SOAPS and DETERGENTS
for Home Laundering
Knowing how to choose and use soaps and detergents is essential for good results in home laundering. The choice of a cleansing agent, in turn, depends on the fabric you are washing, the kind of soil to be removed, the hardness of the water, and the type of washer used.

This bulletin can help you select the right soap or detergent and use it more effectively.

HOW SOAPS AND DETERGENTS WORK

The essential steps in cleaning soiled fabrics are wetting fabric and dirt, removing dirt from fabric, and holding removed dirt in suspension—that is, keeping it from settling back on the fabric before it is rinsed away.

Water alone has limited cleaning ability. A soap or a detergent is needed to increase both the wetting and suspending power of water.

When soiled fabric is agitated during the washing process, oily dirt is broken up into small particles, each of which is surrounded by a film of the soap or detergent solution.

As dirt is lifted from the fabric, the soap or detergent holds it suspended in the water and helps to keep the dirt from settling back on the clothes.

A detergent is a cleansing agent. Detergents, therefore, include both soaps and synthetic detergents as well as many other cleansing agents. In popular usage, however, the term detergent refers only to synthetic detergents and is used to distinguish them from soaps. All products on grocery shelves labeled detergents are synthetic detergents. In this publication, the word detergent refers to a synthetic detergent.
SOAPS AND DETERGENTS AVAILABLE

Soaps

Soap is made by a reaction between natural fats—including oils—and an alkali, such as lye. As soap dissolves, it reacts with water and the solution becomes alkaline. Some alkalinity is needed for good washing. Acid in soiled clothes lowers the alkalinity of the wash water and reduces the effectiveness of the soap.

Minerals in hard water react with soap to form insoluble substances, called soap scum. Scum reduces the amount of soap available for washing, and tends to settle on clothes and give them a gray color. More soap has to be added to do a good washing job.

To maintain enough alkalinity in the wash water for effective cleaning, and to remove hardness minerals, manufacturers often “build” their soaps with alkaline salts and water softeners.

Retail stores offer a choice of light-duty (unbuilt) and heavy-duty (built) soaps in bar, flake, and powdered forms.

A partial list of brands of laundry soap available in 1971 includes—

<table>
<thead>
<tr>
<th>Light duty</th>
<th>Heavy duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ivory Flakes</td>
<td>Duz</td>
</tr>
<tr>
<td>Ivory Snow</td>
<td>Instant</td>
</tr>
<tr>
<td>Lux Flakes</td>
<td>Fels Naptha</td>
</tr>
</tbody>
</table>

Light duty. Light-duty soaps are for laundering fine fabrics and lightly soiled garments such as lingerie, stockings, blouses, and baby clothes. They are safe for most dyes and are mild to the skin.

Heavy duty. These soaps are general-purpose products for the family wash and for heavily soiled items—rugs, grimy play clothes, and greasy overalls. They may be harder on some dyes than unbuilt soaps. The alkaline salts in these products may damage wool and silk.

Detergents

Detergents are made from petroleum and from natural fats and oils. The chemical processes that produce detergents are more complex than the reaction between fat and lye that makes soap.

The properties of detergents depend on their chemical composition. Because a greater diversity of raw materials and chemical processes is used in making detergents than in making soaps, more types of detergents are available.

Detergents dissolve readily in water, hot or cold, soft or hard. They do not form scum in hard water. Some make suds easily, others clean with little or no suds.

Like soaps, packaged detergents come in two types—light duty (unbuilt) and heavy duty (built), and in liquid, powdered, and tablet forms.

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1 The mention in this publication of any commercial product does not imply its endorsement by the U.S. Department of Agriculture over other products not named.
A partial list of brands of detergents on the market in 1971 includes—

**Light duty**
- Aqua Lotion
- Chiffon (liquid)
- Dreft
- Ivory (liquid)
- Joy (liquid)
- Lux (liquid)
- Octagon (liquid)

**Heavy duty**
- Sall
- Silver Dust
- Surf
- Tide
- Trend
- Wisk (liquid)
- Cold Power
- Cold Water All

**Medium sudsing**
- Wisk (liquid)
- Palmolive (liquid)
- Woolite

**Low sudsing**
- Duz
- Fab
- Gain
- Oxydol
- Punch
- Rinso

**Heavy duty.** Heavy-duty detergents are the workhorse products for the family wash. They have largely replaced soaps for this purpose because they do not react with minerals in hard water to form scum.

These built detergents contain alkaline salts and other substances that increase their cleaning power.

Heavy-duty detergents are more effective than light-duty detergents for cleaning moderately or heavily soiled fabrics. They can be used safely on many fine fabrics and are needed for thorough washing of fine fabrics that are heavily soiled.

High-sudsing, intermediate sudsing, and low-sudsing heavy-duty detergents are available. Low-sudsing detergents are designed for use in automatic washers in which high suds interfere with mechanical action.

Heavy-duty detergents especially made for use in cold water are also available. These cold-water detergents are suitable for washing lightly soiled synthetic fabrics; wrinkles may be set in these fabrics if they are wrung or spun dry while hot. When these fabrics are washed in cold water, they need little or no ironing.

**USING SOAPS AND DETERGENTS**

**Suiting Soap or Detergent to Water**

Whether you use a soap or detergent depends partly on the hardness of your wash water.

In soft or softened water, soap does an excellent cleaning job and is economical to use. Hard water, however, wastes soap because the soap reacts with the “hardness” minerals—calcium and magnesium—and forms soap scum.
This scum sticks to washer parts and settles on clothes in gray specks that are almost impossible to remove. Scum is especially troublesome when wash water is allowed to drain through the clothes.

Detergents help solve this hard water problem. If used in sufficient amounts, detergents do not form scum. A greater amount of detergent is needed in hard water than in soft, however. In very hard water (over 20 grains per gallon), it may be more economical to soften the water and use less detergent.

Softening the Water

When hard water causes laundering problems, you can either use a detergent or soften the water and use soap. For best results with soap, soften both the wash water and the water for the first rinse.

A water-softening system installed in the water-supply line is a great convenience. Or, you can add a water-softening chemical directly to the water.

Water-softening chemicals are of two types. One type precipitates or settles the water-hardness minerals. The other type keeps the minerals in solution.

The precipitating softeners should be dissolved in the wash water before adding soap because they cannot dissolve soap scum once it has formed.

The nonprecipitating softeners (also called water conditioners) keep minerals in solution in a form that the minerals cannot react with soap to form scum.

These softeners have the advantage of redissolving soap scum already on fabrics. They can strip scum left from previous washings.

When minerals, such as iron or manganese, are present in water, nonprecipitating water softeners will help prevent the minerals from staining fabrics. Always add a nonprecipitating softener to water containing iron or manganese before adding a bleach.

Some water softeners contain only one water-softening chemical. Others are mixtures of two or more chemicals.

A partial list of water softeners on the retail market in 1967 includes—

<table>
<thead>
<tr>
<th>Precipitating</th>
<th>Nonprecipitating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washing soda</td>
<td>Calgon</td>
</tr>
<tr>
<td>Climalene</td>
<td>Oakite</td>
</tr>
</tbody>
</table>

Amount of Softener

The following test can help you determine the amount of softener necessary for a particular hard water and a specific kind of soap.

- Put 1 gallon of hot (140° F.) water in a pan and add 1/2 teaspoon softener; stir until dissolved.
- Put 2 cups of this solution into a quart jar.
- Add 1/2 teaspoon of soap; shake vigorously for 10 seconds. If good suds form and hold for 5 minutes, the water is softened.
- Try again, using less softener, to find out if a smaller amount makes good suds.
- If 1/2 teaspoon of softener does not make good suds, repeat test with fresh water, using 1 teaspoon of softener to 1 gallon of water.
- Continue until you find the amount of softener that will make good suds.
If you change to a different softener or a different soap, repeat the test to find out the right amount of softener for good suds with the soap.

**Suiting Soap or Detergent to Fabric**

Consider what the cloth is made of and the type of dye used on it when you choose a detergent.

*Wool and Silk.*—Alkali damages wool and silk. Wash these fabrics in nonalkaline, light-duty detergents. Light-duty soaps are also satisfactory in soft or softened water.

Light-duty products do a good job on lightly soiled wool and silk, but heavy-duty detergents may be needed to thoroughly clean badly soiled articles. Heavy-duty detergents are more likely to cause bleeding of dyes and yellowing of white wool and silk.

Shrinkage of wool during laundering is caused by agitation in the washer, tumbling in the dryer, or rubbing by hand—not by the type of detergent used. Unless wool fabrics have a shrink-resistant or wash-wear finish, mechanical action during laundering should be held to a minimum.

*Cotton, Linen, and Manmade Fibers.*—These fabrics are not affected by the alkalinity of soaps and detergents.

For white fabrics, the amount of soil is the best guide in deciding which product to use. For the regular family wash and for all moderately soiled or heavily soiled fabrics, use heavy-duty soaps or detergents. For lightly soiled fine fabrics, use light-duty products.

Some fabric dyes, especially vat dyes, are relatively fast to washing. Other dyes may run or fade because of alkaline salts in heavy-duty soaps and detergents. If in doubt about the colorfastness of a fabric, use a light-duty product.

**Suiting Soap or Detergent to Washer**

In machine washing, your choice of a detergent depends to some extent on the type of washer.

Some machines, particularly the front-loading or tumbler types, give much better results with low-sudsing detergents because of the washing action. For top-loading machines, either high-sudsing soaps or detergents or low-sudsing detergents can be used. Consult your instruction book for type recommended.

**Amount of Soap or Detergent Needed**

How much soap or detergent you need depends on—

- Water capacity of the washer.
- Size of the load being washed.
- Amount of soil in the clothes, particularly greasy soil.
- Hardness of the water.
- Type of detergent.

Insufficient soap or detergent during laundering is a common cause of graying in clothes.

To find out how much detergent to use, first consult the instruction book that came with your washer and the label on the soap or detergent package.
Keep in mind, however, that the amount recommended does not apply to all conditions. If water is very hard, or clothes are heavily soiled, you may need to increase the amount of soap or detergent.

With soap or a high-sudsing detergent, a good layer of suds should remain throughout the wash cycle. Low-sudsing detergents should form and maintain a thin layer of suds.

**What's in Soaps and Detergents**

*Surfactants* are the active ingredients in soaps and detergents that change the surface properties of water, soil, and fabrics so dirt can be more easily removed.

Before July 1965, some surfactants widely used in household detergents decomposed very slowly in sewage treatment plants or surface waters. The low rate of degradation of these "hard" detergents, plus their tendency to foam at very low concentrations, was a major factor in the much-publicized foam problem.

*Household detergents now on the market contain surfactants that are more readily decomposed by microorganisms during treatment of sewage. As a result, less detergent gets into streams to cause foam. Such detergents are called biodegradable or "soft."*

Research is continuing on this problem and more changes may be made in the future. Soaps are completely biodegradable.

*Mildly alkaline phosphates* are important ingredients in heavy-duty soaps and detergents. They act as water softeners, provide proper alkalinity for good cleaning, and help to disperse and suspend soil.

One disadvantage of phosphates is that they may contribute to the growth of algae. Research is underway to develop other builders that can be used to replace part of the phosphates in heavy-duty soaps and detergents.

Other alkaline salts, such as sodium carbonate (washing soda) and sodium silicate, are also used as builders. In heavy-duty detergents, sodium silicate helps prevent damage to the metal parts of washers and to the water pipes.

*Enzymes* are included in many detergents to break down soils consisting of protein or starch so that they can be more easily removed during laundering. This use of detergents is currently under review to determine whether or not such enzymes may irritate sensitive persons exposed to them.

*Brighteners* are included in most soaps and detergents. These compounds, when absorbed on fabrics during washing, convert some of the invisible ultraviolet light in sunlight to visible blue light. The additional blue light from a fabric counteracts yellowness and makes the fabric appear whiter. Fabrics also appear brighter because the total amount of visible light is increased.

Brighteners vary in composition and in their effectiveness on various
fabrics. Some brighteners work well on cotton and rayon, others on nylon and other fibers. Finishes on fabrics may reduce the effectiveness of brighteners.

Chlorine bleaches inactivate some brighteners in wash water. To avoid this, add the soap or detergent to the wash water first, allow a few minutes for the brightener in the cleansing agent to be absorbed on the clothes, and then add the chlorine bleach. Once the brightener is absorbed on fabrics, bleaches have little effect on it.

Many laundry products now contain two or more brighteners.

Antigraying compounds are added to all heavy-duty detergents and to some light-duty detergents and soaps. They help keep loosened soil from redepositing on clothes.

POINTERS ON SOAPS AND DETERGENTS

Specific laundering jobs require specific types of soaps and detergents.

The following recommendations take into consideration the amount of soil, the kind of fabric, the colorfastness of the dye, and the hardness of the water. No one type of soap or detergent is best on all counts.

For laundering lightly soil fine fabrics—
  • Use light-duty detergents in soft or hard water.
  • Use light-duty soaps in soft or softened water.

For general laundering and for heavily soiled fabrics in a front-loading washer—
  • Use heavy-duty detergents, either high-sudsing or low-sudsing type in soft or hard water.

For fabrics of cotton, linen, and manmade fibers—
  • If white or colorfast, use either soaps or detergents; light duty for lightly soiled fabrics, heavy duty for those more heavily soiled.
  • If not colorfast, use light-duty soaps or detergents.

For fabrics of wool and silk and for blends of these with other fibers—
  • Use light-duty detergents or soaps.
  • If heavily soiled, use a heavy-duty detergent.

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