

## Vacuum drying

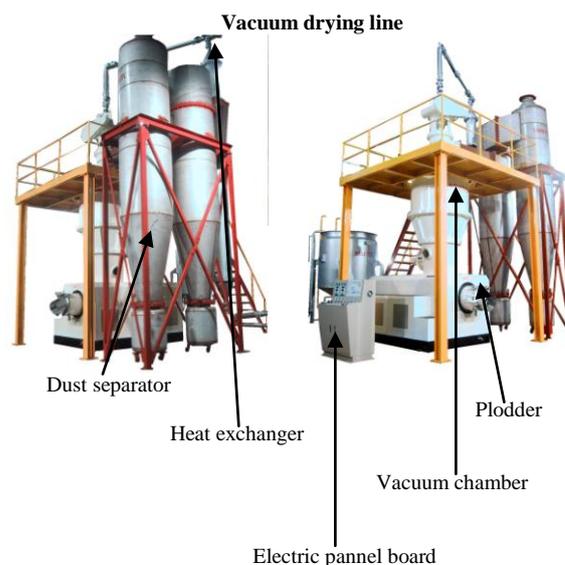
Vacuum drying is a way to dry the soap immediately. In a dryer, soap is dried, expanded in vacuum and cooled at the same time. We recommend this process.

Besides the quality of soap, cool water consumption and availability are very important in the way of drying choice. So, vacuum drying expands soap and evaporates water at a pressure of 20 to 50 mbar and, in the same time, cools the soap to 20-40°C. The steam should be eliminated by condensation and, to do it, toilet soap drying needs a certain amount of cooled water obtained with a cooling tower. Dryers under vacuum need around 15 to 30 m<sup>3</sup> cooled water for 1t of soap.

### Process

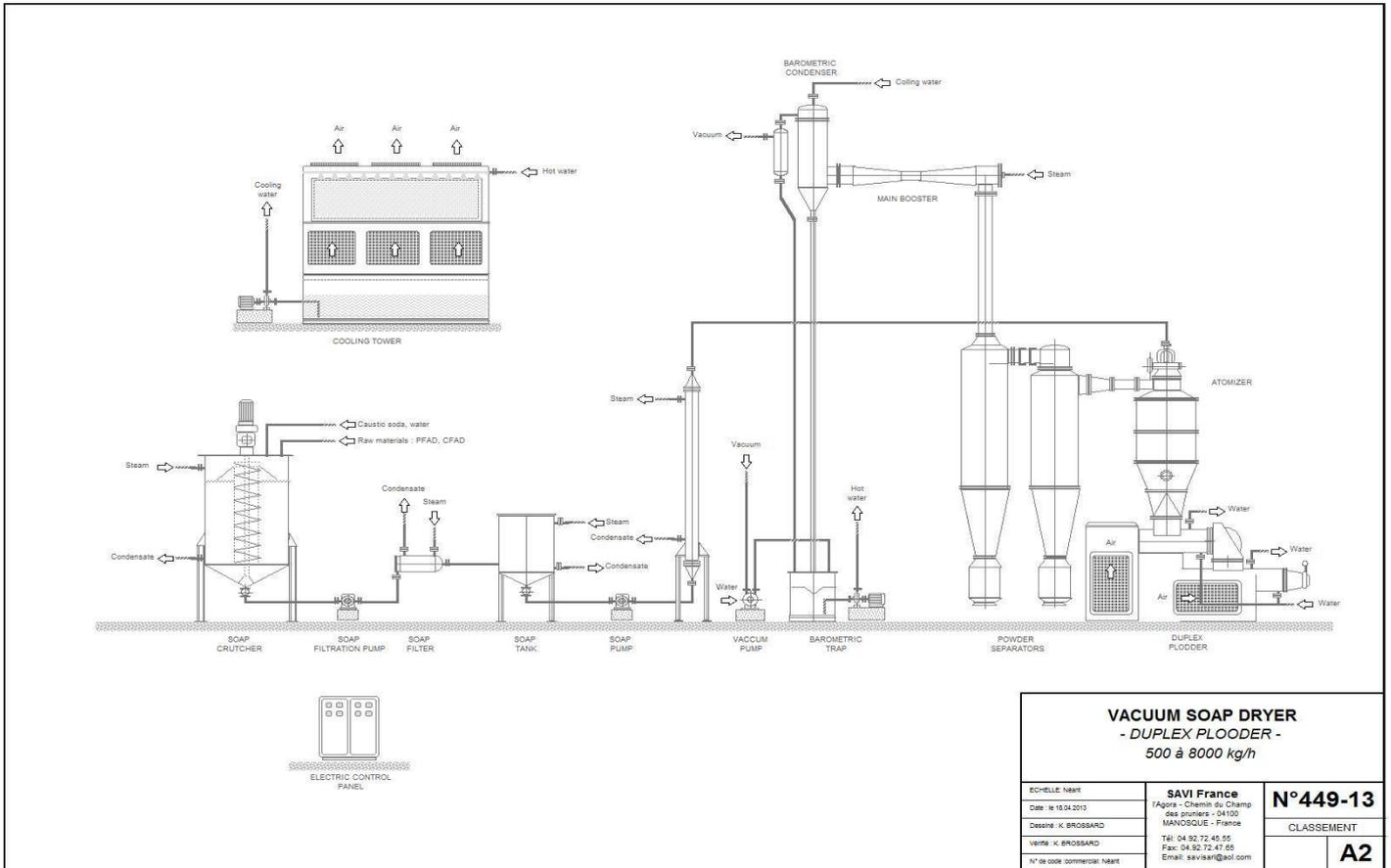
Dryers under vacuum are made for a capacity from 500 to 6000 kgs/h. You will see a drawing later but, before, we have to describe each step of vacuum drying process. So, soap coming from saponification goes in a feed tank with a level control by passing through a filter. A metering pump with continuous control supplies the dryer; pumps are especially adapted to very high viscosity materials and the seals are steam resistant. The heat exchangers are adjusted for a temperature of 80°C at the entrance of the soap and for a steam pressure of 9 bars. They are adapted to special requirements of soap drying; water evaporation begins in the exchanger. In the vacuum chamber, soap is cooled to the boiling temperature of water corresponding to vacuum and is projected on the inside wall by atomizing nozzle. The projected soap is removed from the inside wall by some scrapers mounted on central shaft. To produce perfect quality soap without particles over dried, the inner surface of the atomizing chamber must be clean and allowing the elastic scrapers to remove the dry soap. Soap evacuation from the vacuum chamber is realized with a duplex vacuum plodder from where the household soap is extruded as continuous bar. For drying, pressure changes according to the soap type: for household soap it's 20-25 mbar and 40 to 50 mbar for toilet soap. You can control the vacuum chamber thanks to a sightglass placed just upon it. The eliminated steam goes through centrifugal separators to retain soap dust and is condensed in a barometric condenser.

Water consumption to condense steam depends on available cooling water temperature and site conditions: a high water temperature requires compression of steam by an injector before condensation to reach the condensation pressure required to water temperature. The elimination of air and uncondensable gasses is made through a vacuum pump.



At least, it's important to precise that soap could have two different aspects after drying: it can be extruded as a soap bar ready to be cut and engraved ( it's for household soap ) or as noodles which are going to be used in soap finishing line process.

## Drying vacuum automatic equipments



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