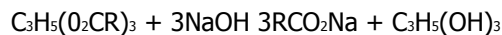


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Personal Care – The soap making process

The basic reaction in soap manufacture is that between a fat or oil and an alkali that results in soap and glycerol:



where R is the carbon chain which can consist of between 8 to 18 carbon atoms.

How Palmolive® soaps are made

Palmolive soaps are made by a two step process which is known as the Mazzoni Continuous Fatty Acid Neutralisation Process (The SCC Process).

This process consists of an initial neutralisation of fatty acids by soda ash and then a final saponification of unreacted fatty acids by caustic soda. These two reactions can be represented by the following chemical formulae:

- i) $2RCOOH + Na_2CO_3$
- ii) $RCOOH + NaOH$

Raw materials

Fatty acids: Distilled fatty acid blends are used as the oil in our soap making process. The blend consists of Palm Oil, Palm Stearin and Palm Kernel Oil in different ratios. The ratio of each in the blend is critical in establishing the quality and quantity of lather. Palm Kernel Oil is mainly made up of carbon chains of 12 and 14, giving a quick lather, which is however not very creamy. On the other hand, Palm Oil is mainly made up of carbon chains of 16 and 18. These do not produce lather readily, but what is produced has a creamy consistency. The oils are distilled and blended prior to delivery to give the required characteristics of our Palmolive Soaps.

Soda ash: Soda Ash is the preferred neutralising agent, because of its price and because of its lower metallic impurities. These impurities can have a long term effect on the soap's perfumes and colour stability.

The use of soda ash results in the release of CO₂. This aids indirectly in the removal of some of the volatile odours and impurities. The fatty acids and soda ash solution have to be heated as the neutralisation is endothermic. Also the reaction results in incomplete conversion of fatty acids and therefore has to be finished with a small quantity of caustic soda.

The soap that comes off after the final caustic soda neutralisation is called neat soap and consists of approximately 65% soap and 35% water and minor levels of excess caustic, salt etc.

Soap drying

After the soap has been neutralised it is sent to a vacuum dryer. There, the level of moisture is reduced from 35% to 12%, by spraying wet soap onto the dryer wall. The water is removed rapidly under vacuum and the dried soap is continuously scraped off the wall. The soap is kept slightly alkaline to reduce the risk of rancidity. Preservatives are added to reduce potential degradation and brine is added to produce a harder bar.

Soap finishing

Soap finishing consists of addition of fragrances, deodorant ingredient and colour.

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The soap making process for Cashmere Bouquet® and Palmolive Gold soaps.

Today, tallow and coconut oil make the main base of most modern soaps. Tallow is rendered oil from animal fats and coconut oil is made from dried kernel of the coconut. Coconut kernel when dried is called Copra and comes from the Philippines and other islands in the South Seas where it is shipped to soap factories all over the world.

In the Colgate-Palmolive plant in New Zealand, which manufactures Cashmere Bouquet and Palmolive Gold soap, the various raw materials such as alkali, tallow, coconut oil, olive oil and palm oil, are received by road tankers. After testing in the laboratory, the oils are treated with bleaching earth and carbon at high temperature and then filtered until bright and sparkling clear.

After treatment, fats, oils and caustic soda are piped into kettles as high as a two or three storey building. The mixture is heated by steam pipes. More caustic soda is added gradually until the contents of the kettle are homogeneous.

The caustic soda is usually lye and is added to the oils, together with salt and water to separate the by-products, such as glycerine, and allow the oils to saponify (become soapy). While boiling, samples of the mixture are constantly taken to the Laboratory for testing by chemists. This testing is done throughout the whole process of soap making.

When the proper stage in boiling is reached, the steam is shut off and salt added to the kettle, the contents of which are then allowed to settle. During the settling the soap rises to the top, leaving below a briny liquid composed of salt, spent lye and soap's major by-product, glycerine.

The lye is drawn off from the bottom of the kettle, to be forwarded to the glycerine evaporating and distilling section and the soap is boiled up again with water until the yeasty mass thins and smooths out.

When boiling is finished, the mass of hot soap is pumped up to insulated storage tanks.

In the New Zealand plant only "hard milled soap" is made, but there are other types, too, which can be made from hot soap.

Hard Milled soap

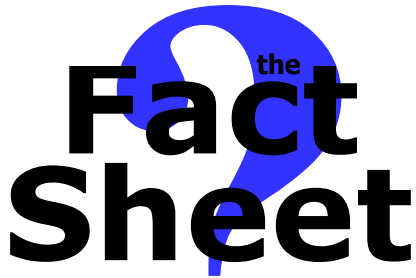
The hot soap is released from the storage tanks and flows by gravity down to the chilling roll, where it is solidified and cut into small strands like wood shavings.

At this stage it has 30% water and is fed to the dryer, which reduces the water content to 13%. The dryer is an enormous long, tunnel-like chamber through which hot currents of air are directed and the soap chips are put through it slowly until they are dried to the correct degree.

After drying, the soap chips are conveyed to a soap storage bin and weighed out into an amalgamator (a mixer with strong blades inside) and here the perfume and colour, if necessary, are mixed with the soap chips.

The perfuming of toilet soaps is a highly specialised art as there are many things to be taken into consideration. The perfume must be consistently good, lasting and appealing to the senses of the majority of people; it must also be adaptable to soap making and stable enough to withstand any conditions that might arise after it leaves the factory.

To meet all these requirements, perfume must be of the very highest quality and since high quality



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Perfume is costly, it is one of the most expensive items in the manufacture of toilet soaps.

Perfume oils used for soap come from many countries and include rosemary, sassafras, patchouli, sandalwood, thyme, geranium, lavender and many other plant distillations; these are used in combination with resins and synthetic products.

When the soap, perfume and colouring have been sufficiently mixed in the amalgamator, it falls by gravity into a plodder, a machine like a giant mincer, which mixes the soap thoroughly and forces it out in the shape of spaghetti to the roller mills.

The roller mills have four steel rollers which go round in opposite directions to each other. The bottom one moves slowly and each roll above it gains speed, the top roll being the fastest of all. This top roll has a comb-like knife which strips the soap off in ribbons. It falls by gravity to the floor below where it is fed into a big vacuum plodder which compresses the ribbons into solid soap and forces it out in the shape of a long bar.

The bar, which is warmed in the plodder to permit easy handling, slides along to a rotary cutter to be cut into short cakes of soap. These cakes are then passed to the stamping machine to be trimmed into proper shape and stamped with the brand name of the manufacturer. The cakes of soap are pushed out of the stamping machine at a fast rate and move straight to the wrapping machine.

Here, each cake is automatically wrapped and travels along a continuous belt to the packing department, where they are checked and packed in strong cartons ready for delivery to the stores which sell them to the public.