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CLEANSING AND SOIL PREVENTIVE COMPOSITION

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4 Claims

ABSTRACT OF THE DISCLOSURE

Compositions comprising a film forming component, a surfactant, a scale inhibitor, an organic solvent, and water are effective for cleansing hard surfaces and inhibiting deposition of soils or stains thereon.

BACKGROUND OF THE INVENTION

This invention relates to compositions suitable for cleaning hard surfaces e.g., tile, porcelain, enamel, and for inhibiting the deposition of soils or stains thereon.

As is well recognized by those familiar with household and industrial cleaning operations, the surface of toilet bowls, lavatories, bathtubs and the like are subject to deposition of adherent stains and soil resulting from deposition of insoluble metal salts from water and from contact with human waste, dirt, etc., in normal usage. The cleansing of such surfaces is a difficult task, often requiring use of scouring agents or harsh, heavy duty cleansers.

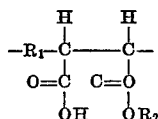
SUMMARY OF THE INVENTION

It is an object of this invention to provide compositions which not only efficiently clean such surfaces but which inhibit further soiling thereof. The compositions which fulfill the objects of this invention contain a film forming resin, a surfactant, a scale inhibitor, an organic solvent and water. The formulations and characteristics of these compositions will be better understood from the following description of the preferred embodiments.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The essential ingredients of the compositions of this invention are a film forming component, a surfactant, a scale inhibitor, an organic solvent, and water.

The film forming component of the compositions of this invention is a 5% to 40% ammonium, amine, alkyl amide (the alkyl group containing 1-5 carbon atoms) mono-alkyl, di-alkyl, or tri-alkyl (the alkyl group containing from 1-5 carbon atoms) amine salts of the polymer having a molecular weight of from about 500 to 100,000 and consisting of repeating units represented by the formula



wherein R_1 is an alkyl group containing from 2 to 5 carbon atoms or an alkyl ether group containing 3 to 5 carbon atoms and R_2 is an alkyl group containing from 1 to 5 carbon atoms. The designation of these materials as 5 to 40% salts indicates that the acidic groups of the polymer are only 5 to 40% neutralized and replaced with the appropriate ammonium amine etc. group. Film forming components of this type are readily obtained by neutralization of half-alkylesters of alkaline-maleic anhydride co-polymers e.g. the half-butylester of ethylene-maleic anhydride co-polymers of half-alkylesters of alkyl

2

ether maleic anhydride co-polymers e.g. the half-butylester of alkyl vinyl-ether maleic anhydride.

The film forming component is water soluble to an extent determined by the molecular weight and degree of neutralization. When employed in the compositions of this invention in conjunction with a surfactant, the film forming component forms a coating containing the other ingredients of the composition on surfaces to which it is applied. For example, if the compositions of this invention are swabbed onto a toilet bowl, the water in the bowl will be provided with a concentration of scale inhibiting agent to prevent solid deposition and the walls of the bowl above the water level will, by reason of the film forming component, be coated with the composition of the invention. This coating serves to inhibit stain deposition on the walls and, upon flushing of the toilet, renews the concentration (by reason of its solubility) of scale inhibitors in the bowl water.

The compositions of this invention will additionally contain from 1 to 20% of a surfactant. Although any surfactant can be utilized in the practice of the invention, the use of surfactants other than those having a tendency to form deposits on the surfaces of vessels in which they are employed in the presence of hard water (e.g. natural soaps) is preferred. Synthetic anionic, non-ionic, zwitterionic, and ampholytic detergent compounds and mixtures thereof are well suited for use in the compositions of this invention. Preferred anionic detergent compositions are the non-stop detergent compounds such as the alkali metal alkyl sulfates such as those obtained by sulfating alcohols containing from 8 to 13 carbon atoms, the alkali metal alkylbenzene sulfonates, particularly those in which the alkyl radical is a straight chain aliphatic radical containing from about 10 to about 20, preferably 10 to 15, carbon atoms. Numerous other suitable anionic surfactants are well known to those skilled in the art.

Suitable non-ionic surfactants include polyethylene oxide condensates of alkyl phenols or aliphatic alcohols.

Examples of suitable ampholytic surfactants include sodium-3-dodecylamino-propionate and sodium-3-dodecyl aminopropane sulfonate.

Examples of zwitterionic surfactants includes 3-(N,N-dimethyl - N - hexadecylammonio) propane - 1 - sulfonate and 3 - (N,N - dimethyl - N - hexadecylammonio) - 2 - hydroxypropane-1-sulfonate.

The foregoing list of surfactants is intended as merely represented rather than comprehensive. The determination of an optimum surfactant for giving application can be readily determined by routine experimentation, it being pointed out that surfactants of low foaming characteristics and showing little tendency to form insoluble products in hard water are generally preferred for use in this invention.

The compositions of this invention will additionally contain as an essential component from .5 to 5% of a scale inhibitor. Numerous scale inhibitors are well known to those skilled in the art as compounds which prevent deposition of insoluble metal salts by either a sequestering or chelating action on the metal or by a threshold effect.

Examples of scale inhibitors suitable for use in this invention include sodium tripolyphosphate, sodium hexamethaphosphate, glassy polyphosphates, nitrilotri (methylenephosphonic acid), 1-hydroxyethylidene - 1,1 - diphosphonic acid, ethylenediaminetetra (methylenephosphonic acid) hexamethylenediaminetetra (methylenephosphonic acid), tri-sodium nitrilotriacetate, ethylenediaminetetraacetate, diethylenetriaminepentaacetate, and N-hydroxy-ethylenediaminetriacetate.

The compositions of this invention will also contain from 3 to 50% by weight of an organic solvent which may be methanol, ethanol, isopropanol, or mixtures thereof.

3

The compositions of this invention will further contain from 5% to 95% by weight water.

In addition to the foregoing essential components the compositions of this invention may also contain minor amounts of various ingredients conventionally employed in cleaning compositions. For example, solubilizing agents such as sodium toluenesulfonate, sodium-cumene sulfonate or sodium xylene sulfonate may be employed with low molecular weight alkyl benzene sulfonate surfactants. Further, the compositions of the invention may desirably contain perfumes, dyes, germicides, e.g. para dichlorophenol or similar materials.

The compositions of this invention and their utilities will be further understood from the following examples wherein all parts are by weight.

Example I

Two wide stem glass funnels are supported in upright position.

A soil preventive and cleansing composition is prepared by admixing 4 parts half butyl ester of a linear ethylene/maleic anhydride copolymer having a specific viscosity of about 0.7; 25 parts isopropanol; 1 part diethylamine; 3 parts linear dodecylbenzene; 6 parts sodium salt of 1-hydroxyethylidene 1, 1 diphosphonic acid; 5 parts ethylbenzyl parachlorophenol; and 56 parts water.

The foregoing composition is sprayed onto the interior wall surface of one funnel and allowed to dry for 20 minutes. The other funnel is left untreated. A soil slurry is prepared containing 200 parts fecal material and 200 parts water containing 3 parts per million iron and 150 parts per million calcium-magnesium (3/2 ratio) hardness.

Ten grams of the soil slurry is applied to the interior wall surfaces of each funnel and allowed to dry for 10 minutes. The funnels are then each rinsed with 400 mls. distilled water. The soil application and rinse procedure is repeated 5 times.

At the conclusion of the test, the untreated funnel is heavily soiled whereas the treated funnel is only slightly soiled.

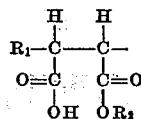
What is claimed is:

1. A cleaning and soil preventive composition consisting essentially of

- (a) from about 1 to 10% of a film forming component selected from the group consisting of 5 to 40% ammonium salts, amine salts, alkyl amide salts, wherein the alkyl group contains 1-5 carbon atoms; mono-, di- and tri-alkyl amine salts wherein each alkyl group contains 1-5 carbon atoms of polymers having molec-

4

ular weights of from about 500 to 100,000 and consisting of repeating units represented by the formula



wherein R₁ is selected from the group consisting of alkyl groups containing from 2 to 5 carbon atoms and alkyl ether groups containing 3 to 5 carbon atoms and R₂ is an alkyl group containing 1 to 5 carbon atoms, (b) from about 1% to 20% by weight of a surfactant selected from the group consisting of synthetic anionic, nonionic, amphotytic, and zwitterionic surfactants,

(c) from about 0.5 to 5% by weight of a scale inhibitor which functions by either a sequestering or chelating action or by threshold effect,

(d) from about 3-50% by weight of an organic solvent selected from the group consisting of methanol, ethanol and isopropanol, and

(e) from about 5% to 95% water.

2. The composition of claim 1 wherein the film forming component is an alkyl amine salt of the half-butylester of an ethylene maleic anhydride copolymer.

3. The composition of claim 1 wherein said scale inhibitor functions as a threshold agent.

4. The composition of claim 3 wherein the film forming component is an alkylamine salt of a half-butylester of an ethylene/maleic anhydride copolymer and the organic solvent is isopropanol.

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