



Tetra Tebel®

Pasta Filata Efficiency line solutions

Continuous processing of Mozzarella and other Pasta Filata cheese



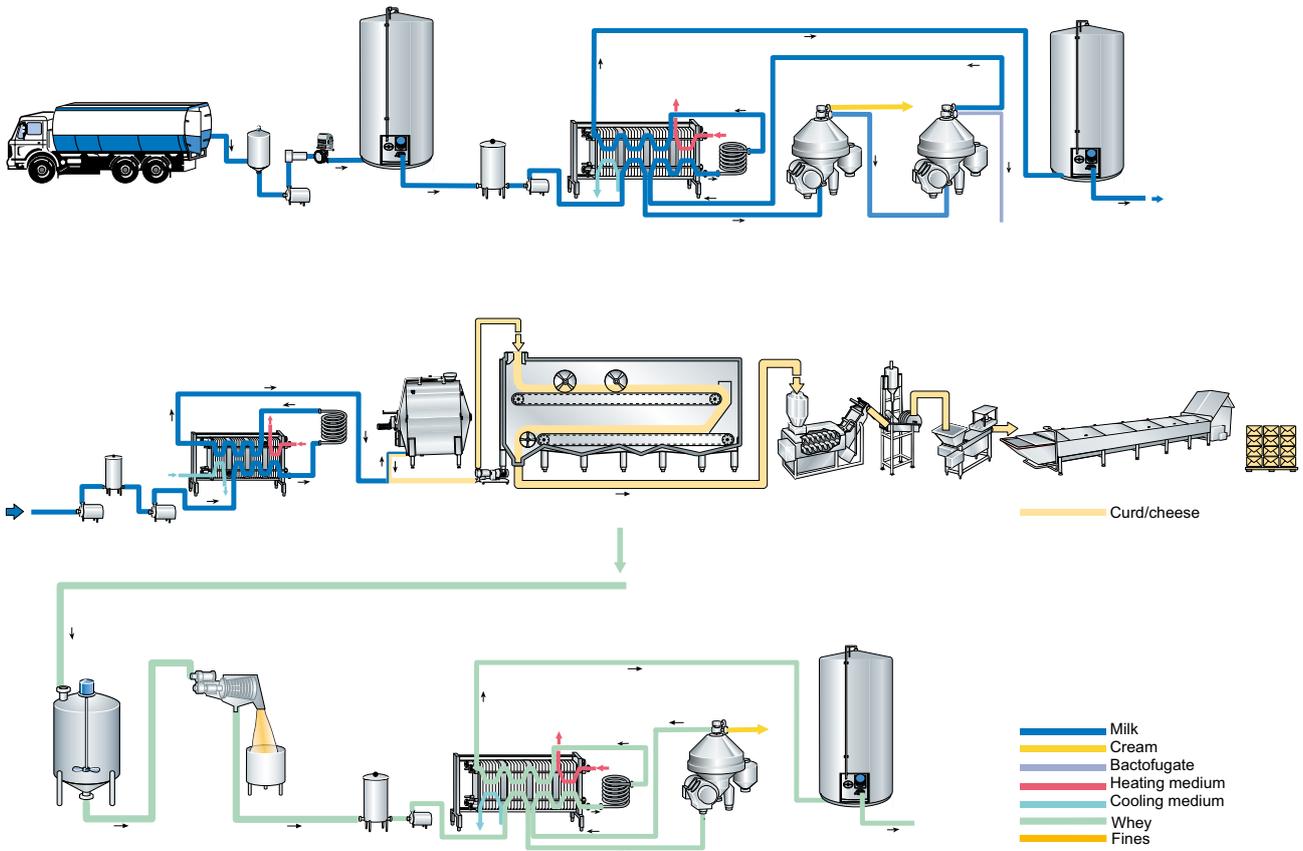
Tetra Tebel Pasta Filata Efficiency line solutions are specially designed for producers who have sufficient milk intake to economically justify full automation. The result is cheese production with the highest yield, quality and performance.

Tetra Tebel Pasta Filata Efficiency line solutions are designed for the production of high quality Pasta Filata cheese types using the fused curd principle, and are completely engineered from milk reception to removing of the cheese from the brine cooling system. Based on Tetra Pak know-how, these are proven solutions backed by guaranteed line performance.

Tetra Tebel Pasta Filata Efficiency line solutions can produce a wide variety of Pasta Filata cheese types, such as Mozzarella, Provolone, Kashkaval and Pizza Cheese varieties.

Capacity range

Tetra Tebel Pasta Filata Efficiency line solutions are designed to process up to 400 000 litres of raw milk per day, depending on the cheese type and production hours.



Process description

Tetra Tebel Pasta Filata Efficiency line solutions are based on raw milk of acceptable quality (SCC < 400 000 /ml and SPC < 10 000 cfu/ml).

1. Pre-treatment

After reception, the raw milk is cooled and stored. In combination with thermization, the milk is standardized and bactofugated (optional). Afterwards the milk is cooled and sent to the cheese milk storage tanks to rest and deaerate. (Cream is cooled and stored. Further treatment is not covered in this solution. Bactofugate is treated as a waste stream.)

2. Pasteurization

Pasteurization at typical cheese milk temperatures takes place when the plant is ready for production. After cooling to renneting temperature, the cheese milk is fed directly to the cheese-making vats.

3. Curd-making

In all cheese-making, air inclusion should be avoided when the milk is fed into the curd-making vat. The milk should therefore be fed to Tetra Tebel OST vat(s) or Tetra Damrow Double-O Vat(s) via a combined bottom inlet/outlet pipe or a foam-repressing top inlet.

The vats are designed for producing a variety of cheese types; the intensity of cutting and stirring can vary, and the heating rate can be optimized for each cheese type.

During filling, the milk is mixed with starter culture to start the process of acidification. At the end of filling, rennet is added and the coagulation process begins. During this process, the casein network starts to form, and the milk turns into a gel. After approximately 30 minutes the milk coagulates and is ready to be cut. Cutting is done to release the whey trapped in the casein network. During cutting, heat is applied to firm and shrink the curd, thus expelling more whey. The curd-whey mixture is delivered by dual pump-out to the draining / acidification section.

4. Draining and acidification

From the curd-making vats, the curd and whey mixture is pumped by means of two positive pumps to the Tetra Tebel Alfomatic draining and acidification module.

Tetra Tebel Alfomatic

Tetra Tebel Alfomatic gives efficient curd conditioning and whey drainage. On entering the machine, the curd / whey mixture passes over a de-whey screen where ~92% of the whey is drained off. On the first belt, the curd forms a "mattress" which is then inverted at the turn-over chute before reaching the second belt. During this process, the acidification of the curd continues.

When the right acidity is achieved – normally at the end of the second belt – it is cut into chips of approximately 14 x 14 x 200 mm. After being cut into chips, the curd is blown via a combination rotary valve and a blower to the cooker / stretcher.

5. Cooking and stretching

The curd is blown from Tetra Tebel Alfomatic to a cyclone mounted on top of the cooker / stretcher, where air and product are separated, after which the chips drop in to the hopper of the cooker. The cooker / stretcher performs three different actions in one machine:

- **Cooking.** To achieve the correct consistency, the curd is heated with hot water to the correct cooking temperature. The curd is transported through the cooking water by means of two counter-rotating augers.
- **Moisture control.** In the middle of the cooker / stretcher there is a mechanism that opens up the molten curd mass to allow the uptake of more moisture.
- **Stretching.** Throughout the cooker / stretcher, the counter-rotating augers not only transport the curd, but also knead and stretch it gently, until it achieves the elasticity that is desirable in Pizza Cheese.

6. Dry salting

In the dry salter, the molten curd is weighed and a pre-set amount of salt is added to the curd. After salting, the curd is transported to the moulder.

7. Moulding

The curd coming from the dry salter drops in to the hopper of the moulder. From here it is fed in to the mould cavities by means of two counter-rotating augers, where the cheese is given its final shape (round or square). The moulder rotates one full round before ejecting the blocks in to the brine cooler. During this rotation, cold water is sprayed on the moulds to ensure proper block stability.

8. Brine-cooling

After initial pre-cooling in the moulder, the curd blocks are now ready to be cooled down to their final temperature (for packing or shredding). This cooling takes place in a long and shallow bath. Depending on the cooling time (which can vary between 2 and 5 hours), the bath can be L- or U-shaped or even multi-layered.

9. Block-drying

After cooling, the cheese blocks are transported out of the cooling liquid to a dryer. Here the remaining liquid on the blocks is dispersed by means of compressed air, preparing the blocks for packaging.

10. Whey processing

Whey must be processed as soon as possible after collection, as its temperature and composition promote the growth of bacteria.

Whey comprises 80 – 90% of the total volume of milk entering the process and contains about 50% of the nutrients in the original milk: soluble protein, lactose, vitamins and minerals. Whey as by-product of Pasta Filata production is known as sweet whey and has a pH of 5.9 – 6.2. Whey is very often diluted with water.

The first stage in whey processing is filtering the curd particles left in the whey, followed by separation of fat and casein fines, partly to increase the economic yield and partly because these constituents interfere with subsequent treatment.

Fines recovery and fat separation

Casein fines, always present in whey, adversely affect fat separation and should therefore first be removed by a separation device – a vibrating screen. Fat is recovered in a centrifugal separator.

The cheese fines can be collected and either re-used immediately in the Tetra Tebel Alfomatic machine or used for processed cheese manufacturing. The whey cream, with a fat content of 25 – 30%, can partly be reused in cheese-making to standardize the cheese milk. This way, you can use a corresponding quantity of fresh cream for special cream products. Tetra Pak can also help you to ensure food safety and product quality.

Whey that cannot be processed immediately should either be chilled or pasteurized as soon as the fat and fines have been removed.

For short-term storage (max. 4 hours), cooling is usually sufficient to reduce bacterial activity. Longer periods of storage require pasteurization of the whey. To reduce the volume, the whey can be concentrated using the Tetra Alcross Reverse Osmosis (RO) system. Whey is concentrated to minimize storage and transport costs. Further processing of the whey is not covered in this solution.

Typical set-up for a Tetra Tebel Pasta Filata Efficiency line solution

- 1. Pre-treatment**
 - Tetra Therm Lacta milk pasteurizer
 - Tetra Centri separator
 - Tetra Centri bactofuge (optional)
- 2. Pasteurization**
 - Tetra Therm Lacta milk pasteurizer
- 3. Curd-making**
 - Tetra Tebel OST or Tetra Damrow Double-O Vat
- 4. Draining and acidification**
 - Tetra Tebel Alfomatic
- 5. Cooking and stretching**
 - Dima cooker/stretcher
- 6. Dry salting**
 - Dima dry salting unit
- 7. Moulding**
 - Dima carousel moulder
- 8. Brine / cooling**
 - Dima brine / cooling unit
- 9. Block-drying**
 - Dima block-drying unit
- 10. Whey processing**
 - Tetra Therm Lacta whey pasteurizer
 - Tetra Centri whey clarifier
 - Tetra Alcross Reverse Osmosis (optional)