LOW-FOAM RINSING AND WASHING AGENTS FOR DISH WASHERS

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References Cited
UNITED STATES PATENTS
3,235,505 2/1966 Tarell ................................252/89

ABSTRACT

Low-foaming rinsing and washing compositions adapted for dishwashers consisting essentially of (A) from 70 percent to 98 percent by weight of water-soluble polyvinyl alcohols having a molecular weight of between 1,000 and 4,000, and (B) from 2 percent to 30 percent by weight of interface active compounds containing oxypropylene and/or oxbutylene radicals which may contain oxyethylene units, as well as aqueous solutions containing said low-foaming rinsing and washing compositions.

10 Claims, No Drawings
LOW-FOAM RINSENG AND WASHING AGENTS FOR DISHWASHERS

THE PRIOR ART

In an increasing measure, mechanical washing methods are being employed to wash china, glass, porcelain, ceramic, metal and synthetic articles. Detergents containing specific surface-active compounds are generally utilized. These detergents should be low foaming so that they do not affect the function of the washing apparatus. A foam formation of too large a volume, caused and increased by the vigorous motion of the bath in the machine, leads to considerable trouble, as the foam must decrease the mechanical effect of the liquid sprayed onto the articles to be cleaned and furthermore may cause the bath in the machine to run over.

Recently, developments in washing apparatus have been directed toward further increasing the intensity of the liquor motion as well as the water volume cycled per minute, and in this way to further improve the mechanical cleansing effect. As a result of such developments, it was found that conventional washing agents, such as higher molecular weight sulfates or sulfonates, caused too much foam. For this reason, in practice, nonionic surface-active agents such as ethylene oxide adducts to alkylphenols or polypropylene glycols, have been preferred. These products, as well, were found to have a relatively high foaming tendency and the range of concentration required for satisfactory washing and cleaning effect when used in the modern dishwashing machines.

It has also been suggested to utilize combinations of effective wetting agents of the known type of ethylene oxide addition products, with foam-inhibiting agents, such as ethylene oxide-propylene oxide mixed adducts with fatty alcohols or alkylphenols. However, such combinations require relatively large additions of the foam inhibitors in order to decrease, to a reasonable extent, the tendency of the combination to foam. A further considerable disadvantage of the named alkylene oxide addition products is that they are not biologically decomposed to a sufficient extent. For this reason, they often play a part in the formation of foam on sluices, dams and overflows. Furthermore, such products often exhibit, even in small amounts of only a few mg./l., a distinct toxicity toward fish and other water organisms. Thus, they can represent a considerable and undesired burden on waste waters and their treatment.

OBJECTS OF THE INVENTION

An object of the invention is the obtaining of highly effective and extremely low-foaming dish and general purpose detergent combinations for dishwashers which do not cause any waste water problems due to their biological harmlessness.

A further object is the obtaining of low-foaming rinsing and washing compositions adapted for dishwashers consisting essentially of (A) from 70 percent to 98 percent by weight of water-soluble polyvinyl alcohol having a molecular weight of between 1,000 and 4,000, and (B) from 2 percent to 30 percent by weight of interface active compounds based on alkylene oxide adducts selected from the group consisting of (1) a polyoxypropylene glycol having an average number of oxypropylene units of between 17 and 86, and xeducted with from 0 to 30 mol percent of oxyethylene units, the total number of oxypropylene and oxyethylene units in said adduct being 100 mol percent (2) a propylene oxide adduct of a hydrocarbon compound having from two to 10 carbon atoms and at least two reactive hydrogen atoms selected from the group consisting of alkanes, benzene and alkylenebenzenes, substituted with substituents selected from the group consisting of hydroxy, amino, and mixtures thereof, said propylene oxide adduct having an average number of oxypropylene units of between 15 and 84, added with from 0 to 30 mol percent of oxyethylene units, the total number of oxypropylene units and oxyethylene units in said adduct being 100 mol percent and (3) an alkylene oxide adduct of a high molecular weight lipophilic radical of the formula:

wherein R represents a radical having from eight to 36 carbon atoms selected from the group consisting of alkyl, alkenyl, alkadienyl, monohydroxyalkenyl and alkylphenyl and Y represents a bridging link selected from the group consisting of O, S, COO, NH, CONH, and SO_3*NH_; added first with oxyethylene units and thereafter with oxalkylene units selected from the group consisting of oxypropylene and oxybutylene, said oxyethylene being from 0 to 70 mol percent of the total amount of oxalkylene units present; from 2 to 90 oxypropylene and oxybutylene units being present in said adduct.

Another object of the invention is the obtaining of aqueous solutions of the above low-foaming rinsing and washing compositions.

A yet further object of the invention is the development of a method of rinsing and rinsing solid articles which comprises forcefully contacting said solid articles with water containing from 0.1 to 0.5 grams per liter of the above low-foaming rinsing and washing compositions.

These and other objects of the invention will become more apparent as the description thereof proceeds.

DESCRIPTION OF THE INVENTION

Accordingly, the present invention relates to low-foaming rinsing and washing compositions adapted for dishwashers based on polyvinylalcohol and nonionic foam-suppressing agents, which is distinguished by a good compatibility with waste waters and harmlessness against fish and other water organisms.

In particular, these compositions are characterized by a content of (A) from 70 percent to 98 percent by weight of water-soluble polyvinylalcohols having a molecular weight of between 1,000 and 4,000, and (B) from 2 percent to 30 percent by weight of interface active compounds with a content of from 2 to 90 oxalkylene units selected from the group consisting of oxypropylene and oxybutylene and preferably a further content of 1 or more oxalkylene units where the amount of oxypropylene and oxybutylene units is at least 30 percent of the total amount of oxalkylene units.

The claimed combination is extraordinarily low foaming even under extreme application conditions, both in household dishwashers as well as in commercial dishwashers. As a result of the high content of polyvinylalcohol, the compositions of the invention possess an excellent wetting effect with respect to hard surfaces such as porcelain, synthetics or metals. The combinations of the invention are particularly suitable for low-foaming, clear, rinsing agents for dishes and silverware of all kinds, possibly with a preceding alkylate prewashing phase, as well as for washing and clear rinsing of drinking glasses and other glassware.

The special advantage of the combinations of the invention with respect to known low-foaming rinsing agents is that the requirement for nontoxicity with respect to fish and other water organisms is met to a satisfactory degree. Although polyvinylalcohol used as the component A is only slightly biologically decomposed, it can yet be considered as physically harmless since it does not exhibit any toxic properties, whatsoever, toward those organisms which live in water. The interface active compounds of type B are biologically decomposed to a satisfactory degree, particularly where they have straight alkyl radicals and a relatively short polyoxyalkylene chain.

In proportion to the increase of length of the polyoxyalkylene chain of the compounds of type B, the ability to biologically decompose decreases, however, at the same time the toxicity of the compounds decreases as well. Other poorly decomposable compounds are the alkylene oxide adducts with alkylphenols and the polypropylene glycols. Due to the fact, however, that the foaming tendency of the polyvinylalcohol can be suppressed effectively with the aid of very small amounts of foam-inhibiting alkylene oxide adducts of the type B, such compounds in practice do not cause waste water problems to any appreciable respect.
The water-soluble polyvinylalcohols having a molecular weight of between 1,000 and 4,000 used as component A are known products and are used in the trade. They can be obtained, for instance, by means of hydrolysis of polyvinyl acetates of the corresponding degree of polymerization. Within the framework of this invention such water-soluble polyvinylalcohols are preferred which have a hydrolysis degree of 85 percent to 90 percent and have molecular weights of approximately 1,000 to 3,000.

As compounds of group B propylene oxide polymers come into consideration such as are obtained by means of polymerization of propylene oxide or addition of propylene oxide to other molecular weight aliphatic compounds containing at least two reactive hydrogen atoms, particularly hydroxy- or amino groups with approximately two to six carbon atoms or to corresponding compounds with six to 10 carbon atoms. The reaction is carried out according to known methods in the presence of alkaline catalysts, preferably under pressure. The corresponding propylene oxide polymers have molecular weights of 1,000 to 5,000 or from 17 to 86 oxypolypropylene units, preferably 1,700 to 4,100. Preferably up to 30 mol percent of ethylene oxide is added as calculated on the basis of the total amount of alkylene oxides.

The propylene oxide polymers of the above type are preferably either polyoxypropylene glycols having an average number of oxypolypropylene units of between 17 and 86, corresponding to molecular weights of 1,000 to 5,000, and more particularly polyoxypropylene glycols having an average number of oxypolypropylene units of between 29 and 70, corresponding to molecular weights of 1,700 to 4,100, adducted with from 0 to 30 mol percent of oxypolyethylene units, the total number of oxypolypropylene and oxypolyethylene units in said polymer being 100 mol percent; as well as propylene oxide adducts of hydrocarbon compounds having from two to 10 carbon atoms and at least two reactive hydrogen atoms, preferably selected from the group consisting of alcanes, benzene and alkylbenzenes, substituted with substituents selected from the group consisting of hydroxy, amino, and mixtures thereof, said propylene oxide adduct having an average number of oxypolypropylene units of between 15 and 84, corresponding to molecular weights of 1,000 to 5,000, and more particularly having an average number of oxypolypropylene units of between 27 and 68, corresponding to molecular weights of 1,700 to 4,100, said propylene oxide adduct being adducted with from 0 to 30 mol percent of oxypolyethylene units, the total number of oxypolypropylene units and oxypolyethylene units in said adduct being 100 mol percent.

The propylene oxide polymers of type B are obtained in a known way by polymerization of propylene oxide to obtain polypolypropylene glycols or by the addition of propylene oxide to compounds resulting from two to 10 carbon atoms and at least two reactive hydrogen atoms. The polymerization and adduct formation is conducted in the presence of alkaline catalysts such as sodium hydroxide, sodium methylate and others. The compounds having from two to 10 carbon atoms which are adducted are aliphatic compounds having two to six carbon atoms such as ethylene glycol, propylene glycol, 1,6-hexanediol, glycerine, sugar alcohols, ethylene diamine, alkylamines, for example, ethanolamine, diethanolamine, etc., as well as aromatic and aliphatic aromatic compounds having six to 10 carbon atoms, such as phenylene diamine, p-ethanolamine, etc., adduct of 4.5 mols of ethylene oxide to polypolypropylene glycol with a molecular weight of 1,750; the adduct of 7 or 16 mols of ethylene oxide to a polypolypropylene glycol with a molecular weight of 2,750; the adduct of 8.5 mols of ethylene oxide to a polypolypropylene glycol consisting of 56 oxypolyethylene radicals; the adduct of 35 mols of propylene oxide to glycerine; the adduct of 48 mols of propylene oxide and 7 mols of ethylene oxide to ethylene diamine, the adduct of 30 percent by weight of ethylene oxide to an polypolypropylene glycol having a molecular weight of 950.

Another method for the preparation of suitable compounds of type B consists in the addition of 2 to 90 mols of propylene oxide and/or butylene oxide to higher molecular weight compounds with eight to 36 carbon atoms which contain reactive hydrogen atoms bonded through the heteroatoms O, S, and N. The higher molecular weight compounds may be aliphatic, aliphatic-cycloaliphatic or aliphatic-aminic. The aliphatic compounds possess higher molecular weight radicals with eight to 36, and preferably 10 to 20 carbon atoms and are preferably of the formula:

\[ R_1 - Y - H \]

wherein \( R_1 \) represents a radical having from eight to 36 carbon atoms selected from the group consisting of alkyl, alkenyl, alkoxy-alkenyl, and \( H \) represents a replaceable hydrogen and \( Y \) represents a bridging link selected from the group consisting of:

\[ -\text{NH}, -\text{O}, -\text{C} = \text{N}, -\text{SO}_2 \text{NH}_2, \text{and} -\text{CO} - \text{O} - \text{O} \]

The aliphatic-aminic compounds possess higher molecular weight radicals with 12 to 22, and preferably 14 to 18 carbon atoms and are preferably of the formula:

\[ R_2 - Y - H \]

wherein \( Y \) and \( H \) have the above-assigned values and \( R_2 \) represents a radical having 12 to 22 carbon atoms selected from the group consisting of alkylphenyl, alkenylphenyl, alkoxy-phenyl and alkylcyclohexyl. The hydrocarbon radicals \( R_2 \) and \( R' \) may contain conventional substituents such as hydroxy groups, halide atoms, or alkyl side chains.

Thus the following starting compounds for their preparation come into consideration: higher molecular weight aliphatic, aliphatic-cycloaliphatic or aliphatic-aminic compounds, such as alcohols, alkylphenols, carboxylic acids, mercaptans, amines, carboxylic acid amides or alkylanilides, sulfonic acid amides, and the like with eight to 36, and preferably 12 to 18 carbon atoms. The alkyl radicals can carry substituents such as halogen atoms or can have side chains. Preferably such adducts are used which, in addition to oxypolypropylene and/or oxypolybutene units, have oxypolyethylene units as well. The number of oxypolypropylene and/or oxypolybutene units should be at least 30 percent by mol of the total oxypolyethylene units. The oxypolyethylene units to be added consist of 70 mol percent or less of ethylene oxide and at least 30 to 100 mol percent of propylene oxide and/or butylene oxide. When various oxypolyethylene units are used, as a rule ethylene oxide is added in the first step and thereafter propylene oxide and/or butylene oxide is then added. The reaction is accomplished in the usual manner, for example, by utilizing pressure in the presence of alkaline catalysts.

Compounds of type B may also be prepared by reacting higher molecular weight aliphatic or aliphatic-aminic compounds with compounds containing prepared polyoxyalkylene chains, for example, the esterification of higher molecular weight carboxylic acids with polyoxypropylene glycols or the etherification of higher molecular weight alcohols with polyoxypropylene glycols.

Examples for suitable compounds of group B are the following: the adduct of 2 mols of propylene oxide to dodecyl alcohol; the adduct of 3 mols of propylene oxide to a fatty alcohol mixture of the chain length \( C_{10} \) to \( C_{18} \), the adduct of 3 mols of ethylene oxide and 3 mols of propylene oxide to dodecyl alcohol; the adduct of 2 mols of ethylene oxide and 4 mols of propylene oxide or of 3 mols of ethylene oxide and 3 mols of propylene oxide to a fatty alcohol mixture of the chain length \( C_{10} \) to \( C_{18} \), the adduct of 7 mols of ethylene oxide and 10 mols of propylene oxide or of 9 mols of ethylene oxide and 16 mols of propylene oxide to a fatty alcohol mixture of the chain length \( C_{10} \) to \( C_{18} \), the adduct of 10 mols of ethylene oxide and 20 mols of propylene oxide to a fatty alcohol mixture of the chain length \( C_{10} \) to \( C_{18} \), the adduct of 3 mols of ethylene oxide and 4 mols of propylene oxide to a fatty alcohol mixture of the chain length \( C_{10} \) to \( C_{18} \), the adduct of 7 mols of ethylene oxide and 2 mols of propylene oxide to nonylphenol; the adduct of 7 mols of ethylene oxide and 5 mols of butylene oxide to nonylphenol; the adduct of 12 mols of a mixture containing 40 mol percent of ethylene oxide and 60 mol percent of propylene oxide to dodecyl alcohol; the adduct
of 2 mols of ethylene oxide and 4 mols of propylene oxide to a coconut fatty acid mixture of the chain length C_{12} to C_{18}, the adduct of 4 mols of ethylene oxide and 12 mols of propylene oxide to a fatty acid amide mixture of the chain length C_{16} to C_{22}, the adduct of 4 mols of propylene oxide to dodecylamine, the adduct of 2 mols of ethylene oxide and 3 mols of propylene oxide to tetradecylmercaptan.

Of particular interest are, in particular, the adducts of ethylene oxide and propylene oxide to higher molecular weight fatty alcohols, whereby, above all, the fatty alcohol adducts with relatively short alkylene oxide chains are employed due to their better biological decomposability.

The individual components in the low-foaming rinsing agents of the invention amount to approximately 70 percent to 98 percent by weight of component A and 2 percent to 30 percent by weight of component B. In practice it was in particular that mixtures from 85 percent to 95 percent by weight of component A and 5 percent to 15 percent by weight of component B are particularly suitable.

When the mixtures are used for the washing of dishes, particularly of drinking glasses, concentrations of approximately 0.05 to 0.5 g/m³/liter, preferably 0.1 to 0.4 g/m³/liter in the cleaning fluid are required. If employed as rinsing agent subsequent to an alkaline washing phase, approximately 0.01 to 0.25 g/m³/liter, preferably 0.02 to 0.1 g/m³/liter are used. To a certain degree the concentrations are dependent upon the hardness of the water and the type of dishes. When washing or rinsing, utilizing hard and salty waters, or with plastic dishes, greater amounts of the rinsing agents are required.

Usefully, the compositions of the invention are prepared in the form of aqueous concentrates with a content of approximately 10 percent to 30 percent by weight of mixtures of components A and B. By variation of the amount of the components, the concentrates can be adjusted to suit such that they possess a good temperature stability and do not tend to precipitate or separate into layers. Usefully, the concentrates are added into the washing and rinsing solution in the dishwashing machines by means of an automatic dosing device in common for such purposes.

The following specific embodiments of the invention are illustrative thereof. It is obvious, however, that other expedients may be employed and the specific embodiments are not to be deemed limiting in any manner.

**EXAMPLES**

The foam behavior of different cleansing and rinsing admixtures was examined for comparison purposes in a special foam examination apparatus. The following table exhibits the extremely good foam behavior of the compositions of the invention.

The foam apparatus was constructed in similar manner as a modern dishwasher operating according to the jet spray system. By means of a pump about 170 liters of water per minute were rotated and sprayed into the metering chamber by means of a rotating spray-arm provided with nozzles. Foam heads from 0 to 280 mm may be measured in reproducible manner, whereas larger foam volumes can no longer be measured accurately, and, therefore, they are indicated in the table as >280. The liquid temperature during the tests was 50°C, the hardness of the water used was 16°dH and the duration of the foam test lasted 5 minutes. The reading of the foam height was done immediately after the machine came to a standstill and 30 seconds after the machine had come to a stop.

The foam apparatus is described in “Fette, Seifen, Anstrichmittel,” 66 (1964), page 529.

The abbreviations used in the table have the following meanings:

- **EO** = mols of ethylene oxide
- **PO** = mols of propylene oxide

The letters A and B represent the component types in the compositions in accordance with the preceding.

<table>
<thead>
<tr>
<th>Example</th>
<th>Composition of mixture</th>
<th>Conc., g/m³/liter</th>
<th>30 sec. after standstill</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a.</td>
<td>A. Polyvinylalcohol (viscosity of a 4% solution at 20°C, 15 cP, hydrolysis degree: 80%)</td>
<td>0.12</td>
<td>&gt;280 &gt;280</td>
</tr>
<tr>
<td></td>
<td>A. Polyvinyl alcohol according to 1a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Fatty alcohol C_{16}-C_{18}EO+4PO</td>
<td>0.009</td>
<td>0 0</td>
</tr>
<tr>
<td>2a.</td>
<td>A. Polyvinylalcohol according to 1a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Oxalol Alice C_{16}EO+4PO</td>
<td>0.009</td>
<td>0 0</td>
</tr>
<tr>
<td>3a.</td>
<td>A. Polyvinylalcohol according to 1a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Nonylphenol+4EO+4PO</td>
<td>0.009</td>
<td>0 0</td>
</tr>
<tr>
<td>4a.</td>
<td>A. Polyvinylalcohol according to 1a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Fatty alcohol C_{16}-C_{22}EO+4PO</td>
<td>0.008</td>
<td>0 0</td>
</tr>
<tr>
<td>5a.</td>
<td>A. Polyvinylalcohol (viscosity of a 4% solution at 20°C, 19 cP, hydrolysis degree: 85%)</td>
<td>0.12</td>
<td>&gt;280 &gt;280</td>
</tr>
<tr>
<td>6a.</td>
<td>A. Polyvinylalcohol according to 5a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Fatty alcohol C_{16}-C_{22}EO+4PO</td>
<td>0.009</td>
<td>0 0</td>
</tr>
<tr>
<td>7a.</td>
<td>A. Polyvinylalcohol according to 3a</td>
<td>0.12</td>
<td>&gt;280 &gt;280</td>
</tr>
<tr>
<td>8a.</td>
<td>A. Polyvinylalcohol according to 7a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Nonylphenol+EO+4PO</td>
<td>0.009</td>
<td>0 0</td>
</tr>
<tr>
<td>9a.</td>
<td>A. Polyvinylalcohol according to 8a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Dodecylamine+4PO</td>
<td>0.009</td>
<td>0 0</td>
</tr>
<tr>
<td>10a.</td>
<td>A. Polyvinylalcohol according to 1a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Fatty alcohol C_{16}-C_{18}EO+4PO</td>
<td>0.009</td>
<td>0 0</td>
</tr>
<tr>
<td>11a.</td>
<td>A. Polyvinylalcohol according to 10a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Fatty alcohol C_{16}-C_{18}EO+4PO</td>
<td>0.009</td>
<td>0 0</td>
</tr>
<tr>
<td>12a.</td>
<td>A. Polyvinylalcohol according to 11a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Polypropylene glycol (MW 2,400)+4EO</td>
<td>0.009</td>
<td>10 0</td>
</tr>
<tr>
<td>13a.</td>
<td>A. Polyvinylalcohol according to 12a</td>
<td>0.12</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>B. Polypropylene glycol (MW 1,750)+4EO</td>
<td>0.009</td>
<td>10 0</td>
</tr>
</tbody>
</table>
EXAMPLE 14
A liquid rinsing agent suitable for commercial dishwashers had the following composition: 20% Polyvinylalcohol (viscosity of a 4% solution at 20°C, 3 cP., hydrolysis degree: 88 percent) 2% Fatty alcohol—C_{12}-C_{14}=3 EO+3 PO 78% water
At application temperatures between 50° C. and 90° C., the product developed practically no foam. It was dosed in concentrations of 0.4 to 0.6 g./liter into the rinsing water subsequent to the alkaline main washing of the dishes. Dirt free, shining dishes were obtained.

EXAMPLE 15
A very low-foaming detergent for household dishwashers had the following composition:
10.0% by weight of polyvinylalcohol (viscosity of a 4% solution at 20°C, 15 cP., hydrolysis degree: 86 percent)
0.6% by weight of fatty alcohol—C_{12}-C_{14}=5 EO+4 PO
89.4% by weight of water
At an application concentration of 0.5 to 1.5 gm./liter, an unobjectionable washing and clear drying effect was obtained.

EXAMPLE 16
For the rinsing of drinking glasses and other dishes in a household dishwasher a mixture of the following composition was particularly suitable:
10% of polyvinylalcohol (15 cP., hydrolysis degree: 86 percent)
0.5% of fatty alcohol—C_{12}-C_{14}=5 EO+13 PO
89.5% of water.
At application concentrations of 0.4 to 0.6 g./liter an unobjectionable washing and clear drying effect was obtained without the occurrence of disturbing foam buildup.

The preceding specific embodiments are illustrative of the practice of the invention. It is obvious, however, that other expedients known to those skilled in the art may be employed without departing from the spirit of the invention.

1 claim:
1. Low-foaming rinsing and washing compositions adapted for dishwashers consisting essentially of (A) from 70 percent to 98 percent by weight of water-soluble polyvinyl alcohol obtained by hydrolysis of polyvinyl acetate, having a hydrolysis degree of between 85 percent and 90 percent and having a molecular weight of between 1,000 and 4,000, and (B) from 2 percent to 30 percent by weight of interface active compounds based on alkylene oxide adducts selected from the group consisting of (1) a polyoxypropylene glycol having an average number of oxypropylene units of between 17 and 86, adducted with from 0 to 30 mol percent of oxyethylene units, the total number of oxypropylene and oxyethylene units in said adduct being 100 mol percent (2) a propylene oxide adduct of a hydrocarbon compound having from two to 10 carbon atoms and at least two reactive hydrogen atoms selected from the group consisting of alkanes, benzene and alkylbenzenes, substituted with substituents selected from the group consisting of hydroxy, amino, and mixtures thereof, said propylene oxide adduct having an average number of oxypropylene units of between 27 and 68, adducted with from 0 to 30 mol percent of oxyethylene units, the total number of oxypropylene and oxyethylene units in said adduct being 100 mol percent of the total amount of oxyalkylene units present; from 2 to 90 oxypropylene and oxybutylene units being present in said adduct.

2. The low-foaming rinsing and washing compositions of claim 1 wherein said component B is a polyoxypropylene glycol having an average number of oxyethylene units of between 29 and 70, adducted with from 0 to 30 mol percent of oxyethylene units, the total amount of oxypropylene and oxyethylene units in said adduct being 100 mol percent.

3. The low-foaming rinsing and washing compositions of claim 1 wherein said component B is a propylene oxide adduct of a hydrocarbon compound having from two to 10 carbon atoms and at least two reactive hydrogen atoms selected from the group consisting of alkanes, benzene and alkylbenzenes, substituted with substituents selected from the group consisting of hydroxy, amino, and mixtures thereof, said propylene oxide adduct having an average number of oxypropylene units of between 27 and 68, adducted with from 0 to 30 mol percent of oxyethylene units, the total number of oxypropylene and oxyethylene units in said adduct being 100 mol percent of the total amount of oxyalkylene units present; from 2 to 90 oxypropylene and oxybutylene units being present in said adduct.

4. The low-foaming rinsing and washing compositions of claim 1 wherein said component B is a propylene oxide adduct of a hydrocarbon compound having from two to 10 carbon atoms and at least two reactive hydrogen atoms selected from the group consisting of alkanes, benzene and alkylbenzenes, substituted with substituents selected from the group consisting of hydroxy, amino, and mixtures thereof, said propylene oxide adduct having an average number of oxypropylene units of between 27 and 68, adducted with from 0 to 30 mol percent of oxyethylene units, the total number of oxypropylene and oxyethylene units in said adduct being 100 mol percent of the total amount of oxyalkylene units present; from 2 to 90 oxypropylene and oxybutylene units being present in said adduct.

5. The low-foaming rinsing and washing compositions of claim 1 wherein said component B is an alkylene oxide adduct of a high molecular weight lipophilic radical of the formula: R—Y—H

6. The low-foaming rinsing and washing compositions of claim 5 wherein said alkylene oxide adduct is the addition product of from 2 to 30 mols of propylene oxide to an alcohol having from eight to 22 carbon atoms selected from the group consisting of fatty alcohols and alkylphenols.

7. The low-foaming rinsing and washing composition of claim 5 wherein said alkylene oxide adduct is the addition product of from 2 to 20 mols of ethylene oxide and from 2 to 30 mols of propylene oxide, to an alcohol having from eight to 22 carbon atoms selected from the group consisting of fatty alcohols and alkylphenols, wherein at least 30 mol percent of said alkylene oxides is propylene oxide.

8. The low-foaming rinsing and washing compositions of claim 1 wherein said component A is present in an amount of from 85 percent to 98 percent by weight and said component B is present in an amount of from 2 percent to 15 percent by weight.

9. Aqueous concentrates containing from 10 percent to 30 percent by weight of the low-foaming rinsing and washing compositions of claim 1.

10. The method of washing and rinsing solid articles which comprises forcefullycontacting said solid articles with water containing from 0.01 to 0.5 grams per liter of the low-foaming rinsing and washing compositions of claim 1.

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