



the Fact Sheet

from the Consumer Information Service

Home Care - Dishwashing liquids

There are a number of features important to the consumer when selecting a dishwashing liquid.

Mildness

Detergents which have such direct exposure to human skin must be mild. Most products on the market today are relatively non-irritating and can be used with complete safety by most users. Some contain special additives to improve skin conditions or eliminate ingredients which are common allergens. Some users however still need or prefer to use rubber gloves when doing the dishes.

Cleaning performance

Light duty dishwashing liquids are designed to aid in the removal of food solids from dishes and utensils. They tend to solubilise, emulsify and disperse grease, oil, and other food substances.

Produce high, stable foam

Market research tells us that thick, rich suds suggest high levels of cleaning potential to consumers. As the suds remain on the water level and are not incorporated in the dishwater itself, suds merely provide the psychological benefit of hiding dirty dishwater.

Safe for all dishes and tableware

A dish liquid must be capable of cleaning a wide variety of surfaces without damaging them. These types of surfaces include: silverware, stainless steel, glass, ceramics, plastics, wood and fine china. Many people also use dish liquids

for hand washing delicate fabrics and it must be suitable for those items as well.

The high foaming characteristics of these products make them completely unsuitable as automatic dishwasher detergents. Not only does the foam interfere with the necessary spray action in a machine, but it can also make a terrible mess.

Convenient to use

Most dishwashing liquids today are packaged and dispensed with plastic squirt bottles. This makes it easy to dispense with no spillage or breakage problems and enables the correct amount to be used. Being water based liquids, the products immediately mix with water with minimal agitation.

Pleasant fragrance and appearance

Products are generally soft pastel colours and are either clear or opaque. Fragrances vary significantly, but are very distinctive. The products are slightly viscous.

Storage stability

Dishwashing liquids must be designed to withstand various extremes of temperature without their physical characteristics changing when brought back to room temperature. A clear product should also remain clear over a wide temperature range. Storage stability must be longer than the expected lifetime of the product which is likely to range from just a few weeks to more than a year.

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Ingredients

The typical ingredients that may be found in a light duty detergent product can be described as follows:

Surfactants

The prime ingredients of these detergents are the surfactant system.

Light duty liquids employ a combination of surfactants to achieve the end result desired. Many are either sulphonated or sulfated products which are very high foaming anionic surfactants with a history of good performance. They are all excellent wetting agents, with good grease cutting properties and have minimal irritation potential. Commonly used surfactants are listed below:

Linear alkyl aryl sulphonate (LAS)

Alcohol ether sulfate (ES)

Alcohol sulfate (AS)

Alkyl glyceryl ether sulfate (AGES)

Alpha olefin sulphonate (AOS)

Paraffin sulphonate (PS)

These materials also meet existing biodegradability standards. Many of these, like LAS, AS and LES, are widely used in other types of detergents as well.

The more common nonionic surfactants used in dishwashing are amides such as coconut diethanolamide and amine oxides such as dimethyl lauric amine oxide. Their major purpose is to provide additional foam boosting and foam stability to other surfactant systems. They are never used alone but play a synergistic role in the product's performance.

Hydrotropes/viscosity modifiers

The product needs to remain stable over extended periods of time and through high and low temperature storage variations. A good performing product needs to provide adequate aesthetic appeal and convenient dispensing. If a liquid is too thick or thin the following materials are added to the formula:

Sodium xylene sulphonate (SXS)

Sodium toluene sulphonate (STS)

Alcohol

Salt

SXS and STS are both anionic surfactants in their own right, but are primarily used for hydrotropes or coupling agents. In an LAS / water system for example, SXS can be used at relatively low levels to provide homogeneity and solubility to an otherwise unstable system. The SXS itself does not contribute significantly to detergency. Other materials such as urea and alcohol are sometimes used.

Alcohol and salts are also used at low levels to either raise or lower viscosity to a desirable level. Ethyl alcohol and either sodium or potassium chloride are used. In some formulations, magnesium salts are also used to provide viscosity control and to improve foam stability.

Special additives

The fragrance and colour of a light duty liquid are critical for a successful product. Careful selection of fragrance types and colours will often become the "trademark" for any particular brand.

From a formulation standpoint, the colour and fragrance, of course, must be compatible with the

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rest of the product. Changes in these aesthetic qualities due to chemical reactions with other ingredients in the product are unacceptable. It must also be verified that the fragrance and colour do not adversely affect dish washing performance and do not contain ingredients which may increase the potential for skin irritation. To prevent these problems, each formulation change undergoes aging trials to monitor the stability of the product.

Preservatives are also additives which are used in small quantities, but play an important role in the product. They are used to ensure microbiological growth within the product doesn't occur.

If unpreserved, these products can degrade, resulting in instability, colour and odour changes and poorer dish washing performance.

No builders

There are no builders used in today's light duty liquid formulations. This is because the detergency requirements of a light duty product are not as critical as heavy duty products. Secondly, the builders frequently used in heavy duty products are highly alkaline and too harsh to soak your hands in. Thirdly, the inorganic builders (phosphates, silicates etc) when used with high concentrations of organic surfactants in a liquid product present some difficult formulation challenges in terms of stability and solubility.



At left: Today's dishwashing liquids come in both regular and concentrated forms