

Cheese making and the role of vacuum

Cheese making is an ancient craft that dates back to the very beginning of civilization. Cheese has been recognized over the centuries in almost all cultures as having great nutritional value, texture and taste. The variety of different cheeses is endless.

Pasteurization

Cheese should be made from High-quality milk, free from flavors, odors or sediments. When milk arrives from local farms it is pasteurized by heating to 162°F (72°C) for 15 seconds, then cooled rapidly, to destroy harmful bacteria.

Ripening

The milk then enters the cheese vats where it is agitated and the ripening process begins. Ripening (the development of acid in the milk) is accelerated by introducing specific lactic acid bacteria, which assist in developing the cheese texture and flavor; and which changes the milk sugar (lactose) into lactic acid which is essential for the curd to form and shrink and expel the whey.

Coagulation

A coagulating enzyme, chimosin, found in rennet, is also added. This is called setting the vat. The cheese milk is stirred for about 5 minutes, then covered and left undisturbed while the coagulation process occurs in about half an hour.

Cutting the curd

When the milk is coagulated it is ready to be cut, separating the solids (curd) from the liquid (whey). The release of moisture (whey) from the curd after it has been cut is called syneresis.

Stirring and heating the curd

Stirring and heating the curd helps to release more whey. The type of cheese being made determines the length of this process. Fresh, soft cheeses are not cooked, but drier matured cheeses are. Cheddar is heated to 100°F (38°C), Parmesan would be heated to 130°F (54°C).

Draining the curd

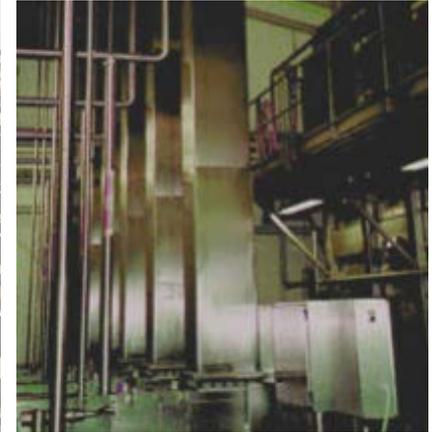
When the proper acidity is achieved the curd and whey are pumped to a draining table where the whey is pumped off. (Whey is used in a variety of products, such as candy, ice cream, vinegar, whey drinks and bakery products.)

Cheddaring

The purpose of cheddaring is to control moisture content and allow the curd to form the right consistency. The curd is cut repeatedly and piled in overlapping blocks to allow maximum whey drainage. The desired texture is achieved after approximately 2 hours.



Block-forming towers in cheese factory



6 of 11 Vmax oil-sealed liquid ring vacuum pump systems installed at a cheese manufacturing plant

Milling

The curd is cut into small pieces to promote more whey removal and prepare the cheese curd for pressing. Salt is added and the curd is constantly stirred until the salt has been absorbed (about 20 minutes). Pieces of milled curd can have different sizes, depending on the kind of cheese being produced. For cheddar cheese they are about 1" across (like potato chips). For drier cheeses, such as Parmesan, the curd is cut to the size of rice grains.

Pressing

When the curd is smooth and the flow of whey has stopped it is ready to be pressed. In the past the curd was pressed into molds by mechanical presses and then matured in temperature-controlled rooms. In the large cheese factories of today the curd is transported to block-forming towers where it is compressed under its own weight for about 35 minutes.

Vacuum

Vacuum is applied to pull out excess whey and air trapped during pressing. It helps to cool the cheese which allows it to cure more evenly. At the bottom of the tower 20 kg (44 Lbs) blocks of cheese are pushed out, checked, weighed and transported to maturing chambers.

Maturing

The cheese is stored and cooled between 4 and 8°C (39 and 46°F) until maturity. Length of time in storage determines strength and flavor of the cheese. Mild cheese is matured for 3 months, medium for up to 9 months and mature (strong) cheese for 15 to 24 months.

Packaging

The matured cheese is then cut into consumer-sized portions and VACUUM-wrapped to ensure freshness, before it is shipped to the stores.





VACUUM ON BLOCK-FORMING TOWERS

SYSTEM SPECIFICATIONS

Type of application:
Vacuum on block-forming towers in the cheese industry to pull out excess moisture and trapped air

Type of system or pump:
Vmax closed-loop oil-sealed liquid ring vacuum pump system

System capacity and model number:
Capacity to be determined by process, may require up to 3000 CFM, (VMXxxxKA1-00)

System components:
Vmax oil-sealed liquid ring systems will include temperature control valve, inlet filter, vacuum relief valve and control panel

System performance:
Inlet gas composition will be air and water vapor; Inlet gas temperature will be atmospheric conditions

Vmax advantages

- The only system on the market with a **full 3-year warranty**
- Patented, **high-efficiency DX-5 separator** eliminates oil carry-over concerns
- Rugged, **high-quality, industrial system**, offering years of **trouble-free operation**
- **Extended-life seal fluid** is not used as a lubricant; **10,000 hours of continuous operation**
- **Extremely low operating noise** level makes this system desirable in today's workplace
- **Air-cooled design, no cooling water required**, resulting in substantial savings
- **Carry-over** of soft solids and/or minimal amounts of liquid **does not cause damage** to internal parts of the pump
- Now available with optional **Variable Frequency Drive** resulting in lower power consumption

VACUUM FOR VACUUM SEALING AND PACKAGING

PUMP SPECIFICATIONS

Type of application:
Vacuum for vacuum sealing and packaging

Type of pump:
DuraVane lubricated rotary vane vacuum pump

Pump capacity and model number:
Capacity to be determined by packaging machine size, (RVLxxxH)

Pump components:
DuraVane lubricated rotary vane vacuum pump



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