

*Pastry Line 1*  
**1**  
*FFA-System*

The world's first full automatic lamination system for finest pastry production.



## **MM Line System**

The MM Line is an automated production line for producing pastry, etc. It consists of a Laminator, Parallel Piler, Stretcher and Make-up System. Croissants and various types of Danish pastry, puff pastry and buns are produced. It is the world's first fully automated system for producing a variety of products with an automatic production switch-over function controlled by a built-in computer-operated Production Memory System.

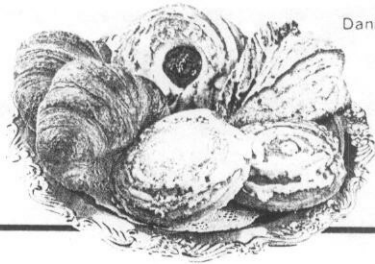
### ●Laminator

The Laminator is equipped with independent hoppers for dough and for shortening. It molds the dough sheet with one shortening layer without mixing two types of input materials, and supplies it to the next process of Parallel Piler. The Laminator can also be used as an independent unit.

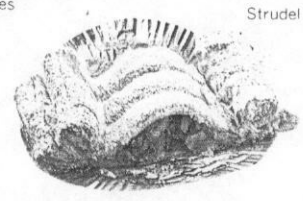
MM 3 0 2 ... 700 kg/hr

MM 3 0 3 ... 1,500 kg/hr ( Max. output )

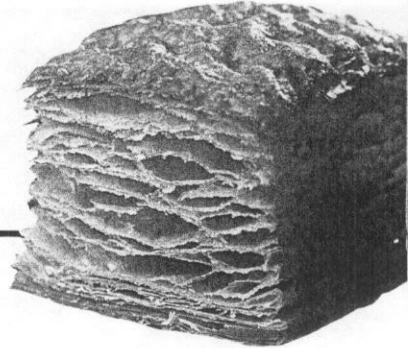
Model code		MM302	MM303
L : Length (mm)		3,035	
W : Width (mm)		1,230	
Wb : Belt width (mm)		460	
H : Height (mm)		2,000	
Weight (kg)		2,800	
Motor	Feeder	2.2	5.5
	Stretching roller	10.75	1.5
	Piler	0.06	
(kW)	Brush	0.04	
	Stretcher duster	0.025	
	Spring type duster	0.06	
Total motor load		3.135	7.185



Danish pastries



Strudel



●Parallel Piler

The Parallel Piler folds a continuous dough sheet into layers (from 4 to 12) and sends it to the next process.

(Max. effective dough width) (Max. folding width)

- LM322 2 ... 400mm • 850mm
- LM323 3 ... 400mm • 1250mm
- LM324 4 ... 600mm • 850mm

Model code	LM322	LM323	LM324
L Length (mm)	2,935	3,735	2,935
W Width (mm)	1,280	1,280	1,480
H Height (mm)	1,252	1,252	1,252
Wb Belt width (mm)	520	520	720
Weight (kg)	700	800	800
Belt speed (m/min)	1.0~10.0		
Motor (kW)	1.5		

●Stretcher

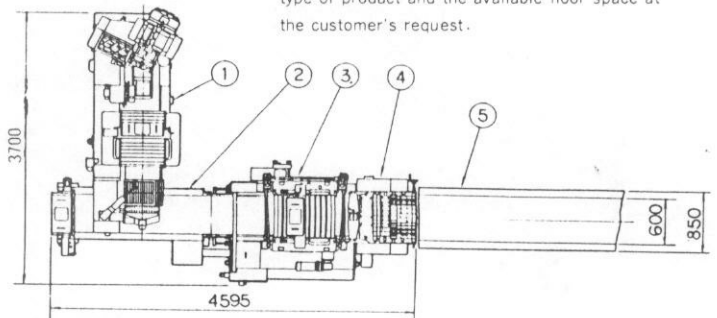
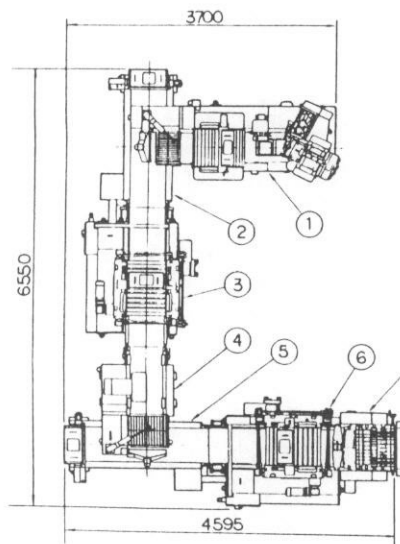
The Stretcher is installed in the middle of the line to stretch thick-folded dough and form it into a thin sheet. Compared with conventional stretching rollers, the rollers of the Stretcher operate at very low pressure to dough to produce perfectly parallel uniform layers of dough. The Stretcher can also be used as an independent unit.

Model SM031

L Length (mm)	1,860
W Width (mm)	1,515
H Height (mm)	1,430
Wb: Belt width (mm)	480
Weight (kg)	
Capacity of duster (t)	Roller section 9 conveyor section 11
Duster for stretcher	0.04
Duster for screw	0.04
Motor (kW)	
For 1st conveyor	0.4
For 2nd and 3rd conveyor	0.4
Stretching roller	0.75

- ① MM Laminator
- ② Pile-up Table PC011
- ③ Stretcher SM031
- ④ Flour Sweeper FV011
- ⑤ Parallel Piler LM322
- ⑥ Pile-up Table PC011
- ⑦ Stretcher SM031
- ⑧ Flour Sweeper FV011
- ⑨ Synchronized Conveyor

Folded layers 16-144  
Stretched dough thickness 3mm-30mm  
Applicable products Puff pastry with many layers.



(1C type)

In the C type line, the dough is folded twice.

Accordingly a large number of layers can be produced (the number of layers means the number of shortening layers).

- ① MM Laminator
- ② Pile-up Table PC011
- ③ Stretcher SM031
- ④ Flour Sweeper FV011
- ⑤ Synchronized Conveyor

Folded layers: 4-12 layers  
Stretched dough thickness: 3mm-30mm  
Applicable products: Coffee rolls and Danish pastry with a small number of layers

●Make-up System

The continuous dough sheet produced in the preceding process is cut and finished into individual products on the Make-up System.

●Optional tools for product forming  
Optional tools for shaping the product include the Guillotine Cutter, Circular Cutter, Folding Unit, Side Winder and Croissant Molder. These units shape the products through synchronized operation.

●Optional tools for supplying supplementary material  
Optional tools for supplying additional materials include the Depositor (deposits jam, cream, etc.), the Strewer (strews raisins, peanuts, etc.) and the Duster (sprinkles cinnamon, sugar, etc.). These units are completely synchronized.

●Examples of Line Arrangements

(1L type)  
A combination of Models MM-2 and SM-031 is used for the continuous production of dough for coffee rolls or Danish pastry with from 4 to 12 folded layers at the output rate of 500 kg/hr (the number of layers means the number of shortening layers).

- MC011 ... 400m/m
- MC012 ... 600m/m
- MC013 ... 800m/m
- MC014 ... 1,000m/m
- MC015 ... 2,000m/m

(Max effective dough width)

[Conveyor length]

Spec. code	L.Length(mm)
A	2,100
B	3,100
C	4,100
D	5,100
E	6,100
F	7,100
G	8,100
H	9,100
I	10,100
J	11,100
K	12,100

[Basic Specifications]

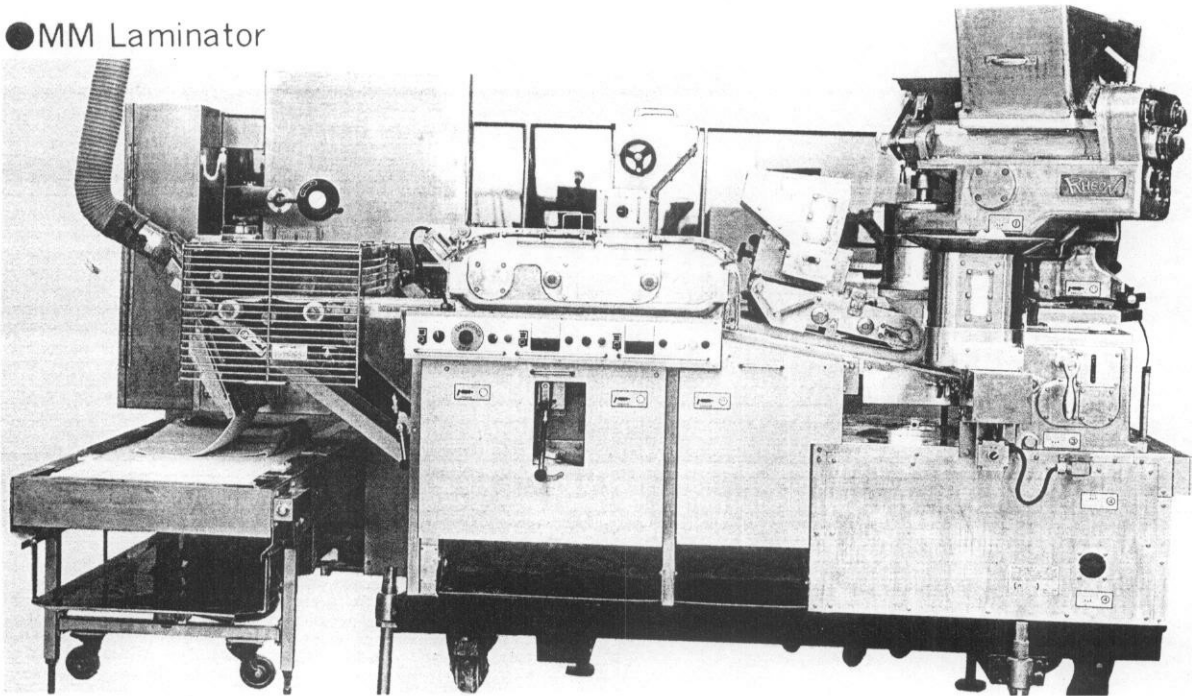
Model code	MC011	MC012	MC013	MC014	MC015
L Length (mm)	See above				
W Width (mm)	1,030	1,230	1,430	1,630	1,830
H Height (mm)	Standard: 850 (adjustable ±75)				
Wb Belt width (mm)	600	800	1,000	1,200	1,400
Weight (kg)	770 (B type)		960 (B type)		1,200 (B type)
Motor (kW)	0.75	0.75	0.75	0.75	0.75
Belt speed (m/min)	1.0~8.5	1.0~8.5	1.0~8.5	1.0~8.5	1.0~8.5

Notes :

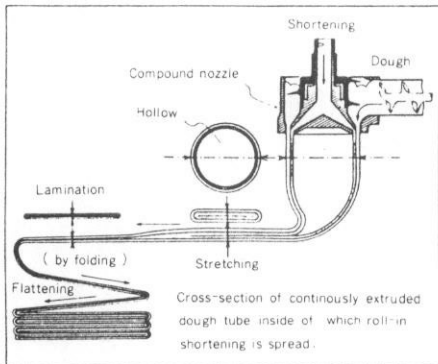
- 1) The examples given here relate to production of dough sheet with an effective width of 400 mm. To produce dough with an effective width of 800 mm or 1,200 mm, the machines in the line must be changed.
- 2) Various line layouts can be designed to suit the type of product and the available floor space at the customer's request.

# As a head of MM Line, it provides automatic roll-in and layering of pastry dough.

## ●MM Laminator



Model MM303



## ●SM Stretcher

Employs vastly superior roller system

This is a compact machine only 1 meter in length equipped with a unique multiple roller system. The rollers rotate as a group while each roller also revolves on its own axis. It is capable of stretching a dough sheet of 50 mm thickness down to 3 mm in a single pass. To achieve this using conventional rollers it would require 70 opposing rollers of 100 mm diameter for gradual stretching, resulting in a machine over 10 meters in length. The theory on which the SM Stretcher works is unique. As shown in Fig. 2, the

conveyors  $V_1$ ,  $V_2$  and  $V_3$  travel at different speeds, so continuous tension is applied to the dough.

When frictionless pressure is applied to the dough by the multiple rollers, the dough is continuously stretched and thinned to the required thickness without increasing the stress. The required thickness, which is expressed by the value  $V_1/V_3$ , can be obtained with an extremely high degree of accuracy. When a conventional roller system is used to thin a dough sheet to one quarter its original thickness, the pressure at the rolling section  $bb'$  (Fig. 1) reaches  $20 \text{ kg/cm}^2$ . To perform the same operation, the SM Stretcher applies a pressure of only  $70 \text{ g/cm}^2$ , which ensures that no damage is given to the dough. In the SM Stretcher, the stress produced by pulling is well balanced with the stress produced by compression and the stream lines in the dough run perfectly straight in sharp contrast to the multiple vortexes created by conventional rollers. This makes the SM Stretcher ideal for building up

multiple, straight line, and parallel layers of dough and roll-in shortening for puff pastry. Since the dough and shortening layers do not become mixed during stretching, it is possible to produce a light, fluffy product with excellent volume using a small amount of roll-in.

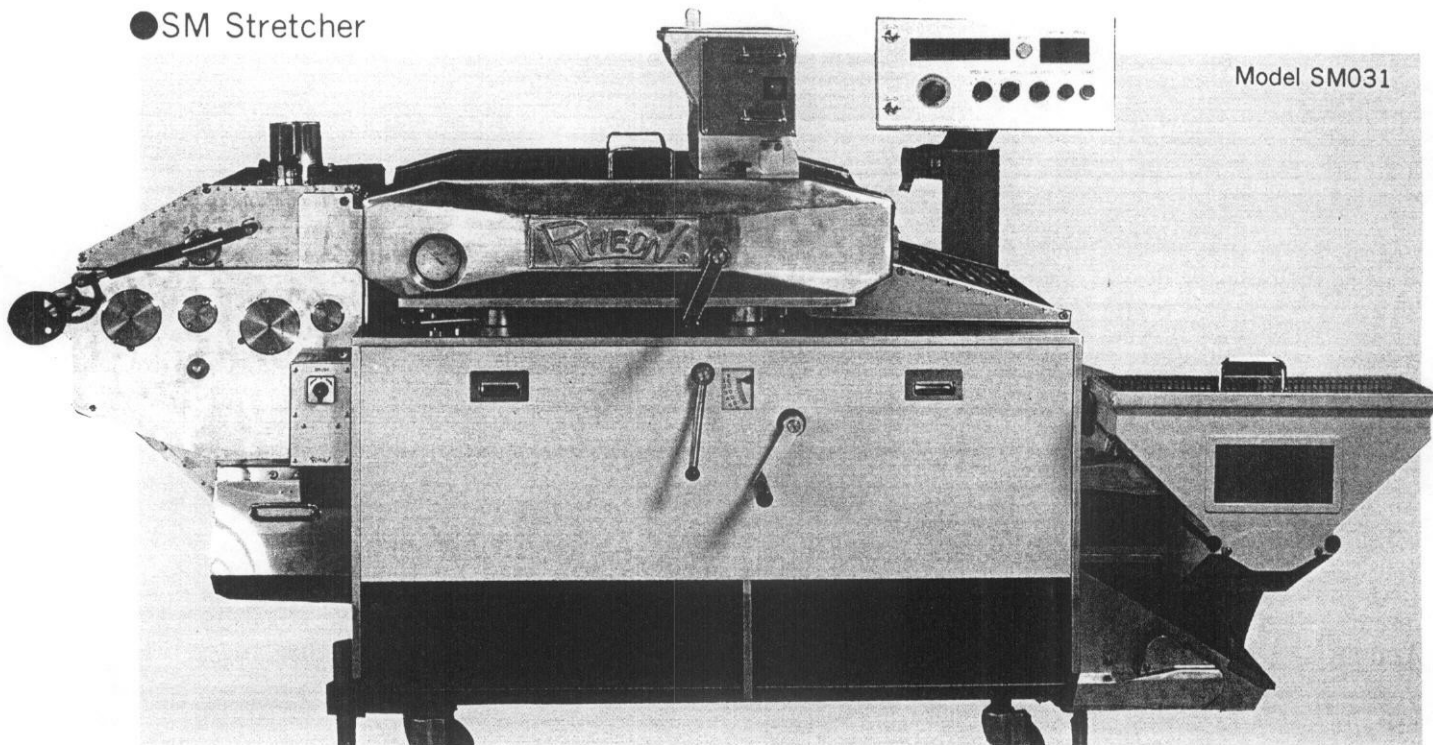
## ●Producing a wide range of high quality products

The SM Stretcher does not increase the pressure inside the dough during stretching, nor does it create convolutions in the flow of the dough. Bread dough is very sensitive to external pressure, too much of which may ruin it. The SM Stretcher stretches dough without adversely affecting its quality. It creates much smaller stress in the dough than any conventional forming device. Accordingly, it can be used for producing bread and similar types of food in addition to pastry.



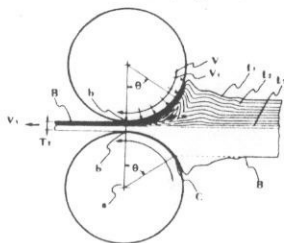
# Super sensitive multi-roller system stretches dough sheet with the most effective manner

● SM Stretcher

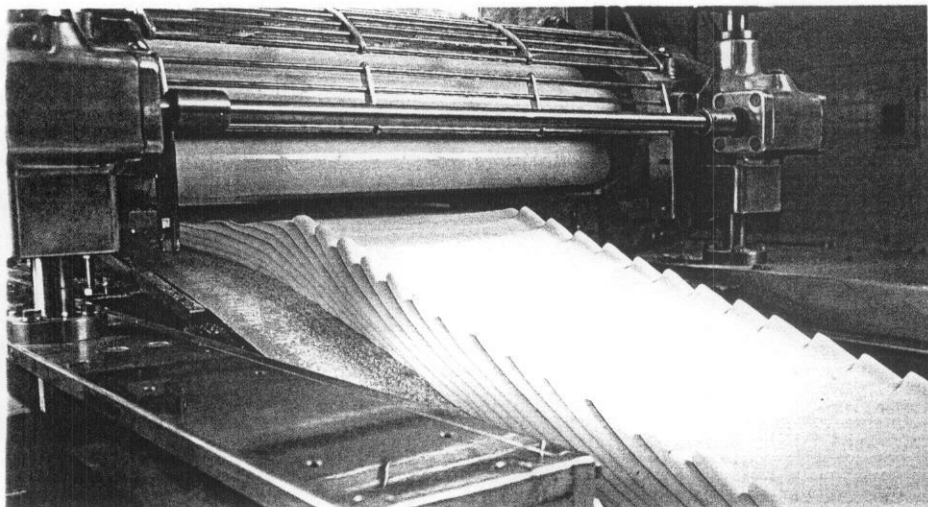
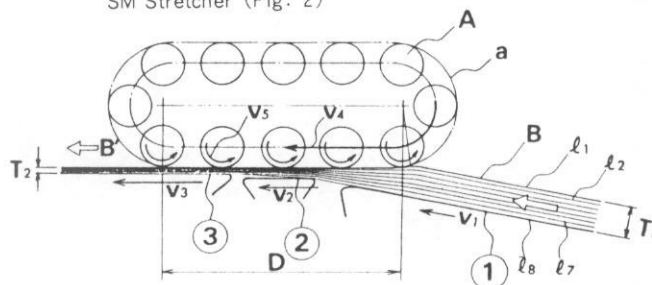


Model SM031

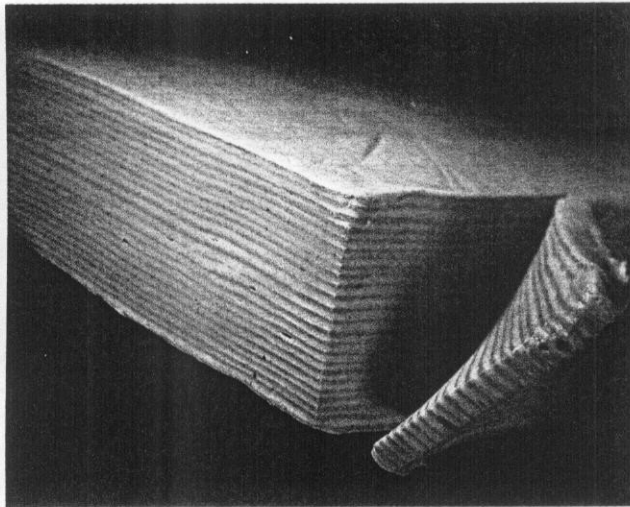
Conventional rollers (Fig. 1)



SM Stretcher (Fig. 2)



View of stretching mechanism



Laminated pastry dough