}$  to  $-3^{\circ}\text{C}$ .

**Example:** Fatty pork  $\approx$  4.2 t/h from  $-18^{\circ}\text{C}$  to  $-5^{\circ}\text{C}$  or  $\approx$  3.0 t/h from  $-18^{\circ}\text{C}$  to  $-3^{\circ}\text{C}$ .

It has to be noted that a starting temperature at  $-20^{\circ}\text{C}$  or  $-18^{\circ}\text{C}$  has almost no effect on the tunnel capacity if temperature is homogeneous in the whole product.

### TEMPERING CAPACITY VS. PRODUCT TYPE



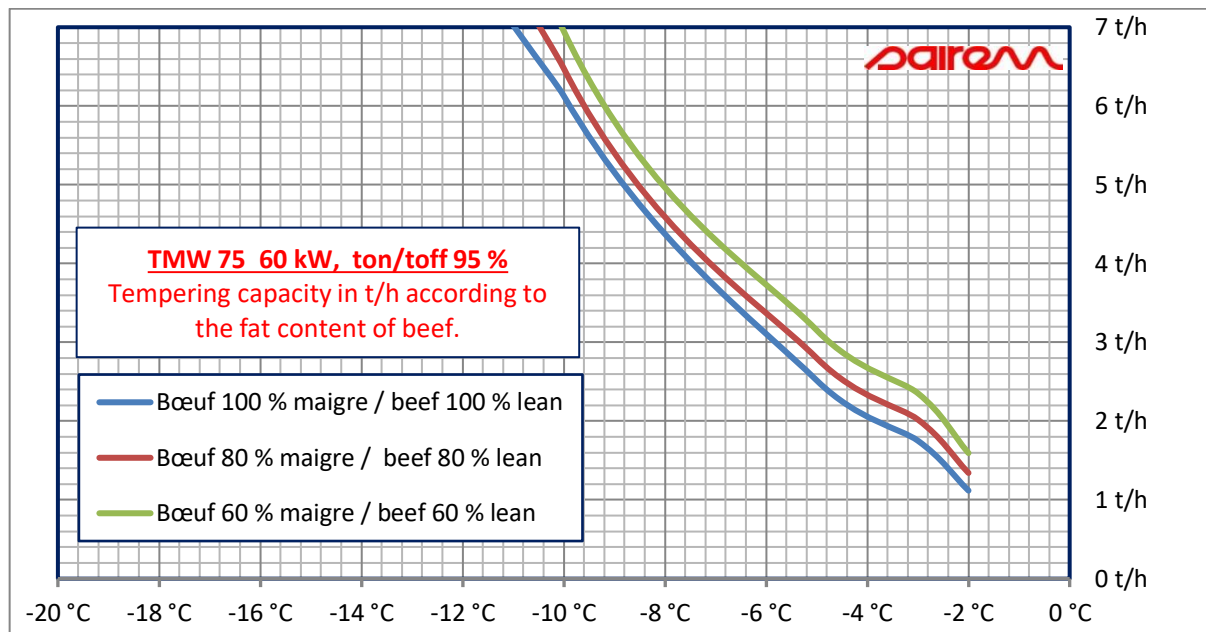
**Examples:** butter (3.5 t/h at  $-3^{\circ}\text{C}$ ) or beef 60 % lean (2.3 t/h at  $-3^{\circ}\text{C}$ ) for the same final temperature.



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### TEMPERING CAPACITY VS. FAT CONTENT



**Example:** capacity  $\approx$  2.4 t/h for beef 60 % lean, or  $\approx$  1.8 t/h for beef 100 % lean from -18 °C to -3 °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 TMW75 operating under following conditions:

- Power of microwave generator at 60 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

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### EXAMPLES OF BLOCKS PROCESSED WITH THE TMW75



#### Beef

25% fat, 250 kg (10 x 25 kg)  
2100 kg/h from -18 °C to -4°C/-2°C  
Block size: 600 x 400 x 260 mm



#### Pork shoulder

10 to 15 % fat, 250 kg (10 x 25 kg)  
2000 kg/h from -18 °C to -3°C / -1°C  
Block size: 600 x 400 x 260 mm



#### Chicken breasts

150 kg (10 x 15kg)  
1500 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)  
1000 kg/h from -18 °C to -3 °C/-1 °C



#### Rhubarb

100 kg bags (10 x 10 kg)  
1000 kg/h from -18 °C to -3 °C/-1 °C



#### Broccolis

200 kg bags (10 x 20 kg)  
1700 kg/h from - 18 °C to - 3 °C/- 1 °C

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### KEY SPECIFICATIONS

| Reference                      | TMW75                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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>Microwave generator:</b> 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, see above charts.</li> </ul>                                                                                                                                                                                                                                                                                                                                        |
| Conveyor belt                  | <ul style="list-style-type: none"> <li>• Flat top Intralox principle, width 900 mm for 2 blocks side by side, operating height 1080 mm</li> <li>• Adjustable belt speed. Left to right or right to Left configuration (at order)</li> </ul>                                                                                                                                                                                                                      |
| Max. size of blocks            | <ul style="list-style-type: none"> <li>• 600 x 400 x 200 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>• 75 kW maximum, adjustable from 10 kW to 75 kW</li> </ul>                                                                                                                                                                                                                                                                                                                                                                |
| HMI (Human Machine interface)  | <ul style="list-style-type: none"> <li>• 12" touch screen, multi-lingual, 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, 50 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>• MW generator: min. 45 L/min with differential pressure min. 3.5 bar, <b>inlet water temperature 18 °C - 22 °C</b>, power to dissipate 25 kW; inlet 3/4" female, outlet 1" gas female.</li> <li>• MW tunnel: min. 5 L/min, max. pressure 1.5 bar, IO 1/2" female.</li> <li>• <b>Optional:</b> air/water chiller</li> </ul>                                                                                               |
| Belt washing / drying (option) | <ul style="list-style-type: none"> <li>• System for belt washing/drying located near the tunnel output with adjunction of cleansing product (not provided)</li> <li>• 7 water jet nozzles from the top and 7 water jet nozzles from the bottom</li> <li>• Maximum water temperature 70 °C</li> <li>• 7 drying jet nozzles from the top and 7 drying jet nozzles from the bottom</li> </ul>                                                                       |
| Tunnel cleaning                | <ul style="list-style-type: none"> <li>• 8 evacuation holes (20 mm <math>\varnothing</math>) under the tunnel</li> </ul>                                                                                                                                                                                                                                                                                                                                         |
| EC standards                   | <ul style="list-style-type: none"> <li>• Directive: 2006/42/EC, 2014/35/EU, 2013/35/EU</li> <li>• Standards: EN 55011, IEC 60519-6:2011, IEC 60204-1</li> </ul>                                                                                                                                                                                                                                                                                                  |
| Dimensions (W x H x D)         | <ul style="list-style-type: none"> <li>• 9043 x 2225x 3016 mm</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                         |
| Weight                         | <ul style="list-style-type: none"> <li>• 3500 kg</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                      |

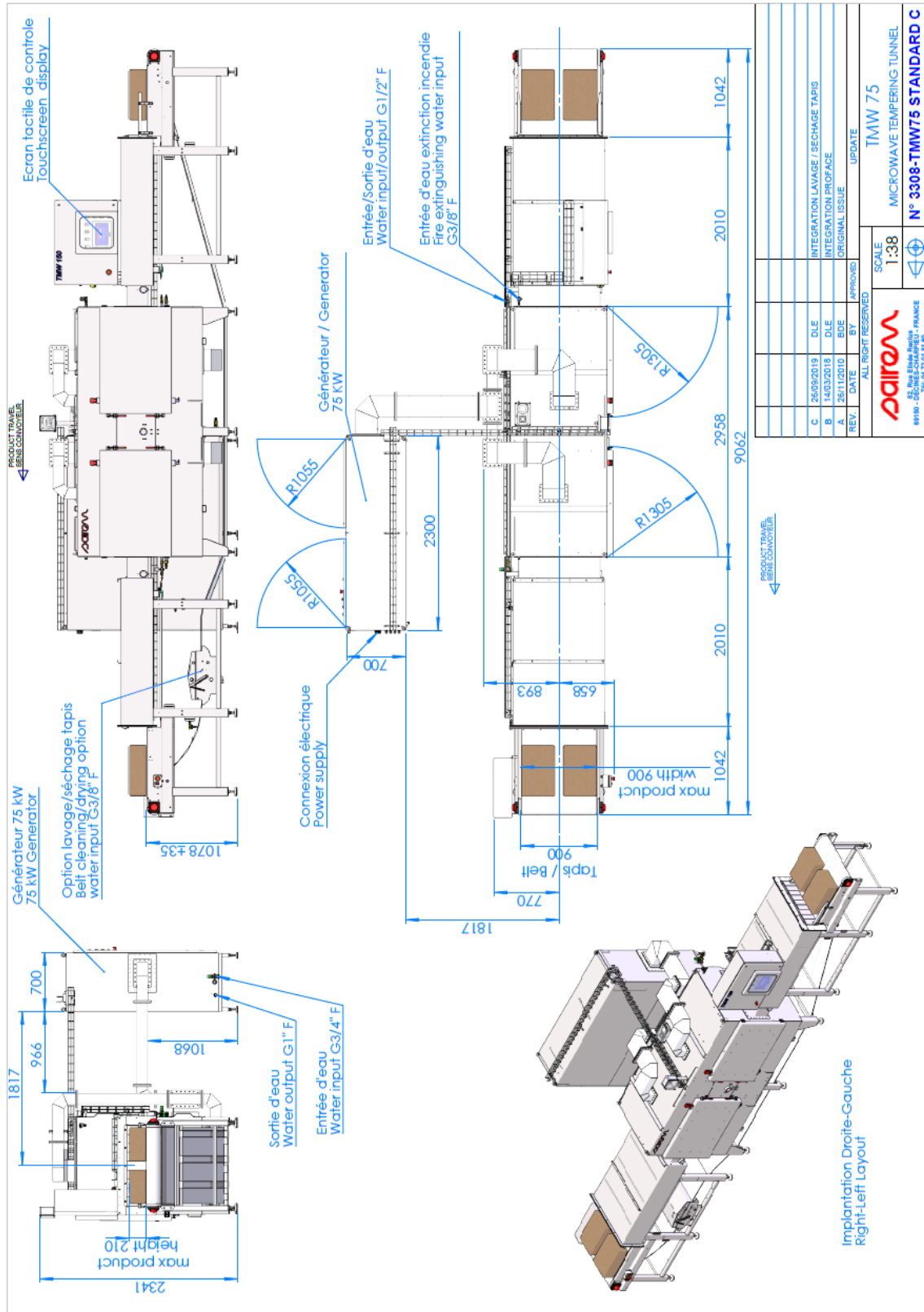


# TMW75

## MICROWAVE TEMPERING TUNNEL

### MAIN DIMENSIONS

#### RIGHT – LEFT LAYOUT



# TMW75

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### LEFT – RIGHT LAYOUT

