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BUILT LIQUID DETERGENT

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This invention relates to a novel built liquid detergent composition and a process for making the same. More particularly, it relates to a substantially non-aqueous built liquid detergent composition and process for producing the same, in which the composition contains a nonionic detergent surfactant and colloidal polyphosphate salts in suspension in the nonionic detergent surfactant.

During the past few years, liquid detergent compositions, both built and unbuilt, have become increasingly popular with the housewives and other consumers because they are easy to store, dispense and measure, and they do not cake as some granulated detergent products have a tendency to do when stored for lengthy periods of time or when they become damp. The chief disadvantage of liquid detergent compositions has been their cost as compared to the corresponding granular products. Cost of liquid products has been excessive because the package is expensive, hydrotropes are usually required to prevent phase separation of the organic and inorganic components, the ingredients are often more critical and hence more expensive, and in the case of water based compositions shipping costs are greater because of the high water content which does not contribute toward detergency.

Most of the built liquid detergents commercially available at the present time are either water based or a mixture of water and alcohol which contain a relatively small percentage of detergent surfactant as compared to the total volume of the composition. When polyphosphate salts are added to the water-based composition in order to achieve heavy duty detergency, one of the most desirable calcium sequestering polyphosphates, sodium tripolyphosphate, presents difficulties because of its tendency to hydrolyze, reverting to the pyrophosphate and more particularly to the orthophosphate form. (Sodium tripolyphosphate provides significantly greater whiteness maintenance in laundering than do the other commonly used forms of phosphate salts.) The rupture of P—O—P linkage in this hydrolysis results in the formation of acid phosphates, consequently the pH of the solution falls and hydrolysis accelerates. Thus, it is difficult to maintain a tripolyphosphate solution if the solvent or suspending medium contains water in an amount sufficient for tripolyphosphate hydrolysis; therefore, in most water based built liquid detergents the most commonly used polyphosphate salt is potassium pyrophosphate because it has a lesser tendency to revert to the ortho phosphoric form. (The builder effectiveness of the ortho phosphoric form is relatively low and the orthophosphate has no sequestering power.)

In addition, it is very difficult to manufacture a built liquid detergent product containing a large percentage of any kind of phosphate salts in solution because of the tendency of these salts to separate in crystalline form or form separate phases, even if a hydrotrope is used to prevent phase separation of the organic and inoragnic components. Heretofore the practical limit of phosphate builder salt concentration in aqueous liquid detergent compositions has been about 25%.

More recently, it has been shown that colloidal tripolyphosphate salts can be incorporated into a non-water based detergent composition. This is achieved by adding hydrated sodium tripolyphosphate (STP-$6H_2O$) into a glycol, glycerin or higher alcohol solution and under controlled conditions precipitating the colloidal sodium tripolyphosphate and pyrophosphate (there is some reversion) in the glycol medium in the absence of substantial amounts of water. See U.S. Patent No. 2,940,938 to Joseph Blinka. After the colloidal tripolyphosphates are formed in the glycol or organic water absorbing medium, an active detergent agent is then admixed and other inmor additives added to form the complete detergent composition.

A disadvantage of this composition is that it contains substantial amounts of inert material (glycol or other similar compound) which is expensive and which adds nothing to the detergency effectiveness of the composition. It is, however, possible by the method for preparing this composition to use the desirable alklali metal tripolyphosphate builder salts.

It is therefore an object of the present invention to provide (1) a concentrated liquid detergent composition which will be efficient and economical and which will possess good detergency and cleansing properties and (2) a process for making that composition.

It is a further object to provide a built liquid deteregnt composition containing a liquid nonionic detergent surfactant and a colloidal suspension of polyphosphate salts in said nonionic agent.

It is a still further object to provide a built liquid detergent composition in which alkali metal tripolyphosphate salts are suspended without substantial reversion to less effective forms.

It is a still further object of this invention to provide a detergent composition in which there is substantially no inert filler.

It is a still further object of this invention to provide a homogeneous built liquid detergent composition which does not require a hydrotrope to prevent phase separation.

It is also a purpose of this invention to provide a process for making a substantially non-aqueous built liquid detergent composition containing a large amount of colloidal polyphosphate builder salt dispersed in a liquid nonionic detergent surfactant which is both efficient and economical.

Other objects and advantages of the invention will be apparent during the course of the following description.

The process of the present invention can be carried out with a number of variations so long as the essential step of distilling off the dehydrating vehicle, in which the colloidal anhydrous polyphosphate builder salt has been precipitated, is carried out in the presence of the colloidal anhydrous polyphosphate salt and the liquid nonionic surfactant which is desired as the active ingredient in the final product thereby leaving the colloidal anhydrous polyphosphate salts in suspension in the liquid nonionic surfactant. Depending on the particular means used to accomplish this purpose, the conditions of heat, vacuum, etc. will vary as hereinafter more fully described.

The detergent composition produced by the process described herein consists essentially of a colloidal dispersion of a polyphosphate salt, e.g., sodium tripolyphosphate or sodium pyrophosphate in a liquid nonionic detergent surfactant. Such a surfactant is preferably one constituted of a water solubilizing polyoxyethylene group in chemical combination with an organic hydrophobic compound, i.g., polyoxypropylene, alkyl phenol in which the alkyl group contains from about 6 to about 12 carbon atoms, dialkyl phenols in which each alkyl group contains from 6 to 12 carbon atoms, the reaction product of an excess of propylene oxide and ethylene diamine, and aliphatic alcohols having from about 8 to about 18 carbon atoms, said nonionic detergent desirably having a molecular weight of from about 300 to about 11,000. In the detergent composition the nonionic is preferably present in an amount ranging from about .5 to about 99 parts per part colloidal polyphosphate salt and the composition has a viscosity ranging from about 500 cp. to about 15,000 cp.

The colloidal suspension of polyphosphate salts can be produced in a liquid nonionic detergent surfactant vehicle by means of the following variations of the process of this invention.

One variation comprises precipitating colloidal anhydrous alkali metal tripolyphosphate or pyrophosphate builder salts in a glycol or similar hydroxylated vehicle, as is described in U.S. Patent 2,940,938, to Joseph Blinka, then taking the resultant colloidal suspension, admixing a liquid nonionic detergent surfactant compound and subsequently distilling off the glycol or other hydroxylated vehicle under vacuum and/or heat, thereby leaving the colloidal phosphate builder salt in suspension in the liquid nonionic detergent surfactant compound. Minor amounts of ingredients such as silicate, fluorescers, perfume, and other agents commonly used in commercial detergent compositions can be added at any point in the process without affecting the process. The end product is a highly concentrated and effective built liquid detergent which on a usage basis can be more efficiently used than commonly used water-based detergent compositions.

Another variation of the process of this invention is to prepare a mixture containing the liquid nonionic detergent surfactant, dehydrating agent (any of those mentioned in the Blinka patent) or monoethanol amine and hydrated sodium tripolyphosphote ($STP\cdot6H_2O$) or other hydrated polyphosphate builder salt and proceed with the dehydrating steps as outlined in the Blinka patent, and then distill off the dehydrating agent leaving a dispersion of colloidal polyphosphate salts in the liquid nonionic detergent surfactant vehicle.

The Blinka process, mentioned above, comprises removing the water of hydration of polyphosphate builder salts by means of a dehydrating vehicle and thereby effecting precipitation of colloidal sized polyphosphate salts in the dehydrating vehicle. This is accomplished by suspending the crystalline hydrated salts in the dehydrating vehicle, feeding the suspension into a reaction zone or otherwise agitating it and saturating the vehicle with respect to the hydrated salts and maintaining the temperature of the suspension within a range of about 70° F. to about 180° F. and under an absolute pressure from about 5 mm. of mercury to atmospheric pressure, whereby a portion of the hydrated polyphosphate is dissolved in the vehicle, is rendered insoluble in the vehicle by removal of the water of crystallization of the phosphate and its precipitated as colloidal particles, thereby allowing successive portions of the crystalline hydrated polyphosphate to be dissolved, to be dispossessed of water of crystallization, and to be precipitated.

As used herein, the word "suspension" is used in two different senses. The hydrated polyphosphate salts are initially in suspension in the dehydrating medium prior to the dehydration step, but the particle size of the hydrated polyphosphate salts are not of colloidal dimension at that point. A colloidal suspension is formed only after the water of hydration of the hydrated polyphosphate salt is removed during the dehydration step and as a result of dehydration the colloidal particles are precipitated in the dehydrating vehicle. It is only after a colloidal suspension is formed that a stable suspension results.

The preferred builder for use in this invention is anhydrous sodium tripolyphosphate because of its greater whiteness maintenance characteristics in laundering; however, it should be realized that other hydrolyzable polyphosphates can be used to good advantage. Other suitable anhydrous builder salts are, for example, those derived from the hydrates of tetrasodium pyrophosphate.

The size of the colloidal polyphosphate salt precipitate left in the nonionic detergent surfactant by the distilling off of the dehydrating vehicle will be approximately the same size as that oroginally precipitated in the vehicle, ranging from about 0.015 to about 50 microns. Usually the particle size distribution is such that about 95% is below 10 microns and about 50% is below 1.0 micron. Mechanically produced fine particles of inorganic polyphosphate builder may be added to the mixture or to the nonionic within limits, and will be prevented from settling by the fine colloidal dispersion of dehydrated polyphosphate. These added builders can be of commercial grind, about 25 to 30 microns in size and can be incorporated in the composition in an amount up to 50% of the total polyphosphate builder.

In carrying out the process of this invention, the upper limit of the percent of colloidal polyphosphate builder salts in the mixture of the nonionic and the dehydrating vehicle is set by the condition that it must be stirrable and be sufficiently fluid that it will pass through the apparatus used to make the product, particularly after removal of the dehydrating vehicle. About two parts of the colloidal polyphosphates to one part of the liquid nonionic detergent surfactant in the final product is about as high in solids as can be handled easily. Preferably, in order to have a good built detergent, the ratio of anhydrous sodium tripolyphosphate to the nonionic should be no lower than about 1:1, although a light duty detergent could be made by this process having a colloidal phosphate level as low as 1%.

Thus, the ratio of anhydrous polyphosphate builder to nonionic synthetic detergent surfactant should be on the order of about 1:99 to about 2:1, depending upon the type of composition desired. For light duty detergency, polyphosphate levels can be low and nonionic high. Thus, 10–20% polyphosphate builder salt and 80–90% nonionic can be employed. For heavy duty detergency, higher phosphate levels are desirable so that 60% or more polyphosphate and 40% or less liquid nonionic can be employed.

Depending on the processing conditions as described herein, the finished product viscosity will vary. When more than about 50–60% phosphate builder salts are present in the composition, processing difficulties are often encountered and the viscosity of the product is so high that thinning material is usually required. Desirably, the end product viscosity should be within the range of about 1000 cp. to about 3000 cp., to insure good pourability, although products with viscosities as high as 15,000 cp. or more are satisfactory. If necessary, minor amounts of ethyl alcohol or other thinner can be added at the end of the process to bring the composition within a desired viscosity range.

Suitable hydroxylating vehicles for use in this invention, in addition to the preferred ethylene glycol, are other glycols of from 2 to 4 carbon atoms, such as propylene glycol, butylene glycol, trimethylene glycol, glycerine, 1-octanol, and monoethanol amine. The glycols above 4 carbon atoms are not good solvents for the hydrated polyphosphates, hence the glycols usable are those described as saturated hydrocarbons of 2 to 4 carbon atoms, two of the carbons having hydroxyl constituents.

The particular nonionic detergent surfactants used in this invention have vapor pressures, in the range of the processing temperatures, which are considerably less than that of the glycol or other dehydrating vehicle, thus there is no serious problem of volatilization of the liquid nonionic detergent surfactant during the process and the vehicle comes off in substantially pure form.

The operating temperature of the process described herein will vary according to the pressure employed, the time of the reaction, and the particular ingredients used to make the composition. The temperature at which this process can be practiced ranges from about 70° F. to about 400° F., although the preferred temperature range is from about 140° F. to about 220° F. It is within this range that the composition while being processed has a desirable fluidity and therefore is more easily transferred through the various apparatuses used without the necessity of adding unduly large quantities of thinner or finished product to reduce viscosity. The preferred vacuum is that which can be obtained without the use of special equipment. Actually any amount of vacuum could be used, even down to as low as .1 mm. pressure. The operating temperature will vary with the amount of vacuum being applied. Because the vapor pressure of the water is considerably higher than that of the dehydrating agent, the vacuum tends to become lower stepwise as processing continues. Thus, in a typical example it might be about 14 mm. of mercury while water is being removed and as low as 2–3 mm. mercury as the last traces of glycol pass off.

It is preferred to use the same ratio of glycol or other dehydrating vehicle to polyphosphate salt in this process as is used in the process of the Blinka patent. Preferably the glycol is present in the mixture at a ratio of 1 part glycol to 2 parts of polyphosphate salt or less. The lower limit is that some polyphosphate be present, e.g., 99 parts glycol to 1 part polyphosphate.

An added advantage of the second variation described herein in which the nonionic and glycol are admixed and then the dehydration step is carried out is that it is possible by this method to use less glycol than is used in the first described variation and therefore the overall expense is less, and using the second variation equipment size can also be reduced.

The preferred liquid nonionic synthetic organic detergent surfactants which are used in process and compositions in this invention are broadly defined as compounds produced by the condensation of alkylene oxide groups (hydrophilic in nature) with organic hydrophobic compounds, which can be aliphatic or alkyl aromatic in nature and which are liquid at room temperatures. As those skilled in the art are well aware, the length of the hydrophilic or polyoxyalkylene radical required for condensation with any particular hydrophobic group can readily be adjusted to yield a liquid water soluble compound having the desired degree of balance between hydrophilic and hydrophobic elements.

For example, a well known class of nonionics suitable for use in the compositions of this invention is made available on the market under the trade name of "Tweens." The Tweens are fatty acid esters of anhydrosorbitols which have been solubilized by etherifying the free hydroxyl groups with ethylene oxide. Such compounds are, for example, polyoxyethylene sorbitan monolaurate, polyoxyethylene sorbitan monopalmitate, polyoxyethylene sorbitan monooleate and others. These compounds can be made in the manner described in U.S. Patent 2,322,820.

Examples of suitable nonionics for use in this invention are also the polyethylene oxide condensates of alkyl phenols and dialkyl phenols having about 6 to 12 carbon atoms in the alkyl group, either straight chain or branch chain, with ethylene oxide in amounts equal to 4 to 30 moles of ethylene oxide per mole of alkyl phenol. The alkyl substituent in such compounds may be derived from polymerized propylene diisobutylene, octane, or nonane, for example.

Other suitable nonionics are derived by the condensation of ethylene oxide with the product resulting from the reaction of propylene oxide and ethylene diamine. Here again a series of compounds can be produced, depending on the desired balance between hydrophobic and hydrophilic elements. For example, compounds (molecular weight from about 5,000 to about 11,000) of about 40% to 80% polyoxyethylene content and resulting from the reaction of ethylene oxide groups with the hydrophobic base constituted of the reaction product of ethylene diamine and excess propylene oxide, said base having a molecular weight of the order of 2500 to 3000, are satisfactory.

Further examples of satisfactory nonionics are the condensation product of aliphatic alcohols having from 8 to 18 carbon atoms, either straight chain or branched chain, with ethylene oxide with the condensate having from 4 to 30 moles of ethylene oxide per mole of aliphatic alcohol; a preferred alcohol is distilled coconut alcohol ranging from 10 to 16 carbon atoms, with the chain length distribution being about 2% C_{10}, 66% C_{12}, 23% C_{14} and 9% C_{16}.

The followng examples are illustrative of the process aspects of this invention but should not be considered as limiting.

Example I

41.4 pounds of powdered sodium tripolyphosphate hexahydrate were suspended in a mixture of 16 pounds of ethylene glycol and 32 pounds of the condensation product of nonylphenol with about 9 moles of ethylene oxide. The mixture was well agitated in an open mixing tank at a temperature of about 170° F. for 30 minutes. It was then transferred to a vessel equipped to heat and recirculate the mixture. Vacuum was slowly applied and free water (water of hydration given up by the tripolyphosphate) removed. The temperature was then increased to about 180° F. at an absolute pressure of about 5 mm. Hg. At this point, ethylene glycol was removed rapidly, condensed and collected in a receiver beside the stripping vessel. As the ethylene glycol level in the mixture approached 6%, the mixture became very viscous, and at this point finished product from a previous run was added to thin the mixture. (This was desirable, but not necessary.) In this instance, 31 pounds of finished product, having a composition of 45% colloidal sodium tripolyphosphate and 45% nonionic plus 10% minor ingredients, were added. The minor ingredients consisted of sodium silicate, sodium carboxy methyl cellulose, perfume and benzotriazole. At an ethylene glycol level of about 2%, the mixture abruptly turned fluid and stripping of ethylene glycol to a level of about 0.5% continued with relative ease. At this point, 8% of minor ingredients were added to the mixture. These consisted of finely powdered anhydrous sodium silicate, sodium carboxy methyl cellulose, fluorescers and benzotriazole. Vacuum was again applied and the mix heated to about 200° F. for 30 minutes to remove the rest of the glycol and any moisture which might have been added with the minors. The product was then cooled, the vacuum broken and perfume added. At this point, the viscosity of the liquid product was about 3,000 centipoises. Since a final viscosity of 1500 cp. was desired, approximately 1.5% ethyl alcohol (3A) was added slowly with continuous stirring. The composition had good stability on standing. In this example the potassium salts of the tripolyphosphate can be used with equivalent results. Other nonionics which can be used with equal results include, for example, polyoxyethylene sorbitan monolaurate (Tween 20), and the condensation product of 6 moles of ethylene oxide with 1 mole coconut fatty alcohol.

The composition has excellent heavy duty detergency characteristics and finds utility in washing clothes and other fabrics. It had good stability upon standing.

It should be emphasized at this point that the minor ingredients which were added in the above example are not essential components of the composition and any steps involving minors are not essential to the process described herein and can be omitted if desired.

Example II

Fine particle size polyphosphate was prepared by the method described in U.S. Patent 2,940,938. In this example, a mixture containing about 44% anhydrous colloidal form II sodium tripolyphosphate and 56% ethylene glycol was employed. 1500 grams of this mixture were added to a glass flask equipped with a stirring device, and 600 grams of the liquid anhydrous nonyl phenol ethylene oxide condensate of Example I were stirred in. The flask was sealed and a vacuum of about 2 mm. Hg applied. The temperature was raised by means of a heating mantle until the glycol passed off at a fairly rapid rate. When the glycol level in the mixture reached about 1%, 10% of minor ingredients, i.e., dry silicate, CMC, fluorescers, were added and the vacuum again applied to remove additional glycol and any moisture incorporated with the minors. When the glycol level in the mixture reached about 0.5%, the vacuum was broken and the mixture cooled. Perfume was added along with about 4% ethanol which reduced the viscosity of the liquid detergent composition to approximately 1000 cp. This composition had excellent cleaning and whiteness maintenance characteristics in the laundering of soiled clothes and other fabrics and showed no tendency to settle out or separate on standing. Minor amounts (1% or less) of residual glycol can be present in the composition of this invention without deleterious effect. Practically speaking, a small amount of glycol will always be present as the processing conditions required to distill off all of the glycol would be prohibitive.

Example III

To an open heated container equipped with a high shear agitator, the following materials were added:

	G.
Nonyl phenol ethylene oxide condensate described in Example I	300
Ethylene glycol	225
$STP \cdot 6H_2O$ (sodium tripolyphosphate)	557
Sodium silicate ($Na_2O:SiO_2=1:2.5$)	63

The mixture was maintained at a temperature of about 75° C. for about 35 minutes. At this time, 2.2 grams of CMC (sodium carboxymethyl cellulose) were added, and the agitation continued for another 10 minutes. The mixture was then transferred to a glass flask equipped with a stirring device and heating mantle, and vacuum was slowly applied. Water (from the $STP \cdot 6H_2O$) was removed by distillation followed by removal of about 99.5% of the glycol. At this point, the temperature was about 80° C. with the vacuum at 2 mm. Hg and the mix was too thick to stir with simple mixing equipment. In order to proceed, without using more elaborate mixing equipment, thinning was required and, in this instance, 5% methoxytriglycol, based on the weight of the starting materials, was added. Stripping of the two glycols proceeded until the following fluid composition resulted:

	Percent
Nonyl phenol ethylene oxide condensate	37.18
Anhydrous colloidal sodium tripolyphosphate	55.31
Sodium silicate	6.39
Sodium carboxymethyl cellulose	0.27
Methoxy triglycol	0.50
Water and miscellaneous	0.35

The final homogeneous liquid detergent product had a viscosity in excess of 10,000 cp. The addition of about 4% ethyl alcohol to this composition gave a viscosity of 1400 cp. It had excellent detergency and whiteness maintenance characteristics when used to launder soiled clothes and other fabrics; it did not settle out upon standing.

Other nonionic detergent compounds which can be substituted with equivalent results include, for example, the condensation product of 6 moles ethylene oxide and 1 mole coconut alcohol, and the condensation product of 12 moles ethylene oxide with one mole of the reaction product of propylene oxide and ethylene diamine.

The following compositions are examples of the product of this invention. It will be understood, however, that the examples are not to be construed as limiting the scope of conditions claimed hereinafter. These compositions are useful in automatic washers as well as hand washing operations.

(A)

	Percent
Nonyl phenol ethylene oxide condensate of Example I	40.0
Anhydrous colloidal sodium tripolyphosphate	50.0
Sodium silicate, powdered	6.0
Flourescent dye	0.2
Perfume	0.10
Sodium carboxymethyl cellulose	.3
Carbowax® (polyethylene glycol)	.2
Other miscellaneous ingredients	1.3
Water	.1
Alcohol	1.8

(B)

Nonyl phenol ethylene oxide condensate of Example I	35.1
Anhydrous colloidal potassium tripolyphosphate	55.3
Sodium silicate ($Na_2O:SiO_2=1:1.6$)	6.0
Polyethylene glycol having a molecular weight of about 800	.5
Fluorescent dye	.18
Perfume	.18
Benzotriazole	.03
Other minor amounts of miscellaneous ingredients	2.71

(C)

Condensation product of 6 moles ethylene oxide and 1 mole coconut fatty alcohol	70.0
Anhydrous colloidal sodium pyrophosphate	2.0
Anhydrous colloidal sodium tripolyphosphate	20.0
Sodium silicate ($Na_2O:SiO_2=1:1.6$)	6.0
Polyethylene glycol having a molecular weight of about 1000	.2
Perfume	.20
Other minor amounts of miscellaneous ingredients	1.60

(D)

Condensation product of 6 moles ethylene oxide and 1 mole coconut fatty alcohol	36.0
Anhydrous potassium tripolyphosphate	56.0
Sodium silicate ($Na_2O:SiO_2=1:1.6$)	4.0
Polyethylene glycol having a molecular weight of about 800	.2
Water	.5

Balance miscellaneous ingredients.

The compositions listed above are homogeneous and are highly stable and have excellent detergency properties. They have viscosities in the range of 1000 cp. to 3000 cp. It is preferred to keep the viscosities within the above indicated ranges because if the compound has too high a viscosity the housewife will have difficulty pouring it from the container and if the viscosity is too low it becomes too fluid and there is a tendency for the dispersed phosphate salts to settle out.

Materials which are considered normal and desirable additives in liquid detergent compositions can also be added to the compositions of this invention without substantially modifying the basic characteristics thereof. For example, a tarnish inhibitor such as benzotriazole or ethylene-thiourea may be added in amounts up to about 1%. The compositions of this invention also tend to be corrosive toward aluminum, thus, if the washing solution prepared from these compositions is to contact this metal repeatedly or for prolonged periods of time, especially at elevated temperatures, a corrosion inhibitor should be desirably included. Soluble silicates are highly effective inhibitors when added to the compositions of this invention at levels from about 3.5% to about 6%. It is preferable to add dried, powdered silicate. The silicate remains in suspension in the composition and is supported by the colloidal polyphosphate. Less than about 3.5% of silicate solids, although usable in the present compositions, does not provide full protection against aluminum corrosion in heavy duty use conditions, and more than about 15% of silicate solids has an adverse effect upon the desired homogeniety of the liquid composition. At that level silicate acts as a load on the composition and does not contribute to detergency. Carbowax® or related materials can be added if desired to stabilize the liquid composition and more particularly the sodium carboxymethyl cellulose. Fluorescers, perfume, color, antiredeposition agents, blending and viscosity control agents, while not essential to the compositions of this invention may also be added.

What is claimed is:

1. A process of preparing a substantially non-aqueous built liquid detergent comprising the steps of (1) admixing a liquid nonionic detergent surface active agent constituted of a water solubilizing polyoxyethylene group in chemical combination with an organic hydrophobic compound selected from the group consisting of polyoxypropylene, alkyl phenol and dialkyl phenol in which the alkyl group contains from about 6 to about 12 carbon atoms, the reaction product of an excess of propylene oxide and ethylene diamine, and aliphatic alcohols having from about 8 to about 18 carbon atoms, said nonionic detergent having a molecular weight of from about 300 to about 11,000, with a colloidal suspension of dehydrated polyphosphate salts selected from the group consisting of sodium pyrophosphate, sodium tripolyphosphate, and mixtures thereof, in a dehydrating vehicle selected from the group consisting of glycols of 2 to 4 carbon glycerol, 1-octanol, monoethanol amine, and mixtures thereof, said nonionic detergent agent being added in an amount in excess of about 0.50 times the amount of the colloidal polyphosphate and (2) from this resulting mixture distilling off the said dehydrating vehicle, thereby leaving the said dehydrated polyphosphate salts in colloidal suspension in said nonionic agent.

2. The process of claim 1 in which the nonionic detergent agent is an alkyl phenol ethylene oxide condensate having about 4–30 moles of ethylene oxide per mole of alkyl phenol.

3. The process of claim 1 in which the nonionic detergent agent is the condensation product of 6 moles of ethylene oxide and 1 mole coconut fatty alcohol.

4. The process of claim 1 in which the colloidal dehydrated polyphosphate suspended is sodium tripolyphosphate.

5. A process of making a substantially water-free built liquid detergent comprising the steps (1) admixing a liquid nonionic surface active agent constituted of a water solubilizing polyoxyethylene group in chemical combination with an organic hydrophobic compound selected from the group consisting of polyoxypropylene, alkyl phenol in which the alkyl group contains from about 6 to about 12 carbon atoms, dialkyl phenols in which each alkyl group contains from 6 to 12 carbon atoms, the reaction product of an excess of propylene oxide and ethylene diamine, and aliphatic alcohols having from about 8 to about 18 carbon atoms, said nonionic detergent having a molecular weight of from about 300 to about 11,000, with a suspension consisting of hydrated polyphosphate salts selected from the group consisting of sodium tripolyphosphate, sodium pyrophosphate, and mixtures thereof, and a dehydrating vehicle selected from the group consisting of glycols of 2 to 4 carbon atoms, glycerol, 1-octanol, monoethanol amine, and mixtures thereof, said nonionic agent being added in an amount in excess of about 0.50 times the amount of the hydrated phosphate salt, and (2) from this suspension removing the water of hydration of said hydrated polyphosphate salts by effecting saturation of said dehydrating vehicle with respect to the said hydrated phosphate by agitating the suspension while maintaining the temperature of said suspension within the range of about 70° F. to about 220° F. and at an absolute pressure ranging from .1 millimeter to atmospheric, whereby successive portions of said hydrated polyphosphates are dissolved, rendered insoluble in the vehicle by removal of the water of crystallization and precipitated as colloidal particles and (3) distilling off said dehydrating vehicle from the resulting colloidal suspension.

6. The process of claim 5 in which the nonionic agent is an alkyl phenol ethylene oxide condensate having about 4–30 moles of ethylene oxide per mole of alkyl phenol.

7. The process of claim 5 in which the hydrated polyphosphate suspended in step (1) is sodium tripolyphosphate with six molecules of water of hydration.

8. The process of claim 5 in which the nonionic detergent agent is the condensation product of 6 moles ethylene oxide with 1 mole coconut fatty alcohol.

9. A substantially non-aqueous built liquid detergent composition consisting essentially of:

(1) from about 35% to about 99% by weight of a liquid nonionic synthetic detergent constituted of a water solubilizing polyoxyethylene group in chemical combination with an organic hydrophobic compound selected from the group consisting of polyoxypropylene, alkyl phenol and dialkyl phenol in which the alkyl group contains from about 6 to about 12 carbon atoms, the reaction product of an excess of propylene oxide and ethylene diamine, and aliphatic alcohols having from about 8 to about 18 carbon atoms, said nonionic detergent having a molecular weight of from about 300 to 11,000;

(2) from about 1% to about 65% of a colloidal dispersion of dehydrated polyphosphate salts selected from the group consisting of sodium tripolyphosphate, potassium tripolyphosphate, sodium pyrophosphate and potassium pyrophosphate, in the nonionic of (1) above.

10. The composition of claim 9 in which the nonionic synthetic detergent compound is an alkyl phenol ethylene oxide condensate having about 4–30 moles of ethylene oxide per mole of alkyl phenol.

11. The composition of claim 9 in which the dehydrated polyphosphate salt is sodium tripolyphosphate.

12. The composition of claim 9 in which the nonionic synthetic detergent compound is present in the ratio of 1:1 to about 1:2 to the colloidal dehydrated polyphosphate builder salt.

13. The composition of claim 9 in which the nonionic detergent is the condensation product of 6 moles ethylene oxide with 1 mole coconut fatty alcohol.

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