



Tetra Pak® Extrusion Tunnel A3

Tray tunnel system for ice cream extrusion



Application

Application for extrusion, shaping, filling, decorating and hardening of ice cream. Examples of product types: 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 A3 consists of an endless product plate conveyor system and a hardening tunnel. At the inlet/outlet end of the tunnel the conveyor system forms one or more worktable(s) where extrusion, filling, decorating and product transfer take place. Inside the hardening tunnel, which it cooled down by means of air coolers, the conveyor chain is guided around two parallel frames made from stainless steel.

Standard design

Hardening tunnel configurations

The Tetra Pak® Extrusion Tunnel A3 hardening tunnel consists of a tunnel house erected on site. Two stainless steel frames guides the conveyer chain and trays through the hardening tunnel. The evaporator coil is placed separately between the two frame sections. Air cooler fans are placed on the evaporator coil to maximize the use of cooling energy and to maximize time between required defrosting. Placement of fans combined with low amount of baffle plates ensure optimal air flow and reduce extent of surfaces that need cleaning.

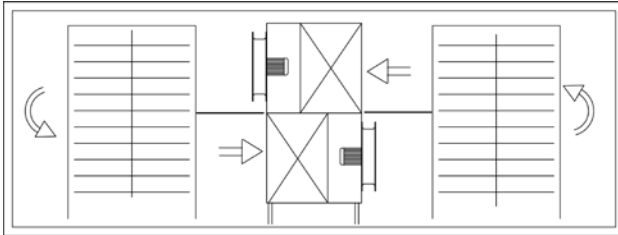
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Standard design

Hardening tunnel configurations

Alternatively, if smaller footprint is required, the air cooler fans can be placed in the frame sections.



Placement of entrance doors can be decided according to the actual lay out. For each of the house section a separate pre-wired electrical cabinet will be delivered. The cabinet can be placed on the tunnel house in the suitable position for the actual project. The electrical cabinet for the worktable is an integrated part of the worktable design.

Worktable

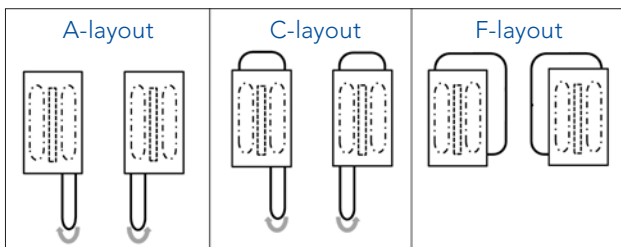
Different basic worktables including three to eight working stations on each side of the worktable are available. Longer worktables can be supplied if more working stations are required.

The module length for one workstation is 1 meter (39"). The worktable is prepared with stations for mounting product specific equipment including carriages and drives. The stations are designed for easy interchange of filling and decorating equipment.

The worktable is constructed in stainless steel without horizontal surfaces facilitating efficient cleaning. Tray change-over is quick and simple. The product plates can be lifted off the conveying chain without the aid of tools.

Worktable configuration

The shown worktable configurations are available for basic tunnels or customized panel house tunnels. The chain-movement can be both clock-wise or counter-clock wise.



Worktable control

All Tetra Pak Extrusion Tunnel functions including chain drive, extrusion, filling and decorating equipment is controlled via the PLC from one central control panel. Up to 99 product programs can be stored in the PLC. Start/stop of the individual filling and decorating units is carried out from the satellite operator panels next to the equipment.

Equipment supports

Primary functions are servo driven. Secondary functions uses air cylinders and are synchronized with the drives by means of a PLC control

Product specific equipment

The Tetra Pak Extrusion Tunnel A3 is designed for the production of a large number of different ice cream products. The choice of dispensers, filling and decorating equipment depends upon the specific product types, designs and output capacities required.

Filling and decorating equipment is designed for easy connection to the carriages supporting the equipment on the worktable. The equipment is individually designed to meet customer requirements, e.g. product size and shape, number of products per product plate, etc. Most commonly as examples:

Stick production

– for producing sticks with one, two or more colors/ flavours the needed equipment is:

Cutting

- Single wire cutter
- Double wire cutter

Stick inserting

- Manual stick inserter
- Automatic stick inserter

Extruding

- 1 color extruder
- Two color extruder
- Funny face extruder

Sandwich production

– for producing sandwich products with half or full biscuit the needed equipment is:

Cutting

- Single wire cutter
- Double wire cutter

Biscuit dispenser

- Bottom dispenser
- Top dispenser

After presser

Cone production – for producing cones with different filling patterns, with or without ingredients, the needed equipment is:

Cone dispensing

- Cone dispenser

Filling

- Chocolate spray unit
- Filling system
- Decoration unit (wet or dry)

Cone ejection

- Cone ejector unit

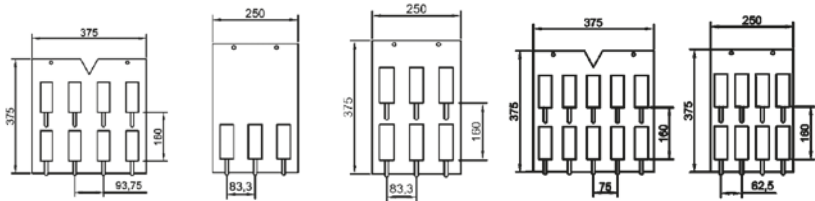
Examples of tray configurations, product size, capacity and hardening time

All hardening times stated in the examples are based on an A-layout.

For C-layout the hardening time will be 2,5 to 4,5% shorter, and for F-layout 2,0 to 3,5 % shorter.



Sticks



Input	Capacity, prod/h	18 000	9 000	18 000	22 500	24 000
Max prod width, mm (inches)		80 (3,15)	70 (2,76)	70 (2,76)	62 (2,44)	50 (1,97)
Max prod length, mm (inches)		150 (5,9)	150 (5,9)	150 (5,9)	150 (5,9)	150 (5,9)

Hardning time

900 A3	Hardning time, min	17	19	19	17	19
1 100 A3	Hardning time, min	19	22	22	19	22
1 300 A3	Hardning time, min	NA	NA	NA	NA	NA
1 700 A3	Hardning time, min	NA	NA	NA	NA	NA
2 200 A3	Hardning time, min	NA	NA	NA	NA	NA

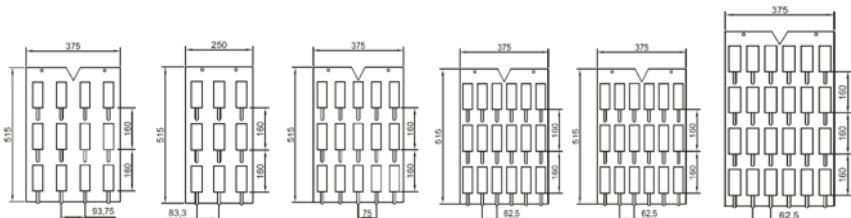
Tray size	Tray depth, mm (inches)	375 (14,76)	375 (14,76)	375 (14,76)	375 (14,76)	375 (14,76)
	Tray length, mm (inches)	375 (14,76)	250 (9,84)	250 (9,84)	375 (14,76)	250 (9,84)

Tray layout	Row pitch, mm (inches)	93,75 (3,69)	83,3 (3,28)	83,3 (3,28)	75 (2,95)	62,5 (2,46)
	Rows	4	3	3	5	4
	Lanes	2	1	2	2	2

Chain speed, m/min		14,1	12,5	12,5	14,1	12,5
Tray speed, tray/min		37,5	50,0	50,0	37,5	50,0



Sticks



Input	Capacity, prod/h	21 600	20 250	27 000	32 400	36 000	43 200
Max prod width, mm (inches)		80 (3,15)	70 (2,76)	62 (2,44)	50 (1,97)	62 (2,44)	50 (1,97)
Max prod length, mm (inches)		150 (5,9)	150 (5,9)	150 (5,9)	150 (5,9)	150 (5,9)	150 (5,9)

Hardning time

900 A3	Hardning time, min	NA	NA	NA	NA	NA	NA
1 100 A3	Hardning time, min	24	29	24	24	24	24
1 300 A3	Hardning time, min	30	36	30	30	30	30
1 700 A3	Hardning time, min	38	46	38	38	38	38
2 200 A3	Hardning time, min	49	59	49	49	49	49

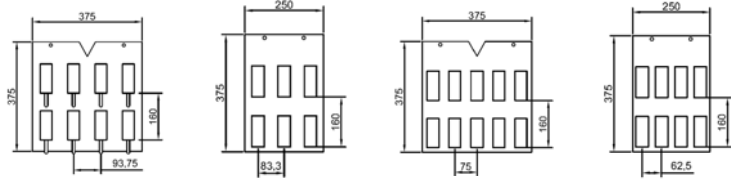
Tray size	Tray depth, mm (inches)	515 (20,28)	515 (20,28)	515 (20,28)	515 (20,28)	675 (26,57)	675 (26,57)
	Tray length, mm (inches)	375 (14,76)	250 (9,84)	375 (14,76)	375 (14,76)	375 (14,76)	375 (14,76)

Tray layout	Row pitch, mm (inches)	93,8 (3,69)	83,3 (3,28)	75,0 (2,95)	62,5 (2,46)	75,0 (2,95)	62,5 (2,46)
	Rows	4	3	5	6	5	6
	Lanes	3	3	3	3	4	4

Chain speed, m/min		11,3	9,4	11,3	11,3	11,3	11,3
Tray speed, tray/min		30,0	37,5	30,0	30,0	30,0	30,0



Sandwiches



Input	Capacity, prod/h	18 000	18 000	22 500	24 000
	Max prod width, mm (inches)	69 (2,72)	63,0 (2,48)	50,0 (1,97)	38,0 (1,50)
	Max prod length, mm (inches)	125 (4,92)	125 (4,92)	125 (4,92)	125 (4,92)

Hardening time

900 A3	Hardening time, min	17	19	17	19
1 100 A3	Hardening time, min	19	22	19	22
1 300 A3	Hardening time, min	30	34	30	34
1 700 A3	Hardening time, min	NA	NA	NA	NA
2 200 A3	Hardening time, min	NA	NA	NA	NA

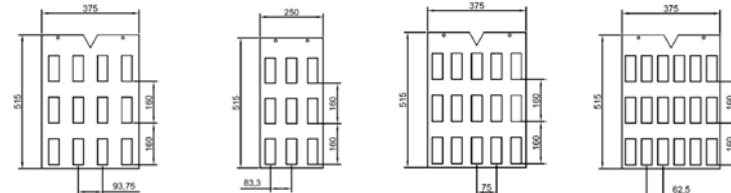
Tray size	Tray depth, mm (inches)	375 (14,76)	375 (14,76)	375 (14,76)	375 (14,76)
	Tray length, mm (inches)	375 (14,76)	250 (9,84)	375 (14,76)	250 (9,84)

Tray layout	Row pitch, mm (inches)	93,75 (3,69)	83,3 (3,28)	75,0 (2,95)	62,5 (2,46)
	Rows	4	3	5	4
	Lanes	2	2	2	2

Chain speed, m/min		14,1	12,5	14,1	12,5
Tray speed, tray/min		37,5	50,0	37,5	50,0



Sandwiches



Input	Capacity, prod/h	21 600	20 250	27 000	32 400
	Max prod width, mm (inches)	69 (2,72)	58 (2,28)	50 (1,97)	38 (1,50)
	Max prod length, mm (inches)	125 (4,92)	125 (4,92)	125 (4,92)	125 (4,92)

Hardening time

900 A3	Hardening time, min	NA	NA	NA	NA
1 100 A3	Hardening time, min	24	29	24	24
1 300 A3	Hardening time, min	30	36	30	30
1 700 A3	Hardening time, min	38	46	38	38
2 200 A3	Hardening time, min	49	59	49	49

Tray size	Tray depth, mm (inches)	375 (14,76)	375 (14,76)	375 (14,76)	375 (14,76)
	Tray length, mm (inches)	375 (14,76)	250 (9,84)	375 (14,76)	375 (14,76)

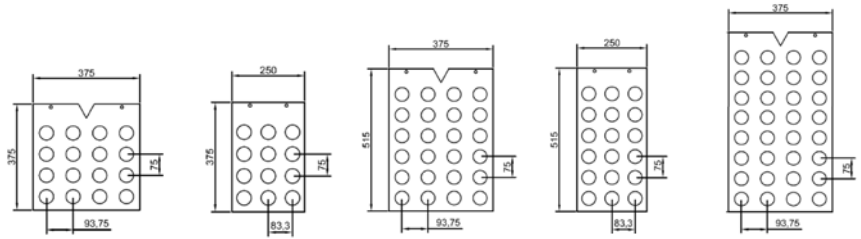
Tray layout	Row pitch, mm (inches)	93,75 (3,69)	83,3 (3,28)	75,0 (2,95)	62,5 (2,46)
	Rows	4	3	5	6
	Lanes	3	3	3	3

Chain speed, m/min		11,3	9,4	11,3	11,3
Tray speed, tray/min		30,0	37,5	30,0	30,0

Max. product width is based on the gripper requirements of the Tetra Pak Pick-and-Place unit. In case of vacuum suction gripper, larger product width is possible.



Ball top cones



Input	Capacity, prod/h	16 000	18 000	24 000	27 000	36 000
	Max prod diameter, mm (inches)	65 (2,56)	65 (2,56)	65 (2,56)	65 (2,56)	65 (2,56)
Max product height						
900 A3	Fan in frame, mm (inches)	210 (8,3)	210 (8,3)	NA	NA	NA
1 100 A3	Fan in frame, mm (inches)	180 (7,1)	180 (7,1)	NA	NA	NA
1 700 A3	Fan in frame, mm (inches)	NA	NA	210 (8,3)	210 (8,3)	210 (8,3)
2 200 A3	Fan in frame, mm (inches)	NA	NA	160 (6,3)	160 (6,3)	160 (6,3)
1 100 A3 & 1 300 A3	Fan on coil, mm (inches)	210 (8,3)	210 (8,3)	210 (8,3)	210 (8,3)	210 (8,3)
1 700 A3	Fan on coil, mm (inches)	NA	NA	210 (8,3)	210 (8,3)	210 (8,3)
2 200 A3	Fan on coil, mm (inches)	NA	NA	160 (6,3)	160 (6,3)	160 (6,3)
Hardening time						
900 A3	Hardening time, min	60	60	NA	NA	NA
1 100 A3	Hardening time, min	68	68	44	44	39
1 300 A3	Hardening time, min	NA	NA	53	53	48
1 700 A3	Hardening time, min	NA	NA	68	68	61
2 200 A3	Hardening time, min	NA	NA	88	88	78
Tray size						
	Tray depth, mm (inches)	375 (14,76)	375 (14,76)	515 (20,28)	515 (20,28)	675 (26,57)
	Tray length, mm (inches)	375 (14,76)	250 (9,84)	375 (14,76)	250 (9,84)	375 (14,76)
Tray layout						
	Row pitch, mm (inches)	93,8 (3,69)	83,3 (3,28)	93,8 (3,69)	83,3 (3,28)	93,8 (3,69)
	Rows	4	3	4	3	4
	Lanes	4	4	6	6	8
Chain speed, m/min		6,3	6,3	6,3	6,3	7,0
Tray speed, tray/min		16,7	25,0	16,7	25,0	18,8

Information for production of bars, cake, logs and bite size products is also available.

Technical data (continued on next page)

Model	900	1 100	1 300	1 700	2 200
Hardening tunnel					
Thickness of polyurethane panels, mm (inches)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)
Coating of panels: PVC / stainless steel	Standard/Optional	Standard/Optional	Standard/Optional	Standard/Optional	Standard/Optional
Entrance: 1 door / additional doors	Standard/Optional	Standard/Optional	Standard/Optional	Standard/Optional	Standard/Optional
Stainless steel bottom tray	Standard	Standard	Standard	Standard	Standard
Stainless steel internal cladding	Optional	Optional	Optional	Optional	Optional
Tray conveyor system					
Frame in stainless steel	Standard	Standard	Standard	Standard	Standard
Number of drives x size, kW	4 x 1.1	4 x 1.1	4 x 1.5	4 x 2.0	4 x 2.0
Frequency controlled drives	Standard	Standard	Standard	Standard	Standard
Tray carrying chain					
Made from stainless steel / lubrication free	Standard	Standard	Standard	Standard	Standard
Chain pitch, mm (inches)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)

Technical data (continued from previous page)

Model	900	1 100	1 300	1 700	2 200
Product tray					
Fans on frame					
Tray pitch, mm / Number of sprocket levels	230/8	200/9	NA	230/14	180/18
Fans on coil					
Tray pitch, mm / Number of sprocket levels	NA	230/9	230/11	230/14	180/18
Tray size short / Trays in tunnel	(250 x 375)/960	(250 x 375)/1 085	(250 x 375)/1 130	(250 x 515)/1 706	(250 x 515)/2 462
Tray size long / Trays in tunnel	(375 x 375)/640	(375 x 375)/723	(375 x 375)/887	(375 x 515)/1 137	(375 x 515)/1 641
Alternative tray width, mm	NA	375 X 675	375 X 675	375 X 675	375 X 675
Air cooler evaporator					
Refrigerant, NH ₃ /Freon	Standard/Optional	Standard/Optional	Standard/Optional	Standard/Optional	Standard/Optional
Material					
Hot galvanized steel / stainless steel	Standard/Optional	Standard/Optional	Standard/Optional	Standard/Optional	Standard/Optional
Approval	CE-PED	CE-PED	CE-PED	CE-PED	CE-PED
Nom cooling capacity, kW - kcal/h	115 - 98 900	150 - 129 000	175 - 152 000	200 - 172 000	200 - 172 000
Evaporation temperature, °C (°F)	-45 (-49)	-45 (-49)	-45 (-49)	-45 (-49)	-45 (-49)
Air temperature inside tunnel, °C (°F)	-38 (-35)	-38 (-35)	-38 (-35)	-38 (-35)	-38 (-35)
Air cooler fans					
Placement of fans	In frame	In frame or on coil	In frame or on coil	In frame or on coil	In frame or on coil
Number of fans x motor size, kW	10 x 1.5	12 x 3.0	12 x 3.0	24 x 2.2	24 x 2.2
Frequency converter controlled	Standard	Standard	Standard	Standard	Standard
Compressed air					
Pressure, bar (psi)	6-7 (87 - 102)				
Total consumption depending upon type of equipment, ltr/min (gal/min)	200-1000 (53-265)				
Electrical cabinet / control system					
PLC	Siemens/Allen Bradley				
Standard power supply	3 x 400 V AC 50/60HZ				
Layout dimension* (excl worktables)					
Fans in frame / tray depth, mm	375				
Fans in coil / tray depth, mm		375	375	515	675
Length, mm (inches)	9 800 (386)	10 000 (394)	10 000 (394)	10 300 (406)	10 600 (418)
Width, mm (inches)	6 000 (237)	7 200 (284)	7 200 (284)	7 800 (307)	8 300 (315)
Height (excl. foundation), mm (inches)	2 600 (103)	3 200 (126)	3 200 (126)	4 000 (158)	4 000 (158)

* Layout dimensions of tunnel depends on placement of fans, tray depth and tray pitch. For other combination than exemplified here, please contact Business Unit Ice Cream

Capacities are based on typical ice cream products and on the following standard ice cream recipe: fat (HCO) 10.0 %, skimmed milk powder 11.0 %, sugar (sucrose) 12.0 %, glucose syrup, DE 42, 75 %, dry matter 5.5 %, Danice stabilizer and emulsifier 0.5 % water 61.0, overrun 100 %.

Tetra Pak Extrusion Tunnel A3 is also available with customized tunnel houses for longer retention time in the tunnel or/ and larger product trays.