

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 780 467 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.06.1997 Bulletin 1997/26

(51) Int. Cl.⁶: **C11D 3/43**, C11D 1/72,
C11D 1/29

(21) Application number: **96203568.9**

(22) Date of filing: **17.12.1996**

(84) Designated Contracting States:
BE DE ES FR GB IT NL

(30) Priority: **18.12.1995 US 574172**

(71) Applicant: **SHELL INTERNATIONALE RESEARCH
MAATSCHAPPIJ B.V.
2596 HR Den Haag (NL)**

(72) Inventors:
• **Haberman, Leonard Michael**
Houston, Texas 77082 (US)
• **Prieto, Nelson Eduardo**
Richmond, Texas 77469 (US)

(54) **Degreasing compositions**

(57) The present invention relates to a degreasing composition which comprises at least one olefin component and at least one surfactant component selected from the group consisting of alcohol ethoxylates, alcohol ethoxysulfates and mixtures thereof.

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Description

The present invention relates to degreasing compositions containing at least one olefin component and at least one surfactant component selected from the group consisting of alcohol ethoxylates, alcohol ethoxysulfates and mixtures thereof.

Many hydrocarbon solvents, particularly chlorinated and fluorinated hydrocarbons, have been used in industrial degreasing operations. These solvents are effective in removing tough industrial soils, but during drying phases, some of the solvents are expelled into the atmosphere. While many industries continue to use chlorofluorocarbon type solvents as degreasers, chlorofluorocarbons have come under increasing attack, and manufacturers of solvent cleaning equipment have concentrated on reducing effluents to the atmosphere by special condensation equipment, etc. However, even with improved degreasing machinery, large quantities of volatile organic compounds like chlorofluorocarbons, hexanes, heptanes, and mineral spirits are still being released into the atmosphere every year due to solvent type degreasing operations.

Therefore, there has become an increasing need for a degreasing composition which would replace in whole or in part these chlorinated and fluorinated degreasing systems. It has been found that a degreasing composition containing at least one olefin component and at least one surfactant component selected from the group consisting of alcohol ethoxylates, alcohol ethoxysulfates and mixtures thereof, is effective to remove tough soils, such as greases, oils, waxes, etc., while having a relatively low environmental impact.

It has been found that the use of a degreasing composition comprising at least one olefin component and at least one surfactant component selected from the group consisting of alcohol ethoxylates, alcohol ethoxysulfates and mixtures thereof, improves the cleaning performance of hard surface cleaners, pre-spotters, and the like, with the advantages being compliance with environmental regulations and low, maskable odor, low toxicity and a high level of effectiveness.

The present invention provides a degreasing composition or formulation which in particular comprises from 2 to 90, preferably from 20 to 87 percent by weight, basis the total weight of the composition, of one or more olefin components, and from 2.0 to 60, preferably from 2.5 to 40, and more preferably from 10 to 30 percent by weight, basis the total weight of the composition, of a surfactant component selected from the group consisting of alcohol ethoxylates, alcohol ethoxysulfates and mixtures thereof.

As used herein, the term "olefin" is used to refer to unsaturated hydrocarbons.

The olefin component(s) suitable for use in the degreasing composition of the present invention include detergent-range olefins containing from 8 to 24 carbon atoms. These olefins can be alpha olefins or internal olefins and they may be linear or branched, but they are preferably linear or lightly branched. Single cut olefins or mixtures of olefins may also be utilized. In a particularly preferred embodiment, the olefin is an alpha olefin containing from about 12 to about 18 carbon atoms.

Preferred olefins for use in the degreasing composition are, for practical reasons of availability, the commercial olefin products in the C_8 to C_{24} range. While commercial production of such olefins may be carried out by the cracking of paraffin wax, commercial production is more commonly accomplished by the oligomerization of ethylene using procedures well known in the art. The resulting oligomerization products are substantially of linear structure. Commercial olefin products manufactured by ethylene oligomerization are marketed in the United States by Chevron Corporation and Albermarle, and by Shell Chemical Company under the trademark NEODENE. Specific procedures for preparing suitable linear olefins from ethylene are described in U.S. Patent Nos. 3,676,523, 3,686,351, 3,737,475, 3,825,615 and 4,020,121. While most of such olefin products are comprised largely of alpha-olefins, higher linear internal olefins are also commercially produced, for example, by the chlorination-dehydrochlorination of paraffins, by paraffin dehydrogenation, and by isomerization of alpha-olefins. Linear internal olefin products in the C_8 to C_{24} range are marketed by Shell Chemical Company and by Liquichemica Company. These commercial products, whether predominantly internal or alpha-olefins typically contain about 70 percent by weight or more, most often about 80 percent by weight or more, linear mono-olefins in a specified carbon number range (e.g., C_{10} to C_{12} , C_{11} to C_{15} , C_{12} to C_{13} , C_{15} to C_{18} , etc.), the remainder of the product being olefin of other carbon number or carbon structure, diolefins, paraffins, aromatics, and other impurities resulting from the synthesis process. Olefins in the C_9 to C_{18} range are considered most preferred for use as the olefin component in the degreasing composition in the present invention.

There appears to be no particular preference with regard to whether the degreasing composition contains one particular olefin or a mixture of olefins as the olefin component of the degreasing composition.

The degreasing composition of the present invention also contains a surfactant component which is selected from the group consisting of alcohol ethoxylates, alcohol ethoxysulfates and mixtures thereof.

Alcohol ethoxylates suitable for use as a surfactant component in the degreasing composition of the present invention include one or more oxyethylene adducts (or ethoxylates) of detergent-range alcohols having from 3 to 20 oxyethylene units per molecule of alcohol. Such alcohol ethoxylates can be represented by the formula



wherein R is a straight-chain or branched-chain alkyl group having in the range of from about 8 to about 20 carbon atoms, preferably from about 9 to about 18 carbon atoms, or an alkylaryl group having an alkyl moiety having from 8 to 12 carbon atoms and n represents the average number of oxyethylene groups per molecule and is a number in the range of from 3 to 20, preferably in the range of from 3 to 13, and more preferably in the range of from 3 to 7. The alkyl group can have a carbon chain which is straight or branched. Preferably, about 80 percent of the R groups in the alcohol ethoxylates utilized in the instant invention are straight-chain. It is understood that R can be substituted with any substituent which is inert such as, for example, halogen groups. Ethoxylates within this class are conventionally prepared by the addition of ethylene oxide to the corresponding alcohol (ROH) in the presence of a catalyst.

The alcohol ethoxylate component of the degreasing composition in the instant invention is preferably derived by ethoxylation of primary or secondary, straight-chain or branched alcohols. Suitably, the alcohols have from 8 to 20 carbon atoms, preferably from 9 to 18 carbon atoms, and more preferably from 9 to 15 carbon atoms. The most common ethoxylates in this class and the ones which are particularly useful in this invention are the primary alcohol ethoxylates, i.e., compounds of formula I in which R is an alkyl group and the $-O-(CH_2-CH_2O)_n-H$ ether substituent is bound to a primary carbon of the alkyl group.

Alcohols which are suitable for ethoxylation to form the alcohol ethoxylate component of the degreasing composition of the instant invention include coconut fatty alcohols, tallow fatty alcohols, and the commercially available synthetic long-chain fatty alcohol blends, e.g., the C_{12} to C_{15} alcohol blends available as NEODOL 25 Alcohol (NEODOL is a trademark of product manufactured and sold by Shell Chemical Company), the C_{14} to C_{15} alcohol blends available as NEODOL 45 Alcohol, the C_{12} to C_{14} alcohol blends available as TERGITOL 24L (TERGITOL is a trademark of product manufactured and sold by Union Carbide Corporation), and the C_{12} to C_{13} alcohol blends available, for example, as NEODOL 23 Alcohol (Shell).

Suitable alcohol ethoxylates can be prepared by adding to the alcohol or mixture of alcohols to be ethoxylated a calculated amount, e.g., from 0.1 to 0.6, preferably from 0.1 to 0.4 percent by weight, based on total alcohol, of a strong base, typically an alkali metal or alkaline earth metal hydroxide such as sodium hydroxide or potassium hydroxide, which serves as a catalyst for ethoxylation. The resulting mixture is dried, as by vapour phase removal of any water present, and an amount of ethylene oxide calculated to provide the desired number of moles of ethylene oxide per mole of alcohol is then introduced and the alcohol ethoxylate is allowed to react until the ethylene oxide is consumed, the course of the reaction being followed by the decrease in reactor pressure.

Preferred alcohol ethoxylate components for use in the degreasing compositions in the present invention include ethoxylated fatty alcohols, preferably linear primary alcohols with C_8 to C_{20} , preferably C_{12} to C_{15} alkyl groups, and an average of from 3 to 20, more preferably in the range of from 3 to 13, and most preferably in the range of from 3 to 7 moles of ethylene oxide per mole of alcohol.

The general class of alcohol ethoxysulfates suitable for use in the degreasing composition of the present invention, either alone as surfactant component or in combination with an alcohol ethoxylate, may be represented by the formula $R'-O-(CH_2CH_2O)_x-SO_3M$ (II), wherein R' is a straight chain or branched chain alkyl group having in the range of from 8 to 20 carbon atoms, preferably from 9 to 18, or an alkylaryl group having an alkyl moiety having from 8 to 12 carbon atoms, x represents the average number of oxyethylene groups per molecule and is an integer in the range of from 1 to 12, and preferably from 2 to 7, and M is a cation selected from an alkali metal ion, an ammonium ion, and mixtures thereof. R' is preferably a straight chain alkyl group, that is, at least 50 percent, preferably 80 percent, of the alkyl R' groups in the formulation are straight chain. It is understood that R' can be substituted with any substituent which is inert such as, for example, halo groups.

Suitable alcohol ethoxysulfates are typically prepared by first reacting an alcohol having from 8 to 20 carbon atoms with 1 to 12 moles of ethylene oxide per mole of alcohol to form an alcohol ethoxylate product. Thereafter, the alcohol ethoxylate product is then sulphated with a suitable sulphating agent, and the resulting sulphated product is neutralized with an aqueous alkali metal solution.

Specific alcohol ethoxysulfates suitable for use as the surfactant component in the degreasing compositions of the present invention include sulphated ethoxylated fatty alcohols, preferably linear or secondary alcohols having from C_8 to C_{20} , preferably from C_9 to C_{18} alkyl groups, and an average of 1 to 12, preferably from 2 to 7, moles of ethylene oxide per mole of alcohol, and sulphated ethoxylated alkylphenols having from C_8 to C_{20} , preferably from C_9 to C_{15} alkyl groups, and an average of 1 to 12 moles of ethylene oxide per mole of alkylphenol.

The total amount of alcohol ethoxylate and/or alcohol ethoxysulfate surfactant component present in the degreasing composition of the present invention is typically in the range of from 2.0 to 60, and preferably in the range of from 2.5 to 40 percent by weight, basis the total weight of the composition. When mixtures of alcohol ethoxylates and/or alcohol ethoxysulfates are utilized as the surfactant component in the degreasing composition, the ratio of alcohol ethoxylate to alcohol ethoxysulfate will typically be in the range of from 10:1 to 1:10, and preferably in the range of from 5:1 to 1:5.

In addition to the olefin component and the surfactant component, the degreasing composition may, depending on the desired use of the composition, also contain additional components. Non-limiting examples of such components include builders such as, for example, zeolite A, soda ash, sodium metasilicate and the like; skin emollients such as, for

example, glycerine and lanolin, cleaning enhancers such as, for example, olefin sulfonates, alkanolamides, or alkoxy-
lates; pH modifiers such as, for example, alkanolamines; solvents such as ethylene glycol, water, and the like; abrasives
such as, for example, silica, calcium carbonate, and the like, as well as dyes, fragrances, optical behaviour enhancers,
viscosity modifiers, etc. Typically, these additional ingredients comprise from 0.1 to 25 percent by weight, basis the total
weight, of the degreasing composition.

While the degreasing compositions of the present invention are useful in a variety of applications in which there is
a need for the removal of grease and oily soils, the degreasing compositions are particularly useful in hard surface
cleaning compositions and pre-spotter compositions.

Hard surface cleaning compositions are formulations which are typically used to clean surfaces containing oily or
greasy materials and other soils, as well as dust and dirt, etc.

Typically, the hard surface cleaning composition contains from 50 to 99 percent by weight, basis the total weight of
the composition, of the degreaser composition, and from 1 to 50 percent by weight of water.

In addition the alcohol ethoxylate and/or alcohol ethoxysulfate surfactant components in the degreasing composi-
tion, the hard surface cleaning compositions according to the present invention may also contain additional surfactant
compounds, selected from the group consisting of nonionic, anionic, cationic and zwitterionic surfactants, and mixtures
thereof. The additional surfactant compounds function as additional cleaning agents in the hard surface cleaning com-
position of the present invention.

Suitable nonionic surfactants are alkylated aromatic alkoxyates such as, for example, alkylated phenol alkoxyates,
particularly nonyl phenol ethoxyates.

Other suitable nonionic surfactants are sugar-derived glycols (i.e., alkylpolyglycosides), alkoxyates, amine oxides
and glucosamides. Sugar-derived glycols or alkyl glycosides which are useful as additional surfactants in the hard sur-
face cleaning composition of the present invention preferably have from about 6 to about 30 carbon atoms. Particularly
suitable sugar-derived glycols are the alkylpolyglycosides.

Suitable anionic surfactants include the water-soluble, particularly the alkali metal, ammonium and alkylammonium
(e.g., monoethanolammonium, diethanol-ammonium or triethanolammonium) salts of organic sulphuric acid reaction
products having in their molecular structure an alkyl group containing from 10 to 20 carbon atoms and a sulphonic or
sulphuric acid ester group. As used herein, the term "alkyl" also includes the alkyl portion of aryl groups. Examples of
anionic synthetic surfactants include secondary alkyl sulphates, especially those obtained by sulphating detergent
range olefins (C₈ to C₂₄ carbon atoms), primary alkyl sulphates, especially those obtained by sulphating the higher
alcohols (C₈ to C₁₈ carbon atoms), and alkylbenzene sulfonates in which the alkyl group contains from 9 to 15 carbon
atoms in a straight or branched chain configuration.

Other suitable anionic surfactants which can be used in the hard surface cleaning composition of the present inven-
tion include the water-soluble salts of: paraffin sulfonates containing from 8 to 24 carbon atoms; olefin sulfonates con-
taining from 8 to 24, preferably from 9 to 18 carbon atoms, particularly alpha olefin sulfonates; alkenyl or alkyl
carboxysulphonates containing from 8 to 30 carbon atoms; alkyl ethoxycarboxylates containing from 8 to 24 carbon
atoms and having from 1 to 10 units of ethylene oxide per molecule; alkyl glyceryl ether sulfonates derived from ethers
of C₈-C₁₈ alcohols; alkyl phenol ethoxysulfates containing from 1 to 10 units of ethylene oxide per molecule and from 8
to 12 carbon atoms in the alkyl group; and soap.

Other useful anionic surfactants include the water-soluble salts of esters of alpha-sulphonated fatty acids contain-
ing from 6 to 20 carbon atoms in the fatty acid group and from 1 to 10 carbon atoms in the ester group; water-soluble
salts of 2-acyloxy-alkane-1-sulphonic acids containing from 2 to 9 carbon atoms in the acyl group and from 9 to 23 car-
bon atoms in the alkane moiety; and beta-alkoxy alkane sulfonates containing from 1 to 3 carbon atoms in the alkyl
group and from 8 to 20 carbon atoms in the alkane moiety.

Suitable zwitterionic surfactants for use as additional surfactant compound(s) in the present composition include
derivatives of aliphatic quaternary ammonium, phosphonium, and sulphonium compounds in which the aliphatic moiety
can be straight or branched chain and wherein one of the aliphatic substituents contains at least one anionic water-sol-
ubilizing group. Examples of suitable zwitterionic surfactants include 3-(N,N-di-methyl-N-hexadecylammonio)-propane-
1-sulphonate and the ammonium sulfonates and sulphates disclosed in U.S. Patent Nos. 3,925,262, issued December
9, 1975 and 3,929,678, issued December 30, 1975, the teachings of which are incorporated herein by reference.

Suitable cationic surfactants include octadecyl trimethylammonium chloride, cetyl trimethylammonium methyl sul-
phate, polymeric cationics derived from monomers such as N,N, N-trimethyl-N-methylacryloxy (2-hydroxy-propyl)
ammonium chloride and cationic monomers such as those described in U.S. Patent Nos. 4,212,820, 4,098,987,
4,171,418 and 4,426,489. In addition to quaternary ammonium cationic moieties, the compounds with phosphonium,
sulphonium, pyridium and isothiuronium moieties and the like are also among the well known cationic surfactants.

When additional surfactant compounds are utilized, they are typically utilized in the hard surface cleaning compo-
sition in an amount of from 0.1 to 15, and preferably in the range of from 0.1 to 12, and more preferably from 0.2 to 6
percent by weight, basis the total weight of the hard surface cleaning composition.

The hard surface cleaning compositions of the present invention can, if desired, contain one or more builder com-
ponents. Builders are known to be added to hard surface cleaning compositions to enhance cleaning performance by

softening water, providing alkalinity and buffering capacity, providing emulsification and deflocculation properties, and providing abrasive action. The builder component can either be of the organic or inorganic type. The builder component is preferably one or more materials selected from the group consisting of hydratable alkali metal phosphates, alkali metal carbonates and bicarbonates (mixed or separate, anhydrous or partially hydrated), zeolites (either crystalline or amorphous, and either natural or synthetic), ethylenediamine tetraacetate, nitrilotriacetate, and mixtures thereof. Carbonates and complexing agents such as, for example, ethylenediaminetetraacetate, are particularly preferred builders. Examples of water-soluble inorganic builders which can be used, alone or in admixture with themselves and organic alkaline builder salts, are alkali metal carbonates, phosphates, polyphosphates, and silicates. Specific examples of such salts are sodium tripolyphosphate, sodium carbonate, potassium carbonate, trisodium phosphate, tetrasodium pyrophosphate, tetrapotassium pyrophosphate, potassium tripolyphosphate, and sodium hexametaphosphate. Examples of organic builder salts which can be used alone, or in admixture with each other or with the preceding inorganic alkaline builder salts are alkali metal polycarboxylates, e.g., water-soluble citrates such as sodium and potassium citrate, sodium and potassium tartrate, the sodium and potassium salts of tartaric acid monosuccinate, the sodium and potassium salts of tartaric acid disuccinate, sodium and potassium ethylenediaminetetraacetate, sodium and potassium N-(2-hydroxyethyl)-ethylene diamine triacetates, sodium and potassium nitrilo triacetates and sodium and potassium N-(2-hydroxyethyl)-nitrilo diacetates. Other organic detergency builders such as water-soluble phosphonates can find use in the compositions of the invention. Builders are typically present in an amount up to 32, preferably between 0.1 and 12, and more preferably between 0.5 and 4 percent by weight, basis the total weight of the hard surface cleaning composition.

The hard surface cleaning composition may also contain an alkanolamine component selected from the group consisting of an monoethanolamine, diethanolamine, triethanolamine and mixtures thereof. Low levels of the alkanolamines, particularly monoethanolamine, are used to enhance product cleaning performance and buffering ability. While the present compositions can contain mixtures of the alkanolamines, best colour stability is obtained using single alkanolamines. When the hard surface cleaning composition contains an alkanolamine component, such component is typically present in the composition in an amount of from 0 to 7, and preferably from 1 to 4 percent by weight, basis the total weight of the hard surface cleaning composition.

The hard surface cleaning composition of the present invention may also contain one or more solvents to aid in the soil removal and blending of the surfactants and builder components, if present. Solvents are known to be added to hard surface cleaning compositions to stabilize, couple ingredients, and enhance performance. The solvent may be water or any other known solvent which aids in the blending of surfactants. Solvents other than water which are suitable include the lower alcohols such as, for example, ethanol, isopropanol, butanol, etc., the alkali metal aryl sulfonates such as, for example, sodium xylenesulfonate, sodium cumenesulfonate, sodium toluenesulfonate, etc., the polyols such as, for example, propylene glycol, hexylene glycol, etc., the glycol ethers such as, for example, propylene glycol n-butylether and monopropylene glycol monomethylether, etc., ethylene glycol monobutylether, diethylene glycol monobutylether, and the like and mixtures thereof. The solvent(s) is typically present in the hard surface cleaning composition in an amount of from 1 to 20 percent by weight, basis the total weight of the composition.

When a lower alcohol is used as a solvent, it is typically used in combination with at least one other solvent such as water, polyols, etc. The amount of lower alcohol utilized in the hard surface cleaning composition is generally an amount from 0.1 to 7 percent by weight, basis the total weight of the composition.

Any polyol containing from 2 to 6 carbon atoms and 2 to 6 hydroxy groups can also be used as a solvent in the hard surface cleaning compositions of the present invention. Examples of such polyols are ethylene glycol, propylene glycol, hexylene glycol and glycerine. Propylene glycol is particularly preferred. When a polyol is used as a solvent, the polyol typically is used in combination with at least one other solvent and represents from 0.1 to 10 percent by weight, basis the total weight of the hard surface cleaning composition.

In addition to the degreasing composition containing at least one olefin component and at least one alcohol ethoxylate and/or alcohol ethoxysulfate surfactant component, the hard surface cleaning composition may suitably contain other components known in the art for use in hard surface cleaners. Non-limiting examples of such components include compounds such as sodium sulphate and sodium chloride, dyes, fragrances, bleaches, bleach activators, enzymes, viscosity modifiers, and the like. The amount of these components present in the hard surface cleaning composition will typically be less than 10, and preferably less than 5 percent by weight, basis the total weight of the composition.

The various components of the hard surface cleaning composition are suitably blended into the finished composition by conventional methods such as, for instance, direct mixing, blending, agglomeration, etc. and the like.

Pre-spotter compositions are formulations which are typically applied to hard-to clean soiled and stained areas of clothing by the launderer just prior to standard laundering or dry cleaning.

In accordance with the present invention, the pre-spotter composition includes a degreaser composition containing at least one olefin component and at least one surfactant component selected from the group consisting of alcohol ethoxylates, alcohol ethoxysulfates and mixtures thereof, as the primary stain remover, and a polar fluid carrier, typically water. Typically, the pre-spotter composition contains from 40 to 99 percent by weight, basis the total weight of the composition, of the degreaser composition, i.e., the primary stain remover, and from 1 to 60 percent by weight of water.

The composition may contain numerous additional stain removing ingredients, in particular, additional nonionic and anionic surfactants, such as, for example, an olefin sulphonate.

The composition may also contain other components such as for example, solubilizers, such as sodium xylene sulphonate and sodium cumene sulphonate, in amounts up to 10 percent by weight, basis the total weight of the composition.

Various supplemental ingredients, which are optional, but often desirable, include dyes, perfumes, germicides, and the like, all of which, if utilized, are typically used in amount of less than 1 percent by weight of the total composition.

The pre-spotter composition is generally applied to the stained or soiled area by any number of methods, i.e., spraying, sprinkling, etc., in sufficient quantity to wet the area, and is allowed to remain in contact with the spotted or stained area of the garment for a relatively extended period of time prior to laundering or dry cleaning, i.e., typically from about 1 hour to about 7 days or more, after which period the garment is conventionally laundered. During the period of contact, the ingredients continue to work upon the stain, thus easing the ultimate removal of the stain during the laundering process. It is also possible to utilize the pre-spotter compositions of the present invention for shorter periods of time, or just prior to laundering, but may not be quite as effective for removing stains.

The invention is further illustrated by the following examples.

EXAMPLES

Preparation of Degreasing Composition

Degreasing Composition A

60.0 Grams of 1-dodecene were added to 15.0 grams of NEODOL 91-6 (a mixture of C₉ to C₁₁ predominantly linear and primary alcohols, i.e., about 18% wt. C₉, 42% wt. C₁₀ and 38% wt. C₁₁, containing an average of about 6 oxyethylene units per molecule) and 5.0 grams of NEODOL 91-2.5 (a mixture of C₉ to C₁₁ predominantly linear and primary alcohols, i.e., about 18% wt. C₉, 42% wt. C₁₀ and 38% wt. C₁₁, containing an average of about 2.5 oxyethylene units per molecule) and mixed vigorously until homogeneous.

Degreasing Composition B

10.0 Grams of NEODOL 91-8 (a mixture of C₉ to C₁₁ predominantly linear and primary alcohols, i.e., about 18% wt. C₉, 42% wt. C₁₀ and 38% wt. C₁₁, containing an average of about 8 oxyethylene units per molecule), 5.0 grams of NEODOL 91-2.5 and 5.0 grams of NEODOL 25-3 (a mixture of C₁₂ to C₁₅ predominantly linear and primary alcohols, i.e., about 28% wt. C₁₂, 30% wt. C₁₃, 22% wt. C₁₄, and 20% wt. C₁₅ containing an average of about 3 oxyethylene units per molecule) were added to 79.0 grams of 1-tetradecene and mixed vigorously until homogeneous.

Degreasing Composition C

7.0 Grams of a nonyl phenol ethoxylate, IGEPAL CO 210 (IGEPAL is a trademark of product manufactured and sold by Rhone Poulenc), was added to 50.0 grams of 1-tetradecene and mixed vigorously at room temperature until homogeneous.

Degreasing Composition D

5.0 Grams of NEODOL 25-7 (a mixture of C₁₂ to C₁₅ predominantly linear and primary alcohols, i.e., about 28% wt. C₁₂, 30% wt. C₁₃, 22% wt. C₁₄, and 20% wt. C₁₅ containing an average of about 7 oxyethylene units per molecule) and 5.0 grams of NEODOL 25-3 were mixed with 89.0 grams of 1-dodecene until homogeneous at room temperature.

Degreasing Composition E

15.0 Grams of NEODOL 25-7 and 15.0 grams NEODOL 25-3 were mixed with 64.0 grams of 1-tetradecene until homogeneous at room temperature.

Degreasing Composition F

10.0 Grams of NEODOL 25-7 and 10.0 grams of NEODOL 25-3 were mixed with 20.0 grams of 1-dodecene until homogeneous at room temperature.

Hard Surface Cleaning

The hard surface cleaning compositions in Examples 1-3 and Comparative Examples A-C below, all of which were liquid, were tested using the test for hard surface cleaners set forth in ASTM D-4488, Section A3. The results are presented in Table I.

EXAMPLE 1

80.0 Grams of Degreasing Composition A, 18.0 grams of Butyl OXITOL Glycol Ether (OXITOL is a trademark of product manufactured and sold by Shell Chemical Company) and 2.0 grams of water were added to a 250 millilitre mixing vessel and mixed vigorously at room temperature until homogeneous.

Comparative Example A

Comparative Example A was carried out in a manner similar to Example 1, except that a mixed isoparaffinic solvent was used in place of the 1-dodecene olefin component of the degreasing composition.

EXAMPLE 2

99.0 Grams of Degreasing Composition B and 1.0 grams of water were added to a 250 ml mixing vessel and mixed vigorously until homogeneous at room temperature. The resulting material was a liquid.

Comparative Example B

Comparative Example B was carried out in a manner similar to Example 2, except that a mixed isoparaffinic solvent was used in place of the 1-tetradecene olefin component of the degreasing composition.

EXAMPLE 3

10.0 Grams of stearic acid, 2.0 grams of glycerine, 1.0 grams of lanolin, 0.2 grams of methyl paraben (4-hydroxybenzoic acid methyl ester), 0.1 grams of propyl paraben (4-hydroxybenzoic acid propyl ester), 2.0 grams of triethanolamine, 27.7 grams of water and 57.0 grams of Degreasing Composition C were added to a 250 ml mixing vessel and mixed vigorously at room temperature until homogeneous.

Comparative Example C

Comparative Example C was carried out in a manner similar to Example 3, except that a mixed isoparaffinic solvent was used in place of the 1-tetradecene olefin component of the degreasing composition.

Pre-Spotter Treatment

The pre-spotter compositions in Examples 4-6 and Comparative Examples D-F below all of which were liquid, were tested in a Terg-O-Tometer using dirty motor oil soil on polyester/cotton. Ten drops of pre-spotter were placed in the centre of the swatch and allowed to soak into the stain for one minute. The presoaked swatch was then washed at 38 °C for ten minutes using 4 grams/litre of a laundry liquid standard and 150 parts per million water hardness, in the Terg-O-Tometer at 100 rpm (revolutions per minute). The composition of the laundry liquid is as follows: 7.5% NEODOL 25-7, 2.5% C₁₂ linear alkylbenzene sulphonate, 1.0% triethanolamine, and 89.0% water. After washing, the swatch was rinsed in cold water for one minute and patted dry between two cloth towels. The swatch was then placed on a rack to dry for 30 minutes using a fan. Soil removal was determined using a Hunter Labscan reflectometre. The results are presented in Table II.

EXAMPLE 4

99.0 Grams of Degreasing Composition D and 1.0 gram of water were added to a 250 ml mixing vessel and mixed at room temperature until homogeneous.

Comparative Example D

Comparative Example D was carried out in a manner similar to Example 4, except that an isoparaffinic solvent was

used in place of the 1-dodecene olefin component of the degreasing composition.

EXAMPLE 5

5 94.0 Grams of Degreasing Composition E, 4.0 grams of ethanol and 2.0 grams of water were added to a 250 ml mixing vessel and mixed at room temperature until homogeneous.

Comparative Example E

10 Comparative Example E was carried out in a manner similar to Example E, except that an isoparaffinic solvent was used in place of the 1-tetradecene olefin component of the degreasing composition.

EXAMPLE 6

15 40.0 Grams of Degreasing Composition F, 3.5 grams of triethanolamine oleate, 12.0 grams of isopropanol, and 44.5 grams of water were added to a 250 ml mixing vessel and mixed at room temperature until homogeneous.

Comparative Example F

20 Comparative Example F was carried out in a manner similar to Example 6, except that an isoparaffinic solvent was used in place of the 1-dodecene olefin component of the degreasing composition.

Discussion of the Results

25 As can be seen from Examples 1-3 in Table I, the substitution of an olefin solvent for the mixed isoparaffinic material in the degreasing compositions enhanced the performance of the hard surface cleaning compositions. A larger quantity of soil was removed from the hard surface.

30 As can be seen from Examples 4-6 in Table II, the substitution of an olefinic solvent for the mixed isoparaffinic material in the degreasing compositions enhanced the performance of the pre-spotter compositions. A larger quantity of used motor oil was removed from the fabric.

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TABLE I		
Hard Surface Cleaning Compositions		
		Soil Removed (%)
Example 1		82.8
Components, % wt.		
1-Dodecene	60.0	
NEODOL 91-2.5	5.0	
NEODOL 91-6	15.0	
Butyl OXITOL Glycol Ether	18.0	
Water	2.0	
Comparative Example A		75.7
Components, % wt.		
Mixed isoparaffinic solvent	60.0	
NEODOL 91-2.5	5.0	
NEODOL 91-6	15.0	
Butyl OXITOL Glycol Ether	18.0	
Water	2.0	
Example 2		86.9
Components, % wt.		
1-Tetradecene	79.0	
NEODOL 91-8	10.0	
NEODOL 91-2.5	5.0	
NEODOL 25-3	5.0	
Water	1.0	

TABLE I (Cont'd)
Hard Surface Cleaning Compositions

		Soil Removed (%)
5	Comparative Example B	
	Components, % wt.	83.8
10	Mixed isoparaffinic solvent 79.0	
	NEODOL 91-8 10.0	
	NEODOL 91-2.5 5.0	
15	NEODOL 25-3 5.0	
	Water 1.0	
20	Example 3	
	Components, % wt.	43.6
	1-Tetradecene 50.0	
	Stearic Acid 10.0	
25	Glycerine 2.0	
	Lanolin 1.0	
	Methyl Paraben 0.2	
	Propyl Paraben 0.1	
30	Igepal CO210 7.0	
	Triethanolamine 2.0	
	Water 27.7	
35	Comparative Example C	
	Components, % wt.	31.1
	Mixed isoparaffinic solvent 50.0	
40	Stearic Acid 10.0	
	Glycerine 2.0	
	Lanolin 1.0	
45	Methyl Paraben 0.2	
	Propyl Paraben 0.1	
	Igepal CO210 7.0	
	Triethanolamine 2.0	
50	Water 27.7	

TABLE II
Pre-Spotter Compositions

		Used Motor Oil Removed (%)
Example 4		
Components, % wt.		75.2
NEODOL 25-7	5.0	
NEODOL 25-3	5.0	
1-Dodecene	89.0	
Water	1.0	
Comparative Example D		
Components, % wt.		73.4
NEODOL 25-7	5.0	
NEODOL 25-3	5.0	
Mixed isoparaffinic solvent	89.0	
Water	1.0	
Example 5		
Components, % wt.		80.1
NEODOL 25-7	15.0	
NEODOL 25-3	15.0	
Ethanol	4.0	
1-Tetradecene	64.0	
Water	2.0	
Comparative Example E		
Components, % wt.		73.3
NEODOL 25-7	15.0	
NEODOL 25-3	15.0	
Ethanol	4.0	
Mixed isoparaffinic solvent	64.0	
Water	2.0	

TABLE II (Cont'd)
Pre-Spotter Compositions

		Used Motor Oil Removed (%)
Example 6		
Components, % wt.		60.7
NEODOL 25-7	10.0	
NEODOL 25-3	10.0	
Triethanolamine Oleate	3.5	
Isopropanol	12.0	
1-Dodecene	20.0	
Water	44.5	
Comparative Example F		
Components, % wt.		56.9
NEODOL 25-7	10.0	
NEODOL 25-3	10.0	
Triethanolamine Oleate	3.5	
Isopropanol	12.0	
Mixed isoparaffinic solvent	20.0	
Water	44.5	

Claims

1. A degreasing composition which comprises at least one olefin component and at least one surfactant component selected from the group consisting of alcohol ethoxylates, alcohol ethoxysulfates and mixtures thereof.
2. The degreasing composition of claim 1 wherein said olefinic component has from 8 to 24 carbon atoms.
3. The degreasing composition of claim 1 wherein said surfactant component is an alcohol ethoxylate having from 8 to 20 carbon atoms and an average number of from 3 to 20 oxyethylene groups per molecule.
4. The degreasing composition of claim 1 wherein said surfactant component is an alcohol ethoxysulfate having from 8 to 20 carbon atoms and an average number of from 1 to 12 oxyethylene groups per molecule.
5. The degreasing composition of claim 1 wherein said composition comprises from 2.0 percent by weight to 90 percent by weight, basis the total weight of the composition, of olefin component and from 2.0 percent by weight to 60 percent by weight, basis the total weight of the composition, of an alcohol ethoxylate and/or alcohol ethoxysulfate surfactant component.
6. The degreasing composition of claim 1 wherein said composition comprises from 20 percent by weight to 87 percent by weight, basis the total weight of the composition, of olefin component and from 2.0 percent by weight to 40 percent by weight, basis the total weight of the composition, of an alcohol ethoxylate and/or alcohol ethoxysulfate surfactant component.

7. The degreasing composition of claim 1 wherein said composition additionally comprises one or more builders.
8. The degreasing composition of claim 7 wherein said builder is selected from the group consisting of zeolite A, soda ash sodium metasilicate and mixtures thereof.
9. A hard surface cleaning composition comprising from 50 percent by weight to 99 percent by weight, basis the total weight of the composition, of a degreasing composition according to any one of claims 1-8, and from 1 to 50 percent by weight of water.
10. The composition of claim 9 wherein said hard surface cleaning composition additionally contains one or more builders selected from the group consisting of alkali metal carbonates, alkali metal phosphates, alkali metal polyphosphates, alkali metal silicates, alkali metal bicarbonates, alkali metal polycarboxylates, polyacrylates and mixtures thereof.
11. The composition of claim 10 wherein said alkali metal polycarboxylate is selected from the group consisting of sodium citrate, potassium citrate, the sodium salt of tartaric acid monosuccinate, the potassium salt of tartaric acid monosuccinate, the sodium salt of tartaric acid disuccinate, the potassium salt of tartaric acid disuccinate, and mixtures thereof.
12. The composition of any one of claims 9-11 wherein said hard surface cleaning composition additionally contains one or more surfactant compounds which is selected from the group consisting of anionic surfactants, nonionic surfactants, cationic surfactants, zwitterionic surfactants, and mixtures thereof.
13. The composition of any one of claims 9-12 wherein said hard surface cleaning composition additionally contains a cleaning enhancer selected from the group consisting of olefin sulfonates, alkanolamides, alkoxylates and mixtures thereof.
14. A pre-spotter composition comprising from 40 percent by weight to 99 percent by weight, basis the total weight of the composition, of a degreasing composition according to any one of claims 1-8, and from 1 to 50 percent by weight of water and up to 10 percent by weight of a solubilizer.
15. The pre-spotter composition of claim 15 wherein said solubilizer is selected from the group consisting of sodium xylene sulphonate, sodium cumene sulphonate and mixtures thereof.