

the Fact Sheet

from the Consumer Information Service

Fabric care – Laundry Detergent

Cleaning products play a vital role in our daily lives. By safely and effectively removing soils, germs and other contaminants they help us to stay healthy and keep our home and possessions clean.

History

Different types of laundry products exist to meet the needs and preferences of different consumers. Basic laundry products include detergents and laundry soaps. Other products like laundry aids include bleaches, bluing, detergent boosters, disinfectants, enzyme presoakers, fabric softeners/conditioners, prewash soil and stain removers and water softeners.

In the first half of the 20th century, consumers used laundry soaps. These products were variations of toilet soaps, with natural bases. The basic raw materials are fats/oils and alkalis. Despite improvements made over the years all soaps suffered from the drawback of combining water hardness minerals to form lime soap or curd which deposited on the washing machine and the fabrics in the wash load.

During WWI, synthetic laundry detergents were invented because of a shortage of fats and oils for making soap. Household detergent production in the US started in the early 1930s. It wasn't until after WWII that their use soared with further wartime shortages and because they performed better over a broad range of water hardness levels.

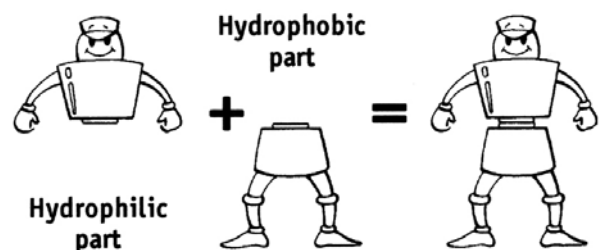
The breakthrough in the development of household detergents came in 1946 when built detergents were introduced. Phosphate builders

improved detergent performance, rendering them suitable for heavy duty cleaning. By 1953, sales of detergents surpassed that of soap in the US. Current laundry detergents are classified by their heavy-duty or light-duty performance and are available in granule or liquid forms.

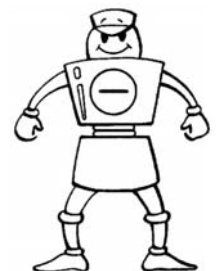
Chemistry

Surfactants

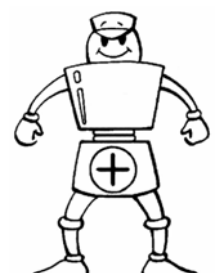
A detergent is an effective cleaning product as it contains one or more surface active agents, otherwise known as a surfactant. These agents are organic molecules that consist of two parts - a water loving part (hydrophilic) and a water hating part (hydrophobic).



Anionic: In water their hydrophilic portion carries a negative charge. They have excellent cleaning properties and are generally high sudsing. Examples include linear alkylbenzene sulphonate, alcohol ethoxy-sulfates and alkyl sulfates.



Cationic: In water their hydrophobic portion carries a



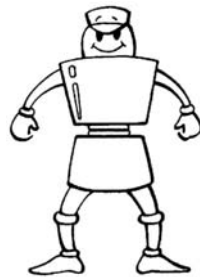
the Fact Sheet

from the Consumer Information Service

Fabric care – Laundry Detergent

positive charge. They are generally used in fabric softeners and in built fabric softening laundry detergents. Quaternary ammonium compounds are typical of cationic surfactants.

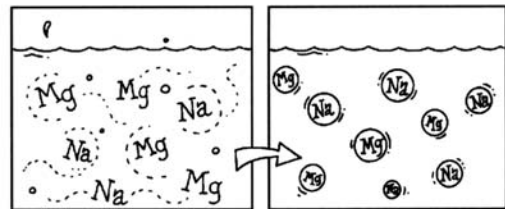
Nonionic: They do not ionise in water thus have no electrical charge. They are resistant to water hardness and clean well on most soils. Nonionic surfactants are low sudsing and are often used in laundry detergent, automatic dishwashing detergents and rinse aids. The most commonly used nonionics are alcohol ethoxylates.



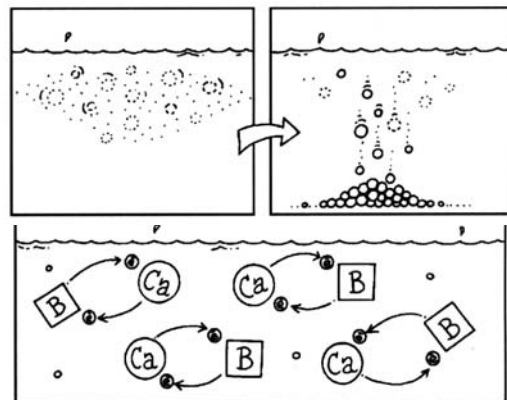
Builders

The next major class of ingredients in laundry detergents are builders, whose primary function is to build or support the cleaning ability of the surfactant by reducing water hardness. Water hardness is caused by the presence of mineral salts like calcium (Ca) and magnesium (Mg). Examples of builders include phosphates and zeolites.

The following processes depict how builders reduce water hardness:



Sequestration: Involves holding the hardness minerals in solution.



Precipitation: When an insoluble substance is formed.

Ion Exchange: Involves trading electrically charged particles.

The table on the following page summarises the other ingredients present in modern laundry detergents.



the Fact Sheet

from the Consumer Information Service

Ingredient	Primary Functions	Examples
Alkalis	Neutralise or adjust alkalinity of other ingredients Make surfactants and builders more efficient Increase alkalinity	Ammonium hydroxide Ethanolamines Sodium carbonate Sodium hydroxide Sodium silicate
Antimicrobial agents	Kill or inhibit growth of micro organisms	Pine oil Quaternary ammonium compounds Sodium hypochlorite Triclosan
Antiredisposition agents	Prevent soil from re-settling after removal during washing	Carboxymethyl cellulose Polycarboxylates Polyethylene glycol Sodium silicate
Bleaches	Helps whiten, brighten and remove stains	Sodium hypochlorite (chlorine) Sodium perborate/percarbonate
Colourants	Provide special identity to product Provide bluing action	Pigments or dyes
Corrosion Inhibitors	Protect metal machine parts and finishes	Sodium silicate
Enzymes	Protein compounds which break down soils to simpler forms for removal by detergent	Amylase (starch soils) Lipase (fatty and oily soils) Protease (protein soils)
Fluorescent whitening agents	Attach to fabrics to create a whitening or brightening effect when exposed to daylight	Optical brighteners
Fragrances	Mask base odour of ingredients Cover odour of soil Provide product's identity Provide pleasant perfume	Fragrance blends
Hydrotypes	Prevent liquid products from separating into layers Ensure product homogeneity	Cumene sulphonates Ethyl alcohol Tolulene sulphonates
Preservatives	Protect against natural effects of product ageing eg. decay, discolouration, oxidation and bacterial attack	Butylated hydroxytoluene Ethylene diammine tetraacetic acid Glutaraldehyde
Processing aids	Provide important physical characteristics eg. viscosity, solubility, stability and uniform density. Assist in manufacturing	Clays Polymers Sodium silicate Sodium sulphate Solvents
Solvents	Prevent separation or deterioration of ingredients in liquid products. Dissolve organic soils. Clean without leaving residue	Ethanol Isopropanol Propylene glycol

the Fact Sheet

from the Consumer Information Service

Fabric care – Laundry Detergent

How detergents work

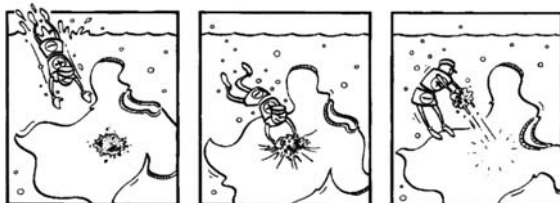
There are three factors necessary for effective cleaning:

1. Chemical energy supplied by detergent.
2. Thermal energy provided by the water temperature.
3. Mechanical energy provided by a machine or hands.

These three types of energy interact with one another and dislodge soil from the fabric mainly through the action of surfactants. The hydrophobic (water hating) end of the surfactant attaches itself to the soil surface, whilst the hydrophilic head stays in water.

These opposing forces, along with agitation (provided by the washing machine or rubbing) and the warm temperature of the water, help pull the soil free.

Once the soil is dislodged, it should remain dispersed without reattaching to the fabric. This is achieved by its coating of hydrophilic heads which is attracted to the water molecule and the mild electrical charge it carries which causes particles, water droplets and surfaces to repel one another. See diagram below.



Colgate-Palmolive's laundry brands

Dynamo®: Dynamo is formulated to work on the toughest greasiest stains and leaves the whole wash brilliantly clean first time. Dynamo was the first premium laundry liquid on the Australian market.



Cold Power®: Cold Power is a premium brand that has been specially formulated to give unbeatable results in cold water - so you save on energy and get an immaculate result.



Fab®: Fab gets deep into fibres to lift out dirt and stains leaving your whole wash brilliantly clean and freshly fragrant.



Spree®: Spree gives a great wash result at a value-for-money price. Spree is formulated to clean effectively in either hot or cold water and always leaves your clothes really bright.



Gow's Bio Clean®: Gow's Bio Clean is the powerful, hard-working laundry detergent that really is true value-for-money. You know you can always trust Gow's Bio Clean to give you a spotlessly bright wash in either hot or cold water.



Hurricane®: Hurricane is an enzyme-boosted powder that works on stains not on the fabric.

Love'n Care: Love'n Care removes everyday stains while being gentle on colours and fabric.