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DETERGENT COMPOSITION

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This invention relates to improved detergents and methods of making and using same, and it relates more particularly to a cleaning fluid for removing oily and greasy films from glass or metal.

Broadly, the invention consists in adding to water a major percentage of a water-soluble organic solvent adapted to lower the surface tension of the water and to aid in cleaning, and a minor percentage of a wetting agent, especially an oil-soluble one. As the water-soluble organic solvent, isopropyl alcohol is particularly well suited and it may be used in percentages varying over a fairly wide range such as from 20 to 50%, even 10 to 80% or so. Isopropyl alcohol evaporates slower than ethyl alcohol but faster than normal propyl alcohol and faster than tertiary butyl alcohol, i. e., it evaporates not too fast and not too slow. However, if isopropyl alcohol is not available, other low molecular weight alcohols may be used, or other types of solvents such as acetone and the like. The primary function of this solvent is to lower the surface tension and to clean. By lowering the surface tension, several advantages are attained; one is aiding the spreading and another is hastening evaporation. The addition of 30% of isopropyl alcohol to distilled water lowers the surface tension from 70.6 dynes per sq. cm. to 29.5 at 31° C.

As wetting agent, it is preferred to use a small amount of a soap produced by neutralizing the oil-soluble sulfonic acids produced by the treatment of liquid petroleum fractions with strong sulfuric acid. Such oil-soluble sulfonates may be produced and purified according to any of the known methods. Although the properties of the oil-soluble sulfonates may vary according to the source of the crude from which they are produced and also according to the gravity, viscosity or boiling point of the fraction treated, any of these sulfonates may be used according to the invention providing they have a suitable wetting power. By this is meant that when a small percentage, for example 0.1% of oil-soluble sulfonate soap is added to an aqueous alcohol solution, it greatly facilitates the spreading of the solution over an oily and greasy surface. This wetting or spreading ability is readily observed by comparing an aqueous alcohol solution alone and one containing a small percentage of the sulfonate. This sulfonate enables the solution to flow quickly and evenly over the surface and thereby reduces the amount of rubbing required and gives a quicker cleaning and polishing. The spreading of the solution into a thin film over the entire surface to be cleaned also causes a quicker evaporation of the solution, thereby reducing the length of time required to produce a cleaned and polished surface. This sulfonate soap lowers the surface tension of the aqueous alcohol solution and keeps the surface tension down even when the alcohol evaporates.

Generally it is desirable to use only so much of this oil-soluble sulfonate as will actually dissolve in the aqueous alcohol solution or at least will only produce a slight haze in the solution. Usually 0.1% is satisfactory although as much as 0.2% may be used or even more under some circumstances, depending upon the particular type of sulfonate and the type and percentage of aqueous organic solvent solution. In any case, if an excess of this soap is used, the solution will have a heavy haze and a fog will be produced on the surface being cleaned. It may be difficult to remove such a fog.

Other types of soaps may be used although not with the same degree of success as the oil-soluble sulfonates just described, for example, the commercial soaps prepared by the saponification of caustic soda and animal or vegetable fatty oils and water-soluble sulfonates derived from petroleum. Generally, however, these soaps do not spread as evenly and quickly as the preferred oil-soluble sulfonates. The water-soluble sulfonates can be made to spread by the use of larger amounts of it, but when this happens a fog is apt to be produced on the surface being cleaned, which is difficult to remove. If desired, a mixture of these soaps may be used such as a small amount of the oil-soluble sulfonate along with one of the other types of soap.

A small amount of dye, perfume, and other such minor ingredients may be added to the composition if desired.

The improved detergent has been found particularly useful in cleaning automobile windshields and other glass surfaces which have become coated with a slight oily or greasy film which is

difficult to remove with water alone and which it is undesirable to clean with water containing a large amount of soap. As a specific example of suitable composition for cleaning automobile windshields, the following formula is given:

	Per cent
Isopropyl alcohol	30
Oil-soluble sulfonate	0.1
Water—Balance	69.9
	100.0

This solution is applied to the glass preferably by spraying, or also by a cloth, or in any other suitable manner, is quickly distributed over the entire surface and then polished with a clean, dry cloth or wiped off clean with a squeegee (rubber scraping blade). Various other types of windows, etc. or metal surfaces, or enameled metal surfaces, may be cleaned in a similar manner.

The oil-soluble sulfonate used in the above example was obtained as a by-product from the manufacture of mineral white oil. The sulfonate product, however, was purified by the method which comprises isolating the oil-soluble sulfonates directly from the alcoholic aqueous solution by agitating with alkali carbonates, drawing off and filtering the upper layer and evaporating the filtrate to dryness. Although in the manufacture of a commercial mineral white oil a wide variety of crude oil stocks may be used and the amount and concentration of the acid used for treating may be varied according to the stock being treated, the oil-soluble sulfonate from any such treatment is generally satisfactory. Usually, it is desirable to use sulfonates having a molecular weight between the approximate limits of 350 and 700 although this is not a definite requirement as some products have been found satisfactory both above and below those limits. It is also possible to make a higher molecular weight sulfonate compound suitable for use by admixing therewith some other sulfonate product such as a lower molecular weight oil-soluble sulfonate.

For the purposes of ease in commercial handling, storage, etc., a stock solution of the detergent may be produced by dissolving a suitable percentage (from 0.2 to 5%) of oil-soluble sulfonate in isopropyl alcohol. This stock solution will, when diluted with water, be ready to use.

It is not intended that the invention be limited by any of the specific examples given merely for the sake of illustration or by any of the theories of the operation of the invention but in the appending claims it is intended to claim broadly all inherent novelty in the invention.

I claim:

1. A non-corrosive detergent composition comprising about 20–50% of isopropyl alcohol, about 0.1% of an oil-soluble sulfonate derived from petroleum oil and about 50–80% of water, with such small amounts of minor ingredients as dyes, perfumes, and the like as may be desired.

2. A stock solution adapted to be diluted with water and used for detergent purposes comprising chiefly isopropyl alcohol with from about 0.2 to 5% of an oil-soluble sulfonate derived from petroleum oil.

3. The method of cleaning automobile windshields and similar surfaces which comprises rubbing over said surfaces a non-corrosive detergent solution comprising about 20–50% of isopropyl alcohol, about 0.1% of an oil-soluble sulfonate derived from petroleum oil and about 50–80% of water, and thereafter wiping the surface dry.

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