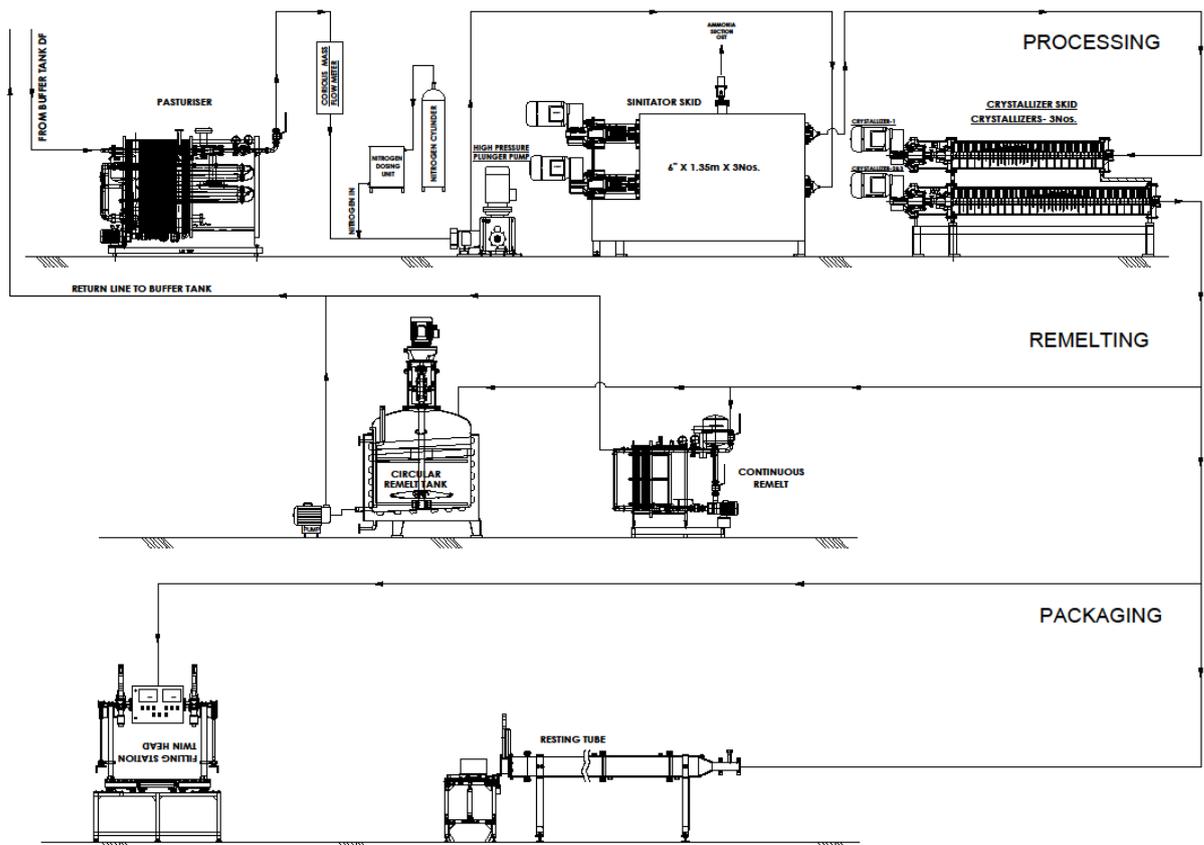




### Crystallization Process for Margarine

The Crystallization process for Shortenings and Margarine begins with the Pasteurization of the emulsion after which it is pumped into the Scraped Surface Heat Exchanger (SSHEs) with the help of a positive displacement pump. The emulsion is shock chilled in high pressure heat exchangers (SSHEs) with the help of continuous chilling and scarping action. Once chilled, the product is crystallized in three different stages. The first phase of crystallization is done with the help of the Crystallizer (Pin Rotors) in which the product is worked with the help of pins on both the rotating shaft and the body or Resting Tube with Sieve Plates. The final stage of crystallization takes place in the cold room or the warehouse for certain other over a maximum period of 48-72 hours.

### Flowchart





## Equipment

The **Pasteurizer** comprises of a 3-stage PHE with the Economizer and a holding circuit with controls for hot and cold water circuits to accurately maintain the required temperature. Pasteurization helps prevent the micro-biological growth and increase shelf life of the product in case of margarines, while ensures no crystallization takes place in Shortenings before it enters the Sinitators.



The sub cooling of the emulsion in the SSHEs and the reduced cross sectional flow in the Resting Tube causes the pressure to rise in the Margarine Manufacturing process. A **high pressure positive displacement pump** is versatile option for the manufacture of all types of Specialty Fats.

**Sinitators™** (SSHE) are high pressure tubular refrigerant flooded chillers with floating/ bulldog knife loaded on rotor shafts pressed against the chiller tubes by centrifugal force to ensure consistent scraping. Sinitators™ are the heart of the Crystallization Line in which the emulsion is shock chilled when passed through the annular space between the rotor shaft and the chilling tube



**Crystallizers** are jacketed horizontal cylinders with intermittently placed pins on the body and the gear driven rotor shafts alike which perform pinning action on the sub-cooled fat to achieve physical properties such as plasticity, structure, cluster, spread ability, penetration, creaming value, stability etc. through fine dispersion of these solids held by internal cohesive forces in the entire mass.





The **Resting Tube** is a set of jacketed modular tubes of different capacities interconnected by flanges or sieve plates between modules. Resting tubes are designed to provide adequate time and kneading required to crystallize the fat to achieve desired properties for block formation. Resting Tubes ranging from capacities 50 L to 300 L are designed for various forms of packaging such as bricks, blocks and sheets.

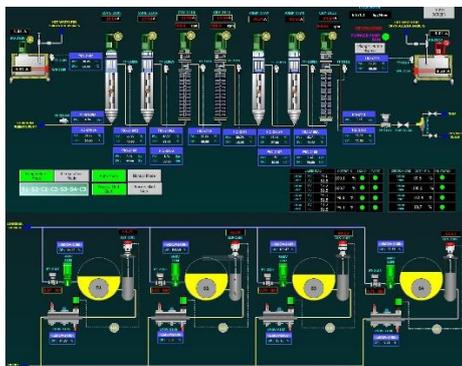


The **Homogenizing Valve** is a set of two high pressure valves used in the production of aerated shortenings in which Nitrogen is dozed as a percentage of the product flow rate at the suction of the Plunger Pump and finely dispersed in the fat with the help of the Homogenizing Valve.

The **Circular Remelt Tank** designed at SIPEPL comprises of an agitator mounted 1.2MT tank of unique design to remelt the product while holding the emulsion together. The tank is designed for a provision of heating in the jackets and the two layers of coils. A rectangular remelt tank is preferred for only Shortening Manufacturing.



The **Continuous Remelt** comprises of a PHE to heat the oil during recirculation to ensure the temperature of the Buffer Tank remains constant at all times.



**Automation** of the complete process with MCC Control Panels, Desk Operating Panels and SCADA Logic to operate the plant, monitor important parameters and trends and store historic data.

