SeppA
Simple Innovations

DAIRY PROCESSING EQUIPMENT

25 Years Of
Complete Line Solutions

Seppa is the leading manufacturer in the field of providing complete solutions for dairy projects. Backed by latest process support facility and team of experienced professionals, we are able to meet handling demands of complete project on Turnkey Basis from start to finish. With our expertise in designing, developing and implementing of solutions as per the defined steps in the project areas, we are able to assure customers of best available services in the market for handling Juice and Soft drink projects.

Here, we are successfully providing complete engineering consultancy support including customized engineering support for meeting the needs of installing plants that are designed for the production of wide variety of beverages. The services of experienced project team comprising technical staff and service engineers also ensure that the complete project is implemented in a smooth manner while taking responsibility right throughout the project.

With a product that can be stored for long periods without spoiling and with no need for refrigeration, there are many advantages for both the producer, the retailer and the consumer. This includes expensive products such as cream, desserts and sauces.

In a modern UHT plant (Ultra High Temperature) the milk is pumped through a closed system. On the way it is preheated, highly heat treated, homogenized, ultra highly heat treated, cooled and packed aseptically. Low acid (pH above 4.5 – for milk more than pH 6.5) liquid products are usually treated at 135 – 150C for a few seconds holding, by either indirect heating or direct steam injection or infusion. High acid (pH below 4.5) products such as juice are normally heated at 90 – 95C for 15 – 30 seconds holding. All parts of the system downstream of the actual highly heating section are of aseptic design to eliminate the risk of reinfection, include aseptic packaging in packages protecting the product against light and atmospheric oxygen. Ambient storage is normal.

Various UHT systems
There are two main types of UHT systems on the market.

1. In the direct systems the product comes in direct contact with the heating medium, followed by flash cooling in a vacuum vessel and eventually further indirect cooling to packaging temperature. The direct systems are divided into:
a. steam injection systems (steam injected into product),
b. steam infusion systems (product introduced into a steam-filled vessel).

2. In the indirect systems the heat is transferred from the heating media to the product through a partition (plate or tubular wall). The indirect systems can be based on:
a. plate heat exchangers,
b. tubular heat exchangers,
c. scraped surface heat exchangers,

Furthermore it is possible to combine the heat exchangers in the direct systems according to product and process requirements

The Whole Line Including

1.Water Treatment section
2.Milk Receiving or powder dissolving Section
3.Preparation Section
4.UHT Sterilization Section
5.Filling & Packaging Section
6.CIP Cleaning Section
7.Chiller
8.Compressor
9. Steam Boiler
10. Installation Material

Technical Parameters

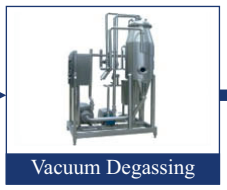
Raw material	: Fresh cow milk, powder milk
Product	: UHT whole milk, UHT skimmed milk, UHT flavor milk, etc
Product package	: Brick shape aseptic carton, (like Tetrapack), Pillow shape aseptic pouch, plastic bottle, etc

UHT MILK FLOW CHART


Raw Milk Testing


Filter


Milk Separator


Vacuum Degassing

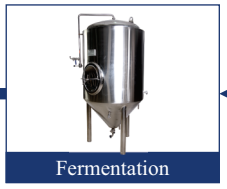

Cooling Storage Tank


Plate Heat Exchanger


Mixing Tank


Filter


Homogenizer

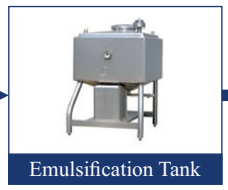

Fermentation


Tube UHT Sterilizer


Warm Keeping Tank


Milk Powder or Milk


Water - Powder Mixer


Emulsification Tank


Filter


Mixing Tank


Homogenizer


Vacuum Degassing


Tube UHT Sterilizer


Temporary Storage


Filling Machine


Pure Ro Water


Label Shrinking


Dryer


Continuos Spraying Sterilizer


Tilting


Testing


Ink Jet Printer


Shrink Wrapping

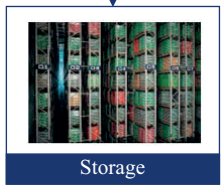

Test


Packing


Carton - Ink Jet Printer


Carton


Palletizing


Storage

The Production line produce several types of pasteurized milk products, i.e. whole milk, skimmed milk and standardized milk of various fat contents.

First the milk is preheated and standardised by in line milk fat standardisation system. The purpose of standardisation is to give the milk a defined, guaranteed fat content. Common values are 1.5% for low fat milk and 3% for regular grade milk, fat contents as low as 0.1 and 0.5% is skimmilk.

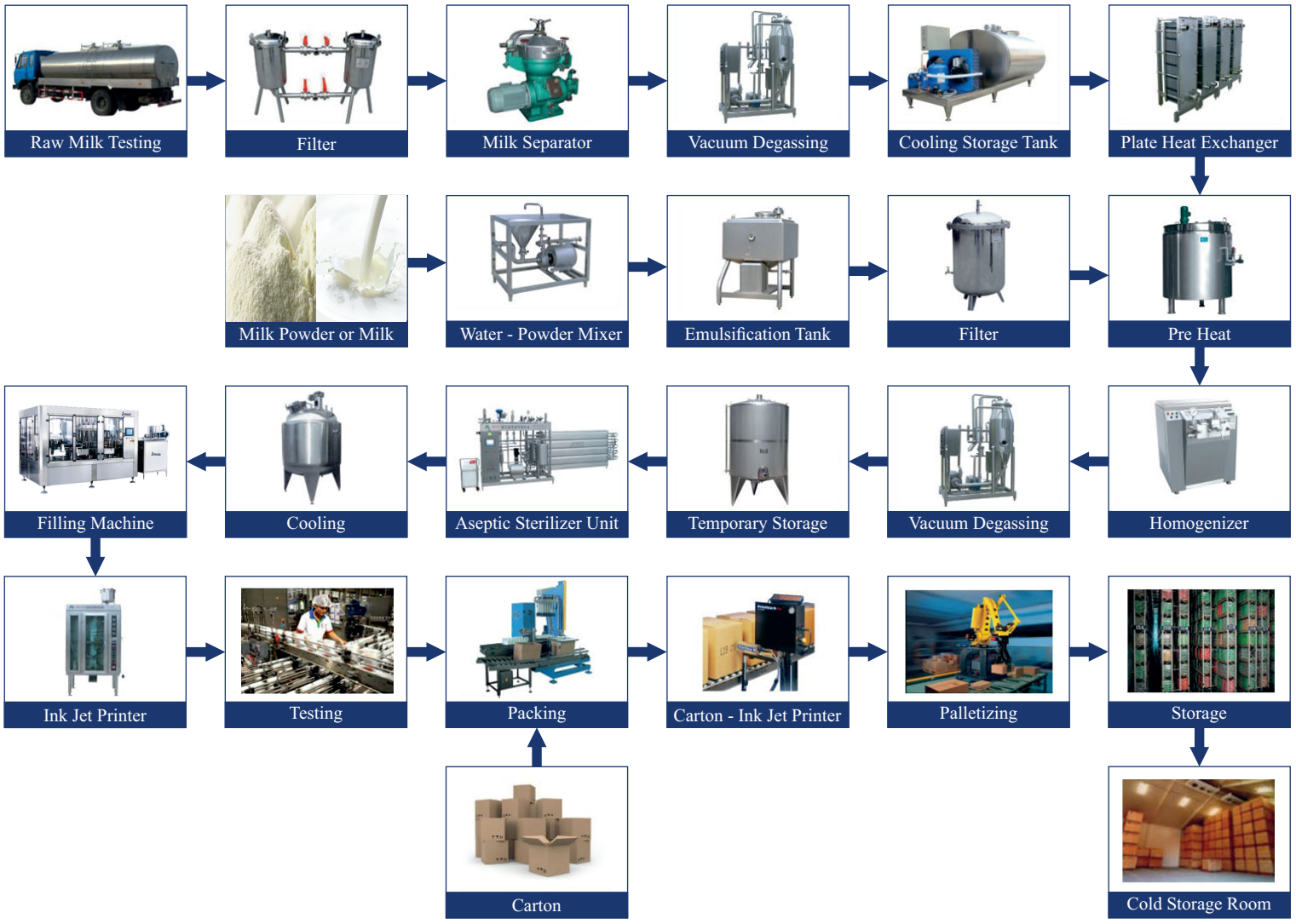
Then the standardised milk is homogenised. The purpose of homogenisation is to disintegrate or finely distribute the fat globules in the milk in order to reduce creaming. Homogenisation may be total or partial. Partial homogenisation is a more economical solution, because a smaller homogeniser can be used.

The milk, now is pumped to the heating section of the milk heat exchanger where it is pasteurised. The necessary holding time is provided by a separate holding tube. The pasteurisation temperature is recorded continuously. Pump is a booster pump which increases the pressure of the product to a level at which the pasteurised product cannot be contaminated by untreated milk or by the cooling medium if a leak occur in the plate heat exchanger. If the pasteurisation temperature should drop, this is sensed by a temperature transmitter. A signal activates flow diversion valve and the milk flows back to the balance tank.

After pasteurisation the milk continues to a cooling section in the heat exchanger, where it is regeneratively cooled by the incoming untreated cold milk, and then to the cooling section where it is cooled with ice water. The cold milk is then pumped to the filling machines.

Temperature and pasteurisation holding time are very important factors which must be specified precisely in relation to the quality of the milk and its shelf life requirements. The pasteurisation temperature is usually 72 – 75C for 15 – 20 sec. A common requirement is that the heat treatment must guarantee the destruction of unwanted microorganisms and of all pathogenic bacteria without the product being damaged.

PASTEURIZED MILK FLOW CHART



The Whole Line Including

1.Water Treatment section
2.Milk Receiving or powder dissolving Section
3.Preparation Section
4.Pasteurization Section
5.Filling &Packaging Section
6.CIP Cleaning Section
7.Chiller
8.Compressor
9. Steam boiler
10.Cooling Room
11. Installation Material

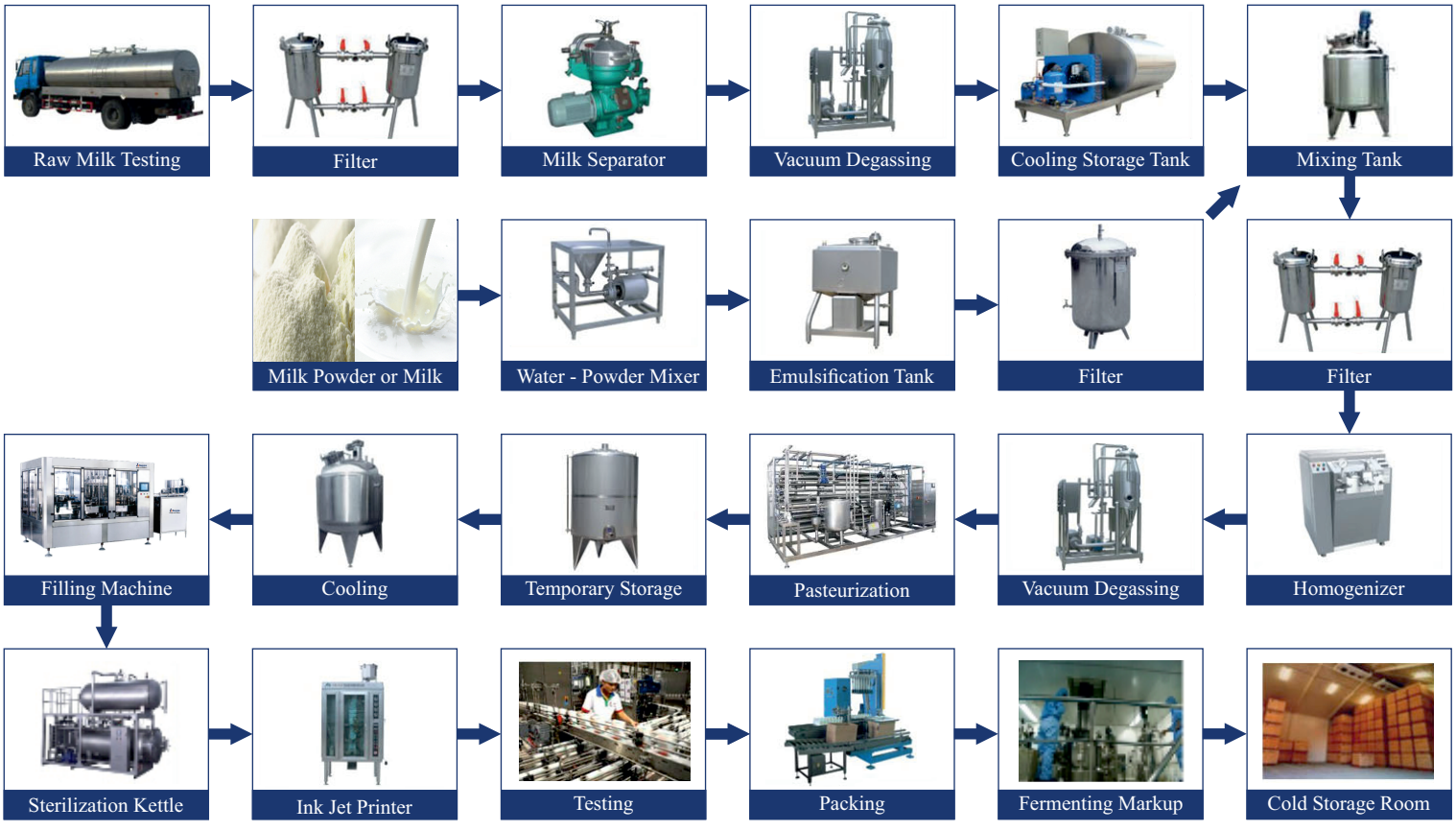
Technical Parameters

Raw material : Fresh cow milk, powder milk
Product : Pasteurized whole milk, pasteurized skimmed milk, pasteurized flavor milk, etc
Product package : Gable Topcarton,plastic pouch,plastic bottle,etc

The pretreatment of the milk is the same, regardless of whether set or stirred yoghurt is to be produced. It includes standardization of the fat and dry matter contents, heat treatment and homogenization. It is assumed that the milk has been standardized to the required fat content before entering the line and standardization of the dry matter content takes place in an evaporator in the process line. If the dry matter content is adjusted by addition of milk powder, the equipment used is similar to that described under “Recombined milk”. Any additives, such as stabilizers, vitamins, etc., can be metered into the milk before the heat treatment. When the yoghurt milk has been pretreated and cooled to inoculation temperature, the procedure for further treatment depends on whether set, stirred, drink, frozen or concentrated yoghurt is to be produced. The quality of the yoghurt in terms of texture and flavour is essential.

The pretreated milk, cooled to incubation temperature, is pumped to the incubation tanks (7). Simultaneously a preset volume of bulk starter (6) is dosed into the milk stream. After a tank has been filled, agitation commences and continues for a short time to assure uniform distribution of the starter culture. The incubation tanks are insulated to ensure that the temperature remains constant during the incubation period. The tanks can be fitted with pH meters to check the development of acidity. In typical production of stirred yoghurt the incubation period is 2.5 to 3hours at 42 – 43C when the ordinary type of bulk starter (2.5 – 3% inoculums) is utilised. To attain optimum quality, cooling from 42 – 43C to15 – 22C should be accomplished within 30 minutes after the ideal pH-value has been reached to stop further development of bacteria. The coagulum must be subjected to gentle mechanical treatment so that the final product will have the correct consistency. Cooling takes place in a plate heat exchanger (8) with special plate.
After cooling to 15 – 22C, the yoghurt is ready for packing. Fruit and various flavours can be added (10) to the yoghurt when it is transferred from the buffer tanks to the filling machines. This is done continuously with a variable speed metering pump which feeds the ingredients into the yoghurt in the fruit blending unit. The blending unit is static and hygienically designed to guarantee that the fruit is thoroughly mixed into the yoghurt. The fruit metering pump and the yoghurt feed pump operate synchronously.

Process Flow Production of Yogurt



CONDENSED MILK PRODUCTION LINE

Sweetened condensed milk (SCM)

Before evaporation, the fat and solids-non-fat values of the milk have been standardised to predetermined. The milk has also been heat treated to destroy micro-organisms and enzymes which could cause problems and to stabilise the protein complex. Heat treatment is also important to the development of product viscosity during storage, and is particularly important in the case of sweetened condensed milk. The addition of sugar is a key step in the manufacture of sweetened condensed milk, as the shelf life of the product depends on its osmotic pressure being sufficiently high. A sugar content of at least 62.5% in the aqueous phase is required. Two methods are used for addition of sugar:

- Addition of dry sugar before heat treatment
- Addition of sugar syrup in the evaporator

The stage at which the sugar is added affe cts the viscosity of the end product. The evaporator is usually of the multistage falling-film type. When sugar is added in the evaporator, the syrup is drawn into the evaporator and mixed with the milk at the half-way stage of the process. Evaporation then continue until the required dry matter content has been reached. The dry matter content is checked continuously by determining the density of the concentrate.

Sweetened condensed milk must be cooled aft er evaporation. This is the most critical and important stage in the whole process. The water in the condensed milk can only hold half the quantity of lactose in solution. The remaining half will therefore be precipitated in the form of crystals. If the surplus lactose is allowed to precipitate freely, the sugar crystals will be large and the product will be gritty and unsuitable for many applications. It is consequently preferable to control the crystallisation of lactose so that very small crystals are obtained. The required crystallisation is accomplished by cooling the mixture rapidlyunder vigorous agitation, without air being entrapped. The cooled condensed milk is pumped to a storage tank where it is kept until the following day to allow the crystallisation process to be completed.

Sweetened condensed milk should be yellowish in colour and have the appearance of mayonnaise. Traditionally, it is packed in cans, which in this case must be cleaned and sterilised before filling as no sterilisation takes place after canning. Nowadays it is also possible to pack sweetened condensed milk in aseptic paperboard packages. The product is also packed in big barrels, holding about 300kg, for supply to large-scale users.

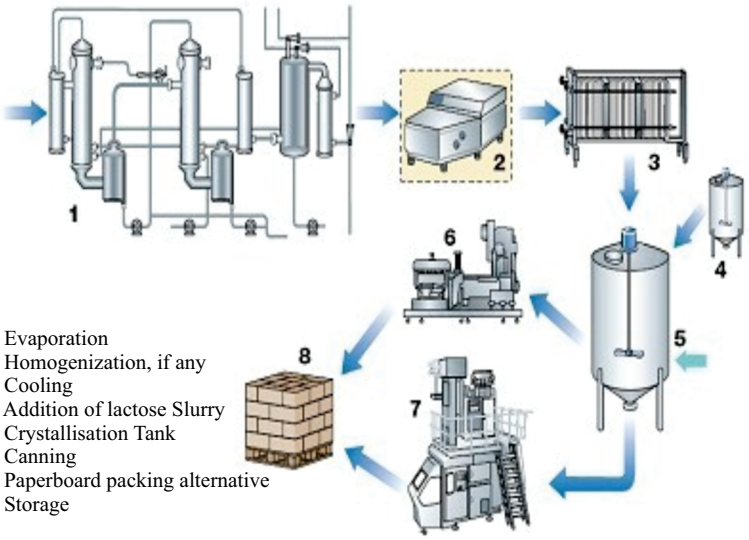
CONSTRUCTION FEATURES

Working capacity from 5 tons/d up to 100 tons/d

PRODUCTS

- Sweetened condensed milk
- Evaporated milk without sugar
- Condensed milk in varied pack age: Can, aseptic paperboard packages, big barriers; etc.

Complete Line - Sweetened Condensed Milk Production Line



1. Evaporation
2. Homogenization, if any
3. Cooling
4. Addition of lactose Slurry
5. Crystallisation Tank
6. Canning
7. Paperboard packing alternative
8. Storage

BENEFIT

1. Opportunity to realize products with customized recipes.
2. Opportunity to produce more than one product with the sa me processing line.
3. Wide customization of the final product.
4. Maximum yield, minimum production waste.
5. Highest energy savings thanks to the most advanced technologies.
6. Complete line supervision system through monitoring of every process phase.
7. Recording, visualization and printing of all daily production data.

CHEESE PRODUCTION LINE

Cheese making involves a number of main stages which are common to most types of cheese.

The cheese milk is pretreated, after addition of a bacteria culture appropriate to the type of cheese, and mixed with rennet. The enzyme activity of the rennet causes the milk to coagulate to a solid gel known as coagulum. This is cut with special cutting tools into small cubes of the desired size to facilitate expulsion of whey. During the rest of the curd making process the bacteria grow and form lactic acid, and the curd grains are subjected to mechanical treatment with stirring tools, while at the same time the curd is heated according to a preset program. The combined effect of these three actions – growth of bacteria, mechanical treatment and heat treatment – results in syneresis, i.e. separation of whey from the curd grains.

The finished curd is placed in cheese moulds, which determine the shape of the finished cheese. The cheese is pressed, either by its own weight or by applying pressure to the moulds. Finally, the cheese is coated, wrapped or packed. Most kinds of cheese will ripened in the ripening room for deferent period.

BENEFIT

1.Opportunity to realize products with customized recipes.
2.Opportunity to produce more than one product with the same processing line.
3.High quality of the final product keeping an elevated nutritional value.
4.Wide customization of the final product.
5.Maximum yield, minimum production waste.
6.Highest energy savings thanks to the most advanced technologies.
7.Complete line supervision system through monitoring of every process phase.
8.Recording, visualization and printing of all daily production data.

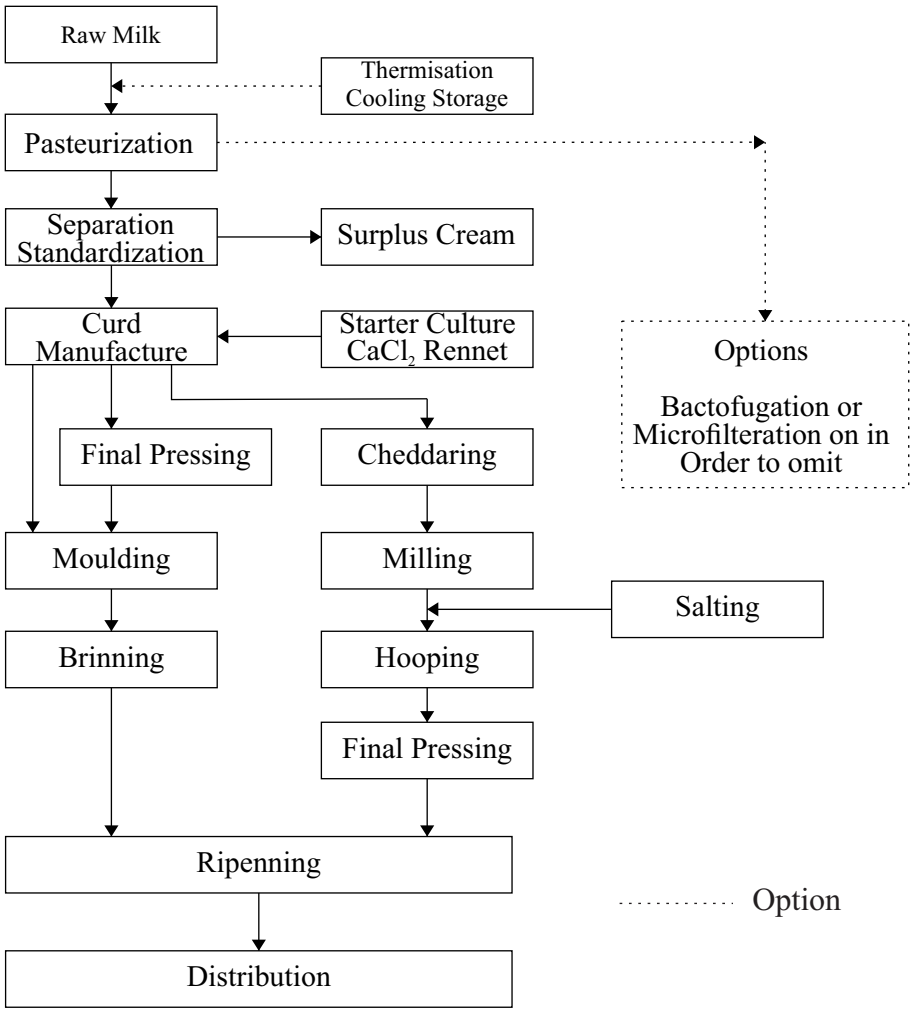
CONSTRUCTION FEATURES

Working capacity : 1 tons/d up to 50 tons/d

Products

- Cheddar cheese
- Emmenthal cheese
- Gouda cheese
- Tilsiter cheese
- Mozzarella cheese
- Blue veined cheese
- Camembert cheese
- Cottage cheese
- Quarg
- Processed cheese

Process Flow Production Of Hard Ad Semi-hard Cheese



MILK POWDER PRODUCTION LINE

The milk fat content is standardised in a direct standardisation system. Standardised milk used for producing whole milk powder is not normally homogenized.

In the production of dried whole milk the heat treatment must be so intense that the lipases will also be inactivated. This normally involves high-temperature pasteursation to a negative peroxidase test. Falling-film evaporators are generally used for concentration, which is carried out in two or more stages to a DS content of 45 – 55%.

Two-stage drying

The last traces of moisture are the most difficult to remove, unless high outlet drying temperatures are used to provide a sufficient driving force. As elevated outlet drying temperatures can have a detrimental effect on powder quality, it is essential to operate at lower outlet temperatures with dairy products. If the moisture content of the resulting powder is still too high, an after-drying stage is incorporated after the spray dryer in a two-stage process.

Two-stage drying methods for producing powdered milk product combine spray drying as the first stage and fluid bed drying as the second stage. The moisture content of the powder leaving the dryer chamber is 2 – 3% higher than the final moisture content. The function of the fluid bed dryer is to remove excess moisture and finally to cool the powder down.

The powder is packed in cans, paper bags, laminated bags or plastic bags, depending on the quality and the requirements of the consumers.

Milk powder production requires the drying of liquid milk into a powder in which aromas, flavours and colouring as well as many important components such as protein, fat, carbohydrate, vitamins, minerals etc. are retained. Additional challenges is a uniform moisture content, particle structure and particle size distribution, solubility, dispersability and wettability.

The Whole Line Including

1.Water Treatment section
2.Milk Receiving Section
3. Preparation Section
4. Concentration Section
5. Drying section
6.Packaging Section
7.CIP Cleaning Section
8.Compressor
9. Boiler
10. Chiller
11. Installation Material

Technical parameters

Raw material	:	Fresh cow milk
Product	:	Whole milk powder,Sweet milk powder,Skimmed milk powder, Infant milk powder, Formulated milk powder, etc
Capacity	:	1.5T/D–100T/D
Product Package	:	Tin, plastic bag,etc

Figure schematically shows both batch production in a churn and continuous production in a butter making machine.

The cream can be supplied by a liquid milk dairy (surplus cream). From the intermediate storage tank the cream continues to pasteurisation at a temperature of 95C or higher. The high temperature is needed to destroy enzymes and micro-organisms that would impair the keeping quality of the butter. The heat treatment releases strongly anti oxygenic sulphhydryl compounds, which further reduce the risk of oxidation.

Vacuum deaeration can also be included in the line if the cream has an undesirable flavour or aroma, e.g. onion taste. Any flavouring will be bound in the fat and transmitted to the butter unless removed. After this the cream is returned to the pasteuriser for further treatment –heating, holding and cooling – before proceeding to the ripening tank. In the ripening tank, the cream is subjected to a temperature program which will give the fat the required crystalline structure when it solidifies during cooling. The program is selected to match factors such as the composition of the butter fat, expressed for example in terms of iodine value, which is a measure of the unsaturated fat content.

The treatment can also be modified to produce butter with good consistency despite a low iodine value, e.g. when the unsaturated proportion of the fat is low. Ripening usually takes 12 – 15 hours. Where possible, the acid producing bacteria culture is added before the temperature treatment. The quantity of culture added depends on the treatment program selected with reference to the iodine value.

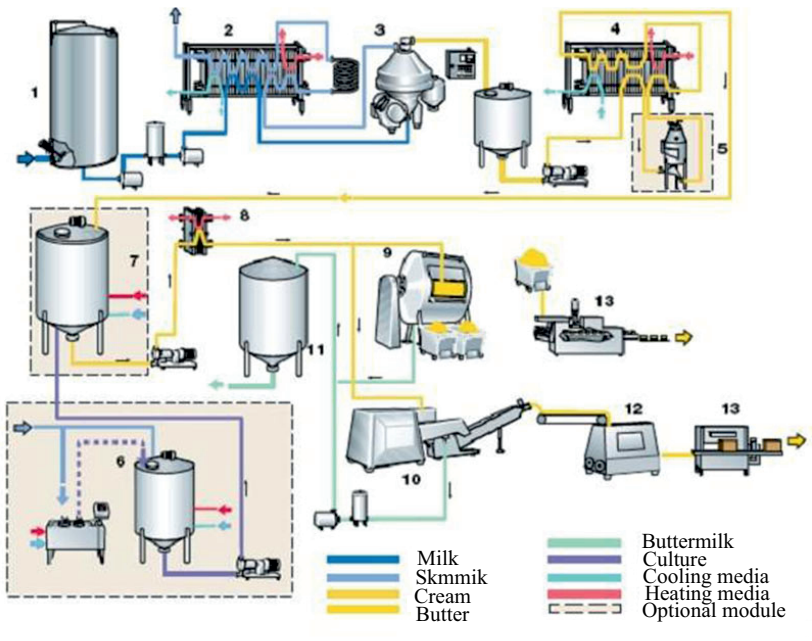
From the ripening tank the cream is pumped to the continuous butter-maker or the churn. In the churning process the cream is agitated violently to break down the fat globules, causing the fat to coalesce into butter grains. The cream is split into two fractions: butter grains and buttermilk. In traditional churning the machine is stopped when the grains have reached a certain size, and then the buttermilk is drained off. Buttermilk drainage is continuous in continuous butter making machines. After drainage the butter is worked to a continuous fat phase containing a finely dispersed water phase. If the butter is to be salted, salt is spread over the surface in batch production, or added in slurry form during the working stage in continuous butter making. After salting, the butter must be worked further to ensure uniform distribution of the salt. The working of the butter also affects the characteristics by which the product is judged – aroma, taste, keeping quality, appearance and colour. The finished butter is discharged into the packaging unit and thence to cold storage.

CONSTRUCTION FEATURES

Working capacity from 1 tons/d up to 50 tons/d
Products - Sweet butter, Sour butter, Salted butter
Package in bulk container, small box

General Process Steps In Batch And Continuous Production Of Butter

1.Milk reception
2.Preheating and pasteurisation of skimmilk
3.Fat separation
4.Cream pasteurization
5.Vacuum deaeration (when used)
6.Culture preparation (when used)
7.Cream ripening and souring (when used)
8.Temperature treatment
9.Churning/working (batch)
10.Churning/working (continuous)
11.Buttermilk collection
12.Butter silo with screw conveyor
13.Packaging machines



SeppA

Simple Innovations

SEPPA SOLUTIONS PRIVATE LIMITED

No. 149, Poonamallee High Road,

Kilpauk, Chennai - 600 010, India.

Ph : +91- 44 - 2836 9900 - 71, Fax : +91- 44 - 2836 2470,

Toll Free : 1800 425 20000

E-mail : info@seppasolutions.company

Website : www.seppasolutions.com

/seppasolutions