

# Toast and more

MECATHERM IS MAKING AN UNUSUAL PRESENTATION TO THE INDUSTRY WITH THIS BREAD LINE, SHOWN FOR THE FIRST TIME AT THE EUROPAIN TRADE FAIR. TOAST BREAD, BAGUETTES, SPECIAL BREADS AND BREAD ROLLS CAN ALL BE BAKED FULLY AUTOMATICALLY ON THE FLEXIBLE PLANT FOR MEDIUM PERFORMANCE CLASSES



**+** The target group for the new bread line are medium-sized factories looking for full automation and maximum flexibility for both their bread and their bread roll production operations, without needing to use several lines in parallel.

The main unusual feature of the line developed by the Mecatherm S.A. Company from Barembach, France, is the spectrum of baked goods that are possible without a major plant conversion. Hourly outputs of 4,000 toast or pan loaves, 5,000 baguettes or up to 27,000 bread rolls are no problem. Produced one after another, this diversity ensures quick profitable plant loading. The variety of doughs that can be processed is also wide, ranging from pure wheat dough and doughs containing rye (max. 50%) to all kinds of additives such as grains, seeds etc.

The complete line consists of a volumetric dough divider, a Combi Bloc make-up station for moulding with and without a twist process, a proofing cabinet based on the “modular vertical system” and an FDA tunnel oven that can bake with radiation and/or convection. Of course the dough divider and make-up unit can also be combined with other proofing and oven systems. The new H3 dough divider adds a double compartment variant to Mecatherm’s range of volumetric dough dividers, and can deposit either in a single row (e.g. baguettes) or in two offset rows (toast and long loaves). The weight range per compartment is 270–900 g and the cycle frequency is 900–2,500 strokes/h, enabling a maximum production output rate of 5,000 bread dough pieces to be achieved in a two-row operation. The pressure acting on the dough in the pre-portioning chamber is adjustable. A sliding knife prevents back-flow of dough into the feed hopper. Rollers at the output point, controlled via the dough piece weight and speed of the output belt, ensure correct positioning on the belt.

First of all, the almost square dough pieces pass once through a calibrator, which uses slight pressure to give them an elongated shape. Rolling vertically between two belts, they are then carried upwards to the dough resting compartment where they are again aligned before relaxing on its seven belts. The entire usable length of the relaxation belts is 30 m for bread dough pieces and around 40 m for baguettes. Their speed is adjustable to resting times from 3 to 5.3 min. A counter-roller at the transfer point from one belt to the next guides the dough piece to maintain their positioning. Just as the rollers at the vertical transport, the turn at each belt end prevents the dough piece sticking to the belt.

## Standard recipe for pain de mie (toast bread)

- +** 75 kg flour **+** 43.5 kg water **+** 1.35 kg salt
- +** 3.75 kg sugar **+** 0.375 kg toast baking agent
- +** 3 kg yeast **+** 2 kg palm oil **+** 1.125 kg milk powder
- +** Mixing (with a spiral mixer during the demonstration): 5 min slow, 11 min fast
- +** Direct process **+** Initial dough piece weight: 800 g
- +** Dough yield: approx. 158
- +** Note: Of course a vacuum dough mixer can also be used for production if the plant specifically and exclusively manufactures toast bread
- +** Proofing time: 60–75 min **+** Proofing temp.: 27 °C
- +** Air humidity: 75 % **+** Baking time: 28 min
- +** Baking temp. in 3 zones: 200 °C/220 °C/220 °C
- +** Baking loss: 7.5 % **+++**

From the last resting belt, the dough piece moves vertically on its edge into a roller unit that rolls it out into a tongue, which is afterwards restored to a cylindrical shape by a rolling net, giving it as many turns as possible. It then travels under two pressure plates mounted in parallel with a synthetic non-stick coating, resulting in the dough pieces now being compressed a third time and the ends of the dough rolls becoming completely tight and homogeneous. Rolling the doughs out vertically has the advantage that the dough pieces are given a defined length of 23 cm, and do not change this significantly thereafter. Without these changes of direction there would be a risk that the dough pieces would expand too far and would no longer fit into the pan.

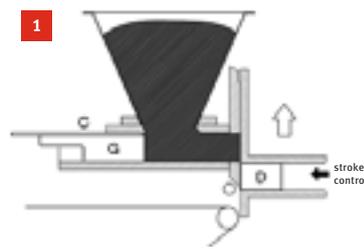
After being shaped in this way, the dough pieces can move on to be deposited or, if 4-pieces are required, they are cut into four parts and these are twisted if desired, i.e. positioned side by side with the cut surface facing downwards. The final touch is given by a cassette long-drawer that takes the dough pieces to be deposited into the pans.

Baking trays with very wide hollows are available as an alternative option if the dough is to be made into loaves with a crusty surface instead of toast loaves baked in pans with lids. Baguette production takes place in an analogous way, the only difference being that the dough pieces from the portioner move one behind the other to the make-up unit instead of being staggered side by side. Baguette dough pieces leave the resting compartment via a simple roller unit with a long-moulding belt and rolling net at the other end of the resting compartment instead of the vertical pair of rollers. Four individually removable pressure plates with separately adjustable entry and exit heights shape the dough stick to the required length and, if it is to be turned into bread rolls, portioner disks ensure division into two, three, four or five bread rolls which are then deposited into mould trays 600 mm long. If an 800 mm mould tray is used, a fifth portioner plate comes into use and divides the strand into six parts.

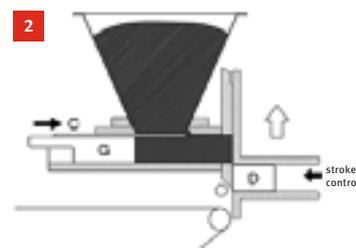
When developing the new bread line, which combines automation and flexibility, Mecatherm wrote a comprehensive specification document for its designers, imposing among other things high demands for ease of cleaning and user friendliness. The entire line is on feet high enough to allow the floor underneath to be cleaned at any time. The dough divider and make-up part of the line can be separated and moved apart effortlessly. When they need to be joined together again, markings and engagement positions ensure that everything is in the right place. Dough residues and flour that fall off end up in drawers, thus allowing them to be disposed of quickly and easily. The components in contact with dough and the drives are hermetically separated from one another. The oil circulations for hoppers, pistons and belts are separated from each other, so the amounts used are also controlled separately. Belts can be adjusted with just a few hand movements. Even removing the entire resting chamber belts takes less than one hour. The plant is controlled via a 10-inch colour touch screen.

See pictures on the following pages. ▶

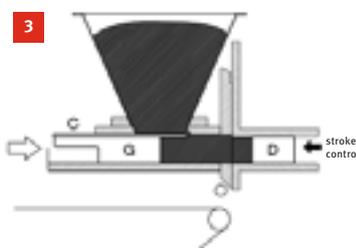
## Principle of the volumetric dough divider



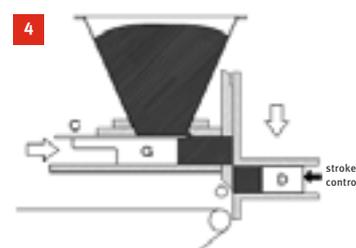
**++ figure 1**  
The compartment is filled with dough, the feeding piston G is moved into its rear position



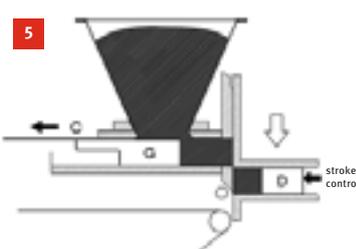
**++ figure 2**  
The hopper opening is closed with the knife C



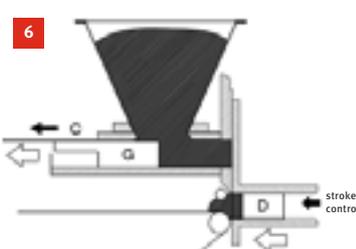
**++ figure 3**  
The feeding piston G pushes the dough into the depositing compartment (the depositing unit is moved into its upper position)



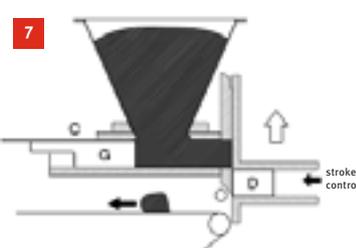
**++ figure 4**  
The dosing piston D is moved up to the stroke control. The required dough volume is enclosed in the depositing compartment. The depositing unit moves downwards. The stroke control can be adjusted to get the required dough volume



**++ figure 5**  
The feeding piston G is in its front position, the knife C is moved backwards



**++ figure 6**  
The feeding piston G moves backwards, the dough is sucked into the main compartment. The depositing compartment moves into the lower position, the dosing piston D puts the dough piece onto the belt



**++ figure 7**  
The dough piece lies on the belt, the depositing unit moves upwards. The feeding piston G is back in its rear position and the main compartment is filled with dough. The cycle starts again with figure 2

The different mobile compartments are completely synchronized, so that a high service speed can be reached (42 cycles/min). The feeding piston enables that the dough is compressed with constant pressure; therefore, a high weight accuracy is reached. The pressure is set between 2 and 5 bar by a manometer



++ figure 1



++ figure 2

++ figures 1+2  
The dough divider, in which components in contact with the dough and the drives are housed completely separately, portions the dough pieces onto the belt, offset in two rows. It can be separated from the plant. Quick-action fasteners ensure that reconnection is quick and easy

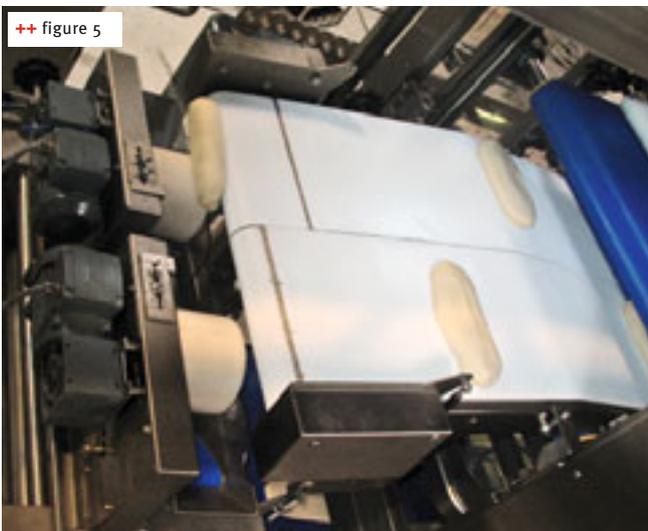


++ figure 3



++ figure 4

++ figures 3+4  
Rolling between two belts, the elongated dough pieces move up and come down again there in two offset rows on the resting belts. The white counter-rollers of the resting belts ensure that the dough pieces are guided and turned as they are transferred from one belt to another



++ figure 5



++ figure 6

++ figures 5+6  
Emerging from the resting phase, they are turned head over heels (i.e. lengthwise), guided downwards and then rolled flat. Rolling the doughs out vertically has the advantage that the dough pieces are given a defined length of 23 cm, which does not change significantly thereafter



++ figure 7



++ figure 8

++ figures 7+8

The dough pieces that were formed into a tongue are then rolled up tightly by a rolling net, giving it as many turns as possible. This re-tensions the dough again. Finally they come down into the pan.



++ figure 9



++ figure 10

++ figures 9+10

The finished toast bread in the pan is removed from the pan. The loaves are uniformly browned and baked evenly with no waste. On the line, approx. 4,000 toast or pan loaves can be baked containing pure wheat dough or even up to 50 % rye flour



++ figure 11



++ figure 12

++ figures 11+12

The adjustment of the drive belts of the cassette long puller decides the moulding length of the baguette dough pieces – the maximum possible length is 800 mm. After 12 min baking time, white baked baguettes come out from the FDA oven, which was developed by Gouet