



Tetra Pak® Extrusion Tunnel M3

Tray-tunnel system for ice cream applications



Application

The Tetra Pak® Extrusion Tunnel M3 handles the extrusion, shaping, filling, decorating and hardening of ice cream products including ball-top cones, desserts, wafer cups, sandwiches, cakes and logs, slices, bite sizes, stick products and candy bars.

Operating principle

The basic Tetra Pak Extrusion Tunnel M3 consists of an endless product-plate conveyor system and a hardening tunnel. At the inlet/ outlet end of the tunnel, the conveyor system forms a worktable where extrusion, filling, decorating and product transfer take place. In the hardening tunnel, the conveyor chain is guided around two parallel, stainless steel frames.

The production process in the Tetra Pak Extrusion Tunnel M3 starts with the extrusion or time elapse filling of ice cream, either directly onto the product trays (e.g. stick products, sandwiches, slices and cakes), or into pre-dispensed cones or wafer cups. Various operations are carried out depending on product specification, including stick insertion, dispensing of biscuits, cones or chewing gum balls and decoration with ice cream, caramel, syrup, jam and/or dry ingredients. The filled product trays pass through the hardening tunnel where the products are hardened with cold air circulation. After hardening, the products are removed from the trays for further processing including coating, dipping and wrapping.

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Standard design

Main drive

The main drive for the conveyor chain system is placed on top of the tunnel house. The main drive system is directly connected to all the turning wheels on the conveyor system front end, inside the tunnel house.

Worktable

The worktable is prepared for mounting product specific equipment. The stations are designed for the easy addition or removal of dispensing, extrusion, filling and decorating equipment. All main motion functions are servomotor-controlled, including the one-wire cutter, sandwich dispensers and filling carrier motions. All exterior surfaces and components on the worktable are made of stainless steel or stainless materials. Extension of the worktable is possible if more space for equipment is required.

Hardening tunnel

The Tetra Pak® Extrusion Tunnel M3 hardening tunnel consists of a pre-assembled chain conveyor, with an evaporator placed on the side. All this is placed in an insulated tunnel house.

The conveyor chain follows a double spiral path around a stainless steel frame. All chain supports, sprockets and framing are constructed to facilitate cleaning and servicing. A built-in chain-tightening mechanism allows for temperature variation.

House

Evaporator and chain conveyor is placed in either a container house or in a panel house

Container house:

- Consist of two boxes made of polyurethane insulated panels. One box for the chain conveyor and one box for the evaporator. The floor is made of fiber glass with drain channels.
- Optionally fully welded stainless steel floor.
- The container house solution enables fast installation

Panel house:

- The panel house is built on site on a concrete foundation. The panels are with polyurethane insulation with PVC coated galvanized surfaced in- and outside.
- Floor is a fully welded stainless steel floor for high hygiene solution.
- Panel houses allows high product pitch suitable for cone production

Control system

All in-line functions, including drives, cutters and filling and decorating equipment are controlled via the PLC from one central control panel. All production data can be pre-programmed, and is supervised and adjusted on the touch screen control panel/ HMI. Different programmes can be stored in the PLC, which operates as master when connected to other machines in the line.

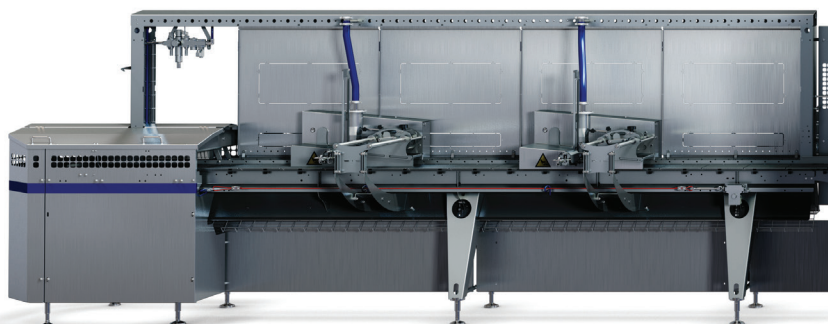
Refrigeration

Tetra Pak Extrusion Tunnel M3 can be provided with evaporators for ammonia (NH₃/R707) or Freon (R404A or R507A). The evaporators are designed with differentiation in fin distance to increase the time before defrosting. Fans secure circulation of air and are equipped with VLT for control of air velocity.

Refrigeration units for Freon are available as options. The refrigeration unit can either be placed at the rear end of the tunnel, as an integrated part of the tunnel or placed remotely.

Product transfer

- Tetra Pak® Dip and Transfer unit 1800 M3 (stick, ball top cones, wafer cups, sandwiches, bars, slices)
- Flat belt conveyor with pusher (for slices and logs)
- Tetra Pak Extrusion Pick-and-Place unit (candybars, bite-sizes, sandwiches, cones)
- Tetra Pak Dip and Transfer unit A3 (stick, ball top cones, wafer cupd, sandwiches)



Equipment

Product type	Biscuit dispenser	Vertical extruder	Stick inserter	Horizontal cutting
Stick		•	•	•
Sandwich	•	•	(•)	•
Slice		•	•	•

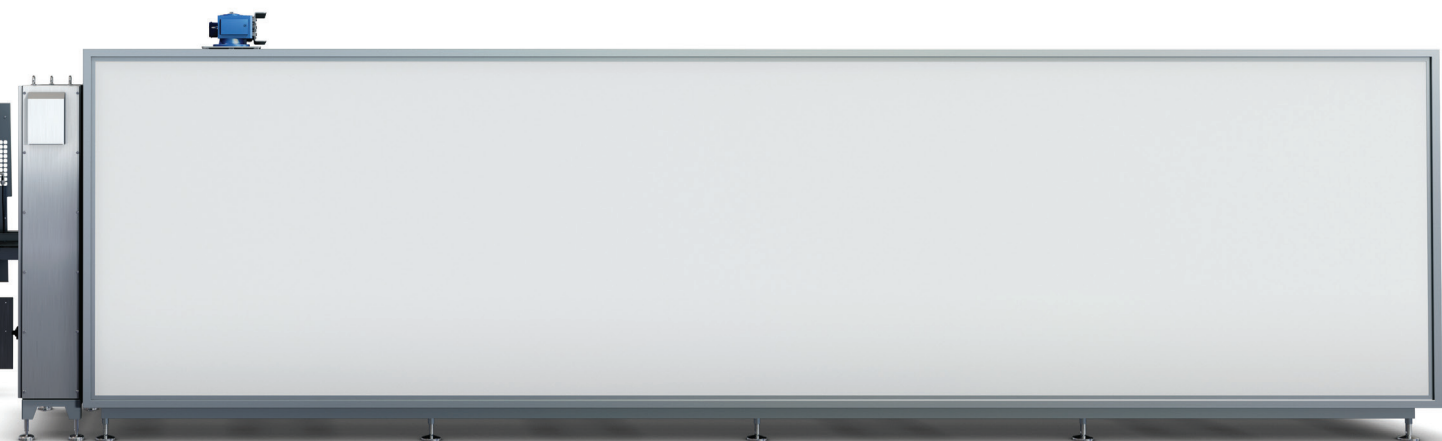
Product type	Cone dispenser	Choco spray	Time-elapse filler	Pencil filler	Top decoration
Wafer cup		•	•	•	(•)
Ball-top cone	•	•	•	•	(•)
Small cakes			•	•	•

Product type	Horizontal extruder	Vertical cutting	Caramel dosing	Top decoration	Dry stuff dosing
Candy bars	•	•	•	(•)	•
Logs	•	•	•	•	•

Capacities	Stick / Slices	Ball-tops	Wafer cups	Candy bars	Logs	Sandwiches	Small cakes	Bite-sized
800 M3	18 000 / 18 000	18 000	18 000	12 000*	1 000	18 000	18 000	24 000

* with minimum 4 lanes x 2 rows/tray configuration

Note: Capacities (pcs/h). Capacities are based on typical ice cream products and on the following reference ice cream recipe: fat (HCO)10.0%; skimmed milk powder 11.0%; sugar (sucrose) 12.0%; glucose syrup, DE42 75%; dry matter 5.5%; Danice stabilizer and emulsifier 0.5%; water 61.0%; overrun 100%. Final capacities to be confirmed when actual recipe and products have been specified.



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Technical data

Hardening tunnel	800 M3 x 180 mm	800M3 x 230 mm
Panel house thickness of polyurethan panels (mm (inch))	125 (4.9)	125 (4.9)
Container house thickness of polyurethan panels (mm (inch))	120 (4.7)	NA
Tray conveyor system		
No. of sprockets / vertical pitch (mm (inch))	9 / 180 (7)	9/ 230 (9)
Conveyor pitch (mm (inch))	50 (2)	50 (2)
Tray dimension (mm (inch))	300 x 345 (11.8 x 13.6)	300 X 345 (11.8 x 13.6)
Total number of trays / inside tunnel	839/ 802	839/ 802
Utility consumption		
Total installed power (incl. fans) (kW (HP))	25 (33)	25 (33)
Main drive motor size (kW (HP))	4.0 (5.3)	4.0 (5,3)
Servo for each one-wire cutter (kW (HP))	1.0 (1,3)	1.0 (1,3)
Wire heating for each one-wire cutter (kW (HP))	0.6 (0.8)	0.6 (0.8)
Servo for each sandwich dispenser (kW (HP))	0.63 (0.84)	0.63 (0.84)
Servo for each trailing carrier (kW (HP))	0.63 (0.84)	0.63 (0.84)
Servo for each filling carrier with vertical servo (kW (HP))	0.63 (0.84)	0.63 (0.84)
Compressed air working/minimum pressure (bar (PSI))	6-7/ 4.5 (87-101/65)	6-7/ 4.5 (87-101/65)
Total compressed air consumption (NI/min (gal/min))	1000 (264)	1000 (264)
Water consumption per wash (l (gal))	500 (132)	500 (132)
Standard power supply	3 x 400 V AC 50/ 60 Hz	3 x 400 V AC 50/ 60 Hz
Main breaker size at	3 x 400 V AC, 50 Hz 125 A	3 x 400 V AC, 50 Hz 125 A
NH3 evaporating unit		
Nominal cooling capacity (kW/kcal/h (TR))	125/107,500 (36)	125/107,500 (36)
Evaporation temperature (°C (°F))	-45 (-49)	-45 (-49)
Air temperature inside tunnel (°C (°F))	-37 (-35)	-37 (-35)
Number of fans x power each fan (kW (HP))	6 x 1.8 (6 x 2.4)	6 x 1.8 (6 x 2.4)
Total power (kW (HP))	13.2 (17.6)	13.2 (17.6)
Defrosting system	water/hot gas	water/hot gas

R404A evaporating unit

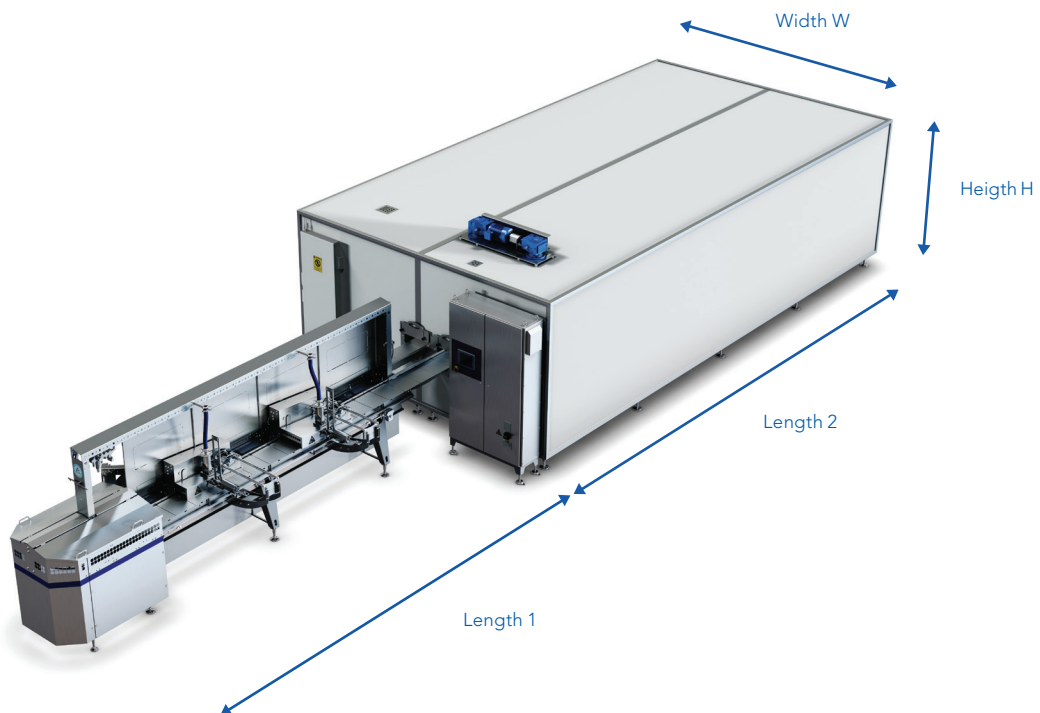
Nominal cooling capacity (kW/kcal/h (TR))	95/81,700 (28)	95/81,700 (28)
Evaporation temperature (°C (°F))	-45 (-49)	-45 (-49)
Air temperature inside tunnel (°C (°F))	-37 (-35)	-37 (-35)
Number of fans x power each fan (kW (HP))	6 x 2.2 (6 x 2.9)	6 x 2.2 (6 x 2.9)
Total power (kW (HP))	9.0 (12)	9.0 (12)
Defrosting system	air	air

R404A refrigeration unit

Compressor principle reciprocating	2 x double screw
Compressor power (kW (HP))	102 (136)
Nominal cooling capacity (kW/kcal/h)	90/77 500
Evaporation temperature (°C (°F))	-45 (-49)
Condensing temperature (°C (°F))	40 (104)
Fluid for condensing	water
Utility consumption	water
Tower water flow (l/h)	66 000 (17 400)

Dimensions

	Length 1	Length 2	Height H	Width W
With Container House				
800 M3 x 180 mm	7 200 (283)	8 550 (336)	2 800 (110)	4 440 (173)
With Panel House				
800 M3 x 180 mm	7 200 (283)	9 000 (354)	2 800 (110)	5 200 (205)
800 M3 x 230 mm	7 200 (283)	9 000 (354)	3 300 (130)	5 200 (205)



Measurements in mm (inches)

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