

## BREADCRUMB & RUSK PROCESSING EQUIPMENT

With their crispy, crunchy outsides and moist, juicy insides, battered and breaded food products are irresistible.

Breading food products helps to seal in moisture when deep-frying or pan-frying. It also provides a crunchy and delicious exterior, and the golden-brown color makes the food more attractive. The consumption of breaded products has increased tremendously during the past decades. Also breaded products have evolved beyond the traditional crumb in terms of functionality, potential health benefits, flavor, texture, and appearance.

Rusk is mainly used as a filler, an ingredient for dried stuffing mixes or a binding agent in hamburgers, sausages, pies, and other compound meat products. It is also a carrier for flavours, colors and seasonings. Rusk is important for its absorption, texture and color properties.

### Ventilex Breadcrumb processing Benefits:

- High quality product with uniform particle size.
- Precise controls enable drying, or toasting, to achieve precise control of color, shape and texture to meet your customer's specifications.
- Processing (milling, drying and cooling) of pellets, bricks, sheets, extrusions or loaves of bread.
- Stand alone fire protection system incorporated into equipment.
- Gentle shaking motion creates fewer fines and less maintenance than competition's high frequency vibration system.



*Fluid bed dryer for breadcrumb*

### Imtech Ventilex breadcrumb and rusk-production equipment

Ventilex is a leading supplier of breadcrumb and rusk dryer production lines. We offer a highly developed product line that is in use at the leading producers world-wide.

The line consists of a bread mill, a fluid bed dryer/cooler, a gas burner, cyclone, recirculation, exhaust blower, cooling fan with filter, ductwork and fully automated controls.

Due to the unique low g-force of the shaking fluid bed design, Ventilex can offer a fully integrated fire protection system with fire detection and water spray nozzles directly in the dryer process space.

The production line can be delivered in seven sizes ranging from 400 kg/hr ( 900 lbs/hr) to 5000 kg/hr ( 9000 lbs/hr) output (finished product spec).



**Breadcrumb milling, drying, baking and toasting with automated controls.**

Breadcrumb comes in many shapes and sizes based primarily on what the customer wants as opposed to the technical characteristics of the material. Most food processing companies have been operating for many years and have defined specific requirements which their end product must meet.

Typically breadcrumb is used as a coating for fish, chicken, etc. The crumb is light weight with an airy structure, good for absorbing allot of oils and water during the baking/frying/cooking of the food stuff.

Breadcrumb is assessed based on how it looks (shape, structure and color), the texture for eating, and the technical properties (absorption, initial moisture content, etc).

Standard breadcrumb is bread made in either bricks/sheets using a sheeting line, or extruded onto the baking belt as individual lines or as one large, continuous layer over the entire baking belt.

These are typically then lightly broken up as they come off the line and then passed to the Ventilex mill for fine milling.

American breadcrumb (also called natural breadcrumb) uses actual loaves of bread. In the past that has been loaves of bread that were reclaimed from supermarkets.

Now the dough is mixed, kneaded, and placed into individual baking tins. It is allowed to rise, then baked in the tins.

Depending on the choice of the customer the loaves may be allowed to cool first, or passed straight to the mill.

**Baking process**

Bread for breadcrumb is generally made with yeast.

The process involves mixing time, proving time (rising), baking and optionally cooling times.

**Cooling / no cooling before milling:**

Cooling helps to fix the structure of the bread making it more resilient through the mill. You get much lighter, less dense crumb from cooled bread. When cooled the bread is typically <50°C on the inside and mills better.

If not cooled, the mill requires a hot air by pass from the burner to reduce condensation and the effects of smearing inside the mill.

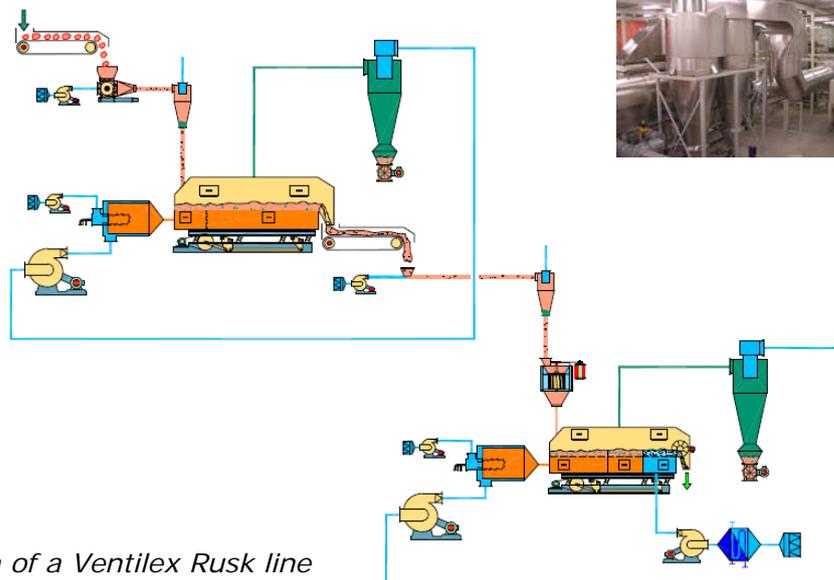
**Milling**

Milling screens determine the quantity of large/small particles into the dryer.

Typical sizes include Ø 4,6,8,10,12 mm.

**Drying/cooling**

Product inlet moisture 35-40% dried to 8-14%, product temperature dryer: 70-80°C, process air temperature: 140-180°C .



*Flowsheet  
Example of a configuration of a Ventilex Rusk line*

### Rusk production/baking process

Rusk is a bread mix where yeast is not used. This is usually replaced by a bicarbonate (either sodium or ammonium) to provide some rising during baking and to produce the airy structure normal for bread.

Because there is no proving time necessary to let the product rise, rusk lines tend to be have a smaller footprint and higher throughputs than breadcrumb processing lines.

A standard baking process using an oven is very similar to breadcrumb except without the proving time required to allow the bread dough to rise.

### Fluid Bed pellet oven

The dough is extruded into small pellets, Ø ~2-3 cm, that are pneumatically transported into a fluid bed oven. Ventilex has developed a fluid bed pellet oven process that is an intensive baking process requiring a significantly smaller footprint than a typical tunnel oven.

The pellets are heated to ~200°C using process air of about 200-220°C. Due to the speed at which the dough is brought to temperature, and the small size of the pellets, there is a relatively large amount of crust, or denser material in the product. Depending on the end user's requirements, significant improvement to the structure can be achieved by adding a conditioning time and a cooling time for the pellets before they are transported to the mill.

### Conditioning / Cooling

The Ventilex system can incorporate a large diameter screw to hold the product at a relatively high temperature after the oven for 15-30 minutes to condition the pellets.

This helps the interior to form a better structure by cooking for longer, while allowing the outside denser crust to absorb the moisture coming from the interior of the pellet, softening and improving the structure.

Before milling, standard baking lines may use a cooling chamber, or a cooling belt

with forced air, or a room cooling track. The Ventilex system can also include cooling (either a belt or a fluid bed) after the conditioning screw. Cooling the rusk fixes the structure before milling in much the same way as it does by breadcrumb.

### Milling

Milling follows a similar principle to that during breadcrumb.

### Drying

Product inlet moisture 35-40% dried to 1-3%, product temp dryer: 150-190°C, process air temperature: 170-210°C. Different products/suppliers/customers require a different mix of drying and conditioning.

Some use only a high temperature drying, heating the product up to 200°C in a thick bed to get a long residence time and the required moisture content.

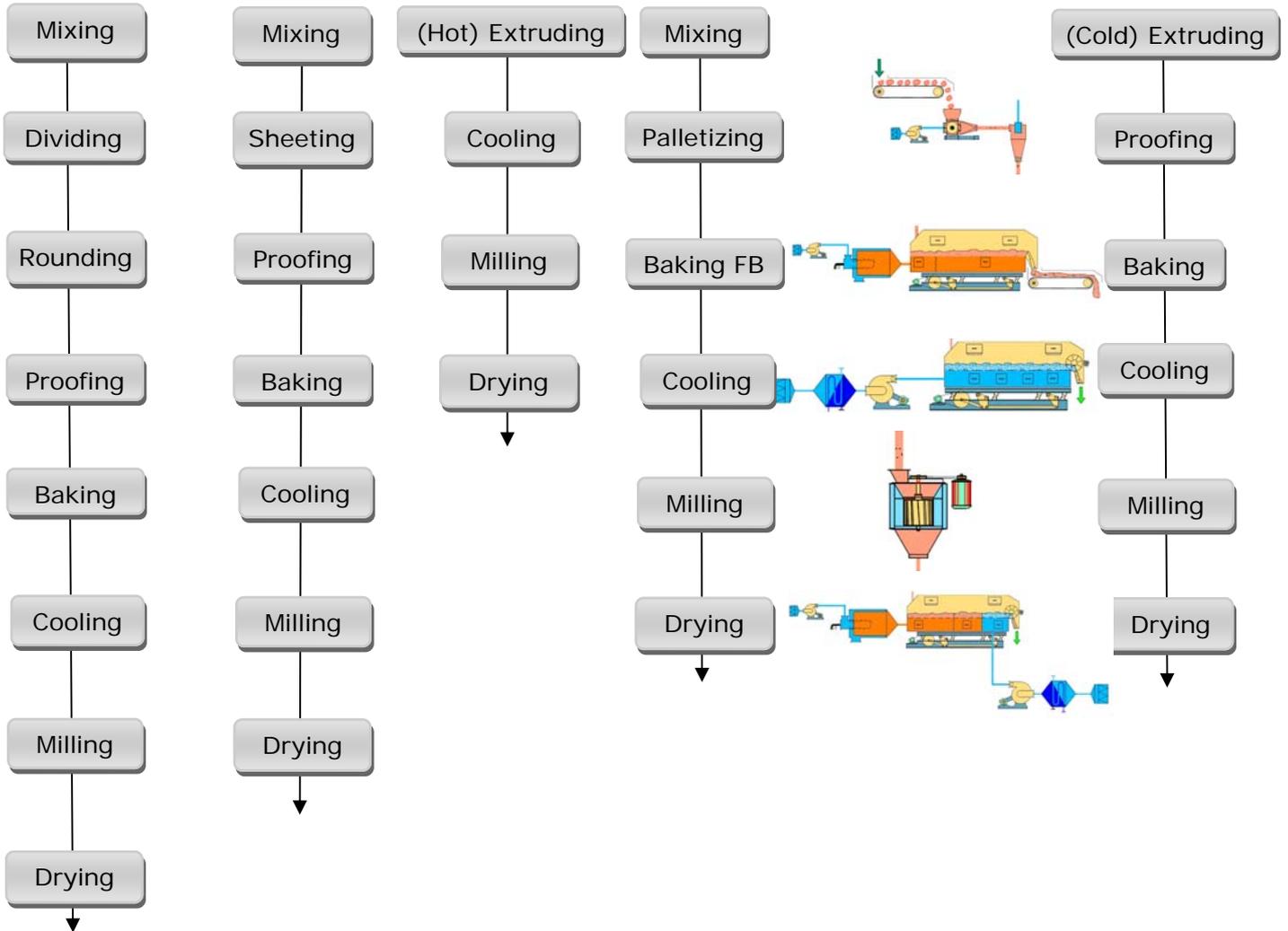
Others use a high temperature drying followed by a conditioning period (maintaining a constant temperature in the product) to get even drier product.

Others use a medium temperature drying (to about 140°C) then conditioning at 130-140°C to get a dry product with maximum



*Bread crumb production line*

### Breadcrumb processing line options



Bread mill



Fluid bed dryer / cooler

## Ventilex Breadcrumb and rusk processing lines

- Ventilex is a leading supplier of breadcrumb dryer production lines worldwide.
- Guaranteed results; color, moisture, size and capacity
- High quality and uniform final product
- Automatically controlled process,
- Data Logging / Traceability
- Hygienic design, high quality finish
- Gentle shaking motion, less fines
- More throughput, low operation cost
- Minimal maintenance
- Low energy consumption
- Fire protection system



*Fluid Bed dryer for breadcrumb*

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*Cyclones behind breadcrumb dryer*