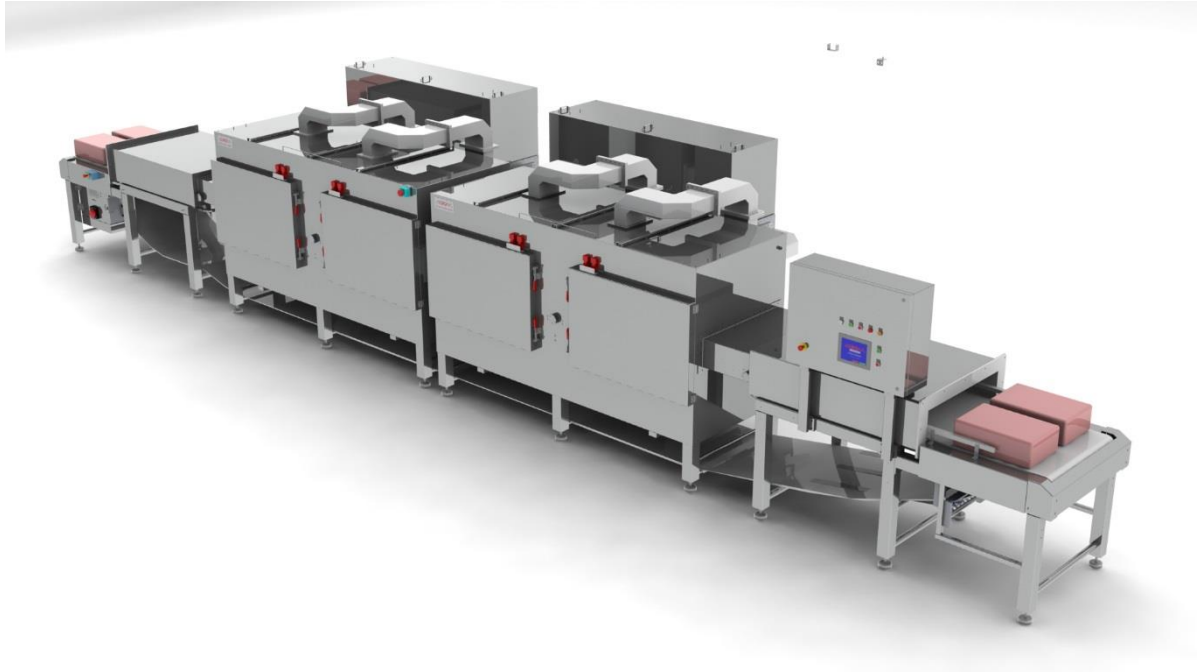


TMW150

MICROWAVE TEMPERING TUNNEL

The TMW150 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 150 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

TMW150

MICROWAVE TEMPERING TUNNEL

TEMPERING CAPACITIES

The TMW150 offers a tempering capacity between 4 t/h and 6 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 TMW150 operating at 120 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.



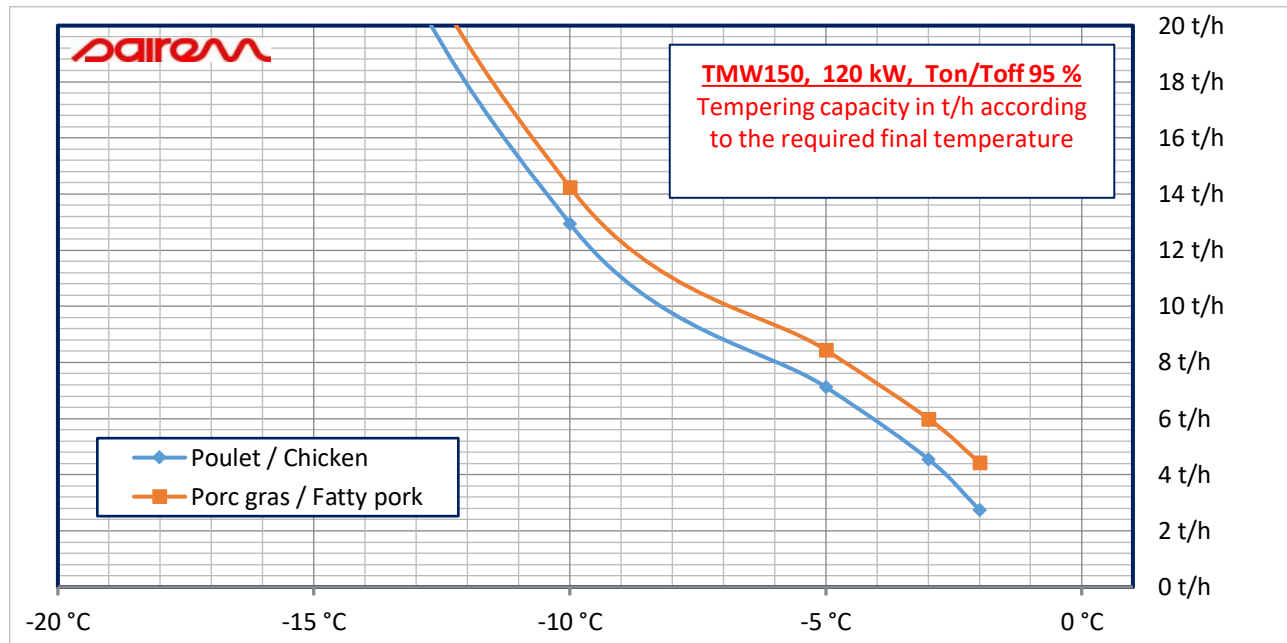
The maximum microwave power which can be used in processing is limited by the products and not the tunnel. Recipes power vs. time must be chosen according to the compromise between capacity and homogeneity of heating.

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

TMW150

MICROWAVE TEMPERING TUNNEL

TEMPERING CAPACITY VS. DESIRED FINAL TEMPERATURE

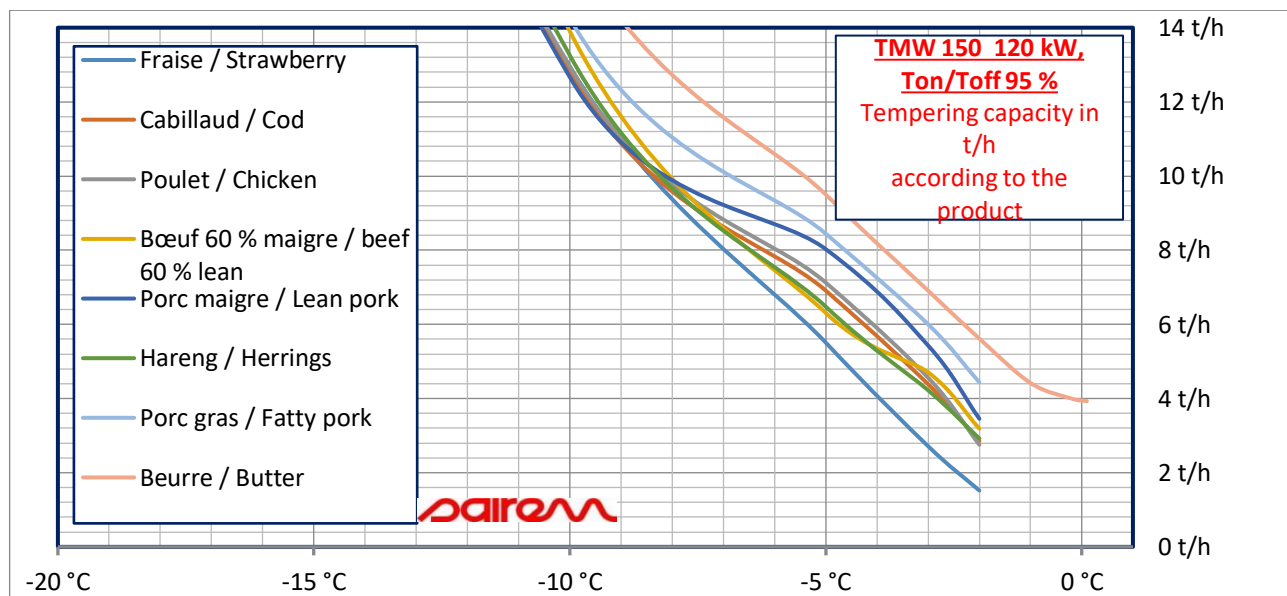


Example: Chicken ≈ 7.2 t/h from -18 °C to -5 °C or ≈ 4.6 t/h from -18 °C to -3 °C.

Example: Fatty pork ≈ 8.4 t/h from -18 °C to -5 °C or ≈ 6 t/h from -18 °C to -3 °C.

It has to be noted that a starting temperature at -20 °C or -18 °C has almost no effect on the tunnel capacity if temperature is homogeneous in the whole product.

TEMPERING CAPACITY VS. PRODUCT TYPE



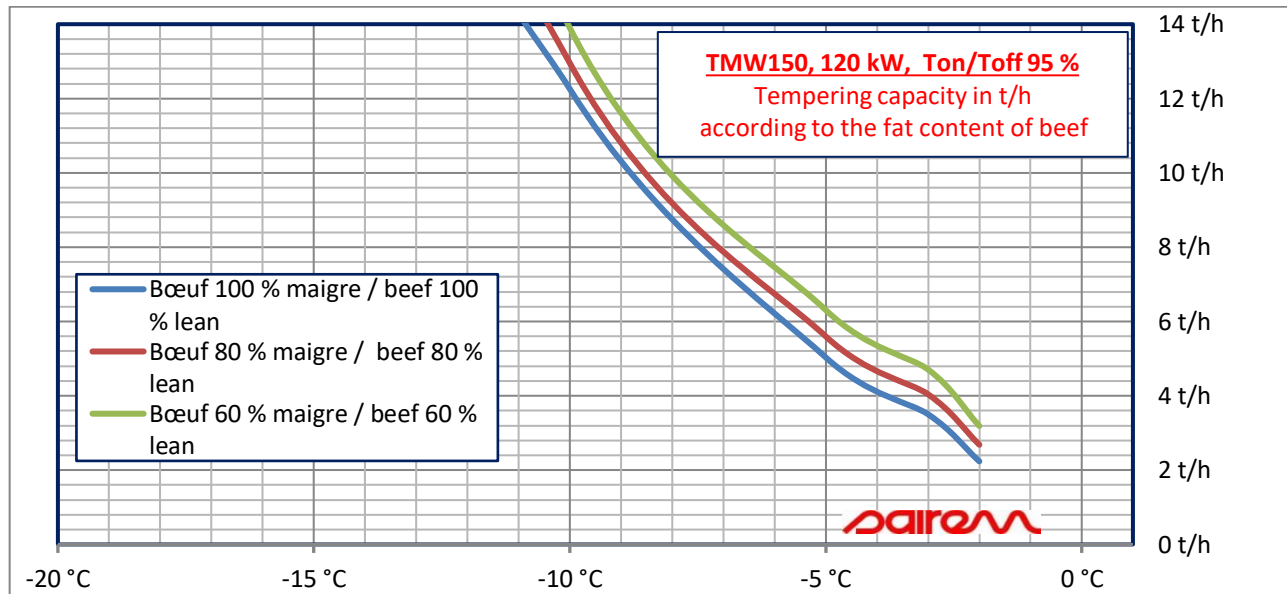
Examples: butter (7.2 t/h at -3 °C) or beef 60 % lean (4.6 t/h at -3 °C) for the same final temperature.

Tempering/thawing capacity is highly variable according to the product.

TMW150

MICROWAVE TEMPERING TUNNEL

TEMPERING CAPACITY VS. FAT CONTENT



Example: capacity $\approx$ 4.8 t/h for beef 60 % lean, or $\approx$ 3.4 t/h for beef 100 % lean from -18 °C to -3 °C

TMW150

MICROWAVE TEMPERING TUNNEL

EXAMPLES OF BLOCKS PROCESSED WITH THE TMW150



Beef
25% fat, 25 kg
5000 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
4000 kg/h from -18 °C to -3 °C / -1 °C
Block size: 600 x 400 x 260 mm



Chicken breasts
15 kg
3000 g/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)
2500 kg/h from -18 °C to -3 °C/-1 °C



Rhubarb
100 kg bags (10 x 10 kg)
2500 kg/h from -18 °C to -3 °C/-1 °C



Broccolis
100 kg bags (10 x 10 kg)
3400 kg/h from -18 °C to -3 °C/-1 °C

CONCLUSION

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 TMW150 operating under following conditions:

- Power of microwave generator at 120 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

TMW150

MICROWAVE TEMPERING TUNNEL

KEY SPECIFICATIONS

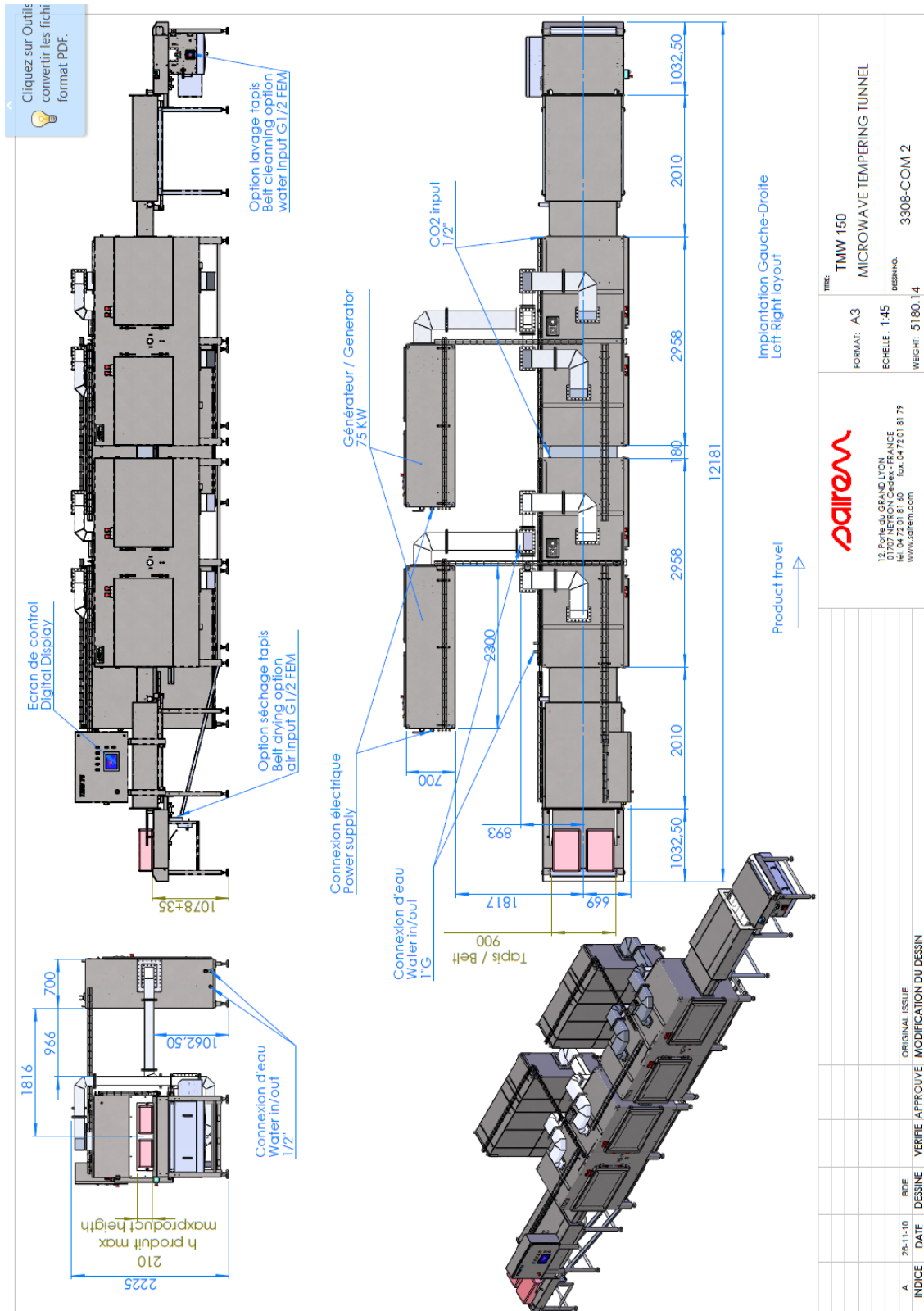
Reference	TMW150	TMW150 Butter
Construction	• Cavity: 304 L stainless steel, chain conveyor belt in polyethylene, microwave door with $\frac{1}{4} \lambda$ choke, microwave inlet above and below, automatic loading and unloading. • Two microwave generators: cabinet is IP55 and equipped with a single 75 kW magnetron, electronic system and boards without any adjustment to make maintenance easier, high reliability.	
Tempering capacity	• Depends on final temperature, product, fat content	
Conveyor belt	• Flat top Intralox principle, width 900 mm, operating height 1080 mm • Adjustable belt speed. Left to right or right to Left configurations	
Max. size of blocks	• 600 x 400 x 210 mm • 30 kg maximum per block • Optional maximum height 260 mm	• 400 x 300 x 250 mm • 20 to 25 kg maximum per standard block • Maximum height 300 mm
Length of the inlet and outlet choke	• 2 m	• 4 m
Microwave frequency	• 915 MHz. Other frequencies available according to regulation of each country	
Microwave power	• 150 kW maximum, adjustable from 20 kW to 150 kW	
HMI Human Machine Interface	• 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.	
Specific safety	• Microwave leak detector • Smoke sensor: detects a fire, stops microwaves, inject water via nozzles	
Voltage & consumption	• 400 V, 3-phase + earth (no neutral), 50/60 Hz, 203 kVA at full power	
Ramp function	• Increase and decrease the power depending on the product's progress in the tunnel.	
Cooling water	• Microwave generators: Min. 100 L/min with differential pressure min. 3.5 bar, inlet water temperature 18 °C to 22 °C, power to dissipate 30 kW; ES 1.5" gas female • Microwave tunnel : min. 6 L/min, max. pressure 1.5 bar • Optional: air/water chiller or water/water chiller	
Belt washing (option)	• Washing/drying system of belts located near the exit of the tunnel with addition of cleaning product (not provided) • 7 water jet nozzles on the top and 7 water jet nozzles on the bottom • 7 drying nozzles on the top and 7 drying nozzles on the bottom • Maximum water temperature 70 °C	
Cleaning	• 8 evacuation holes (20 mm) under the tunnel	
EC standards	• Directive: 2006/42/EC, 2014/35/EU, 2013/35/EU • Standards: EN 55011, IEC 60519-6:2011, IEC 60204-1	
Dimensions (W x H x D)	• 12181 x 2225 x 3186 mm	• 15111 x 2341 x 3446 mm
Weight	• 6 000 kg	• 6100 kg

TMW150

MICROWAVE TEMPERING TUNNEL

MAIN DIMENSIONS

TMW150



TMW150

MICROWAVE TEMPERING TUNNEL

TMW150 BUTTER

