(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 030 096 B2**

(12) # NEW EUROPEAN PATENT SPECIFICATION

(45) Date of publication of the new patent specification : **14.07.93 Bulletin 93/28**

(51) Int. Cl.^{5} : **C11D 17/00,** C11D 3/06

(21) Application number : **80304093.0**

(22) Date of filing : **14.11.80**

(54) **Detergent composition.**

The file contains technical information submitted after the application was filed and not included in this specification

(30) Priority : **04.12.79 GB 7941734**

(43) Date of publication of application : **10.06.81 Bulletin 81/23**

(45) Publication of the grant of the patent : **05.10.83 Bulletin 83/40**

(45) Mention of the opposition decision : **14.07.93 Bulletin 93/28**

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

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Description

The present invention relates to a detergent composition, in particular to an anhydrous non-ionic detergent composition containing builders.

Heavy duty detergent compositions for use, for example, in domestic washing machines are commonly sold in the form of powders. The advantage of a powder is that it enables a wide range of inorganic builders to be incorporated into the composition, wider than if an aqueous composition were formulated because some builders e.g. sodium tripolyphosphate are unstable in the presence of water and bleaches e.g. sodium perborate or percarbonate may oxidise organic components of the composition in the presence of water. It is also impossible to formulate a homogeneous liquid aqueous composition with organic surfactant and the desired quantity of inorganic builders. The disadvantage of a powder from the manufacturer's point of view is that it is relatively expensive to make. Compared with an equivalent aqueous composition a powder requires more expensive drying equipment for its production, and as well as being expensive such equipment is often difficult and sometimes hazardous to operate.

In our Belgian Patent No. 867 827 we have disclosed heavy duty detergent compositions which contain builders dispersed in substantially water-free non-ionic liquid surfactants with the aid of dispersants, silica dispersants being employed.

Surprisingly we have now found that provided that the dispersed solids have average particle diameters of at most 10 μm, dispersions in substantially water free non-ionic liquid surfactants having pour points less than 10°C are acceptably stable even in the absence of a dispersant for the builder. Thus it is possible to prepare formulations containing only components required for the washing function of the composition without introducing additional materials required only for stabilising the dispersed condition of the detergent composition itself.

According to the invention a liquid detergent composition comprises a dispersion of solids comprising at least one builder which is preferably sodium or potassium tripolyphosphate and at least one bleach which is preferably sodium or potassium perborate or percarbonate, the mean diameter of the solids being at least 2.5 μm and at most 10 μm and preferably at most 5 μm in which at least 90 % of the solid particles have diameters less than 10 μm in a substantially water-free non-ionic liquid surfactant which composition has a pour point of less than 10°C, the composition being free from dispersants for the solids and free from soaps. In particular, the composition is free from silica containing dispersants.

The pour point may be measured by ASTM test method designation D97—66 reapproved in 1971.

Any builder which is known for use in detergent compositions may be used in the composition according to the present invention. Generally such builders are inorganic in nature but some organic products in particular sodium carboxymethylcellulose may be used. Suitable inorganic builders include phosphates, e.g. trisodium phosphate, tetrasodium pyrophosphate, sodium hexametaphosphate and, preferably, sodium tripolyphosphate, carbonates e.g. sodium carbonate, sodium bicarbonate and sodium sesquicarbonate, clays e.g. kaolin, montmorillonites and sodium bentonite, and miscellaneous salts e.g. sodium meta-silicate and sodium citrate and nitrilotriacetic acid. The potassium analogues of these sodium compounds may also be used.

The non-ionic surfactant which is a component of the composition according to the invention is preferably an alkylene oxide derivative. In particular, the non-ionic surfactant may be an alkylene oxide derivative of an amide, alkyl phenol or an alkanol. The alkyl group in the alkyl phenol may be straight chain or branched chain and may contain from 6 to 20 carbon atoms, e.g. para-nonyl phenol or paradodecylphenol. The alkanol may contain 6 to 20 carbon atoms, particularly 10 to 16 carbon atoms. The alcohol is preferably a primary or secondary alkanol having a linear or mono branched alkyl group.

The composition may usefully comprise two non-ionic surfactants, one of which fulfills a surfactant function and the other of which both fulfills a surfactant function and reduces the pour point of the composition. The former surfactant may for example comprise alcohols having 12 to 16 carbon atoms which have been alkoxylated with 5 to 15 moles of ethylene and/or propylene oxide; the other surfactant may be a linear or branched chain C_{6-11} alcohol alkoxylate which comprises 2 to 8 moles of ethylene and/or propylene oxide per mole, branched chain alcohols being preferred in the C_{8-11} range and linear alcohols being preferred in the C_{6-8} range, or an alkyl phenol alkoxylate having 2 to 6 moles of ethylene and/or propylene oxide per molecule the alkyl group suitably being in a para-position and having 6 to 12 carbon atoms.

A further surfactant of the anionic or cationic type may be included if desired. Such anionic or cationic surfactants may be of known type for example the anionic detergents may be alkylbenzene or olefine sulphonates, alcohol sulphates or alcohol alkoxylate sulphates; the cationic surfactants are suitably di-C_{14-20} and preferably di-C_{16-18} alkyl, dilower alkyl ammonium salts or hydroxides for example chlorides or sulphates. The lower alkyl groups are suitably methyl groups.

In general the alkyl phenol or alkanol derivative may comprise 2 to 20 alkylene oxide units which are preferably ethylene oxide units although a minor number of propylene oxide or a lesser number or butylene oxide units may also be present. The amide is suitably a mono- or di-alkanol amide e.g. a mono- or di-ethanolamide preferably of a C_6 to C_{30} more preferably C_{10} to C_{20} alkanoic acid, e.g. coconut acids, tallow acids or stearic acid. An alternative non-ionic surfactant for use in a composition according to the invention comprises a copolymer of ethylene oxide with propylene oxide and/or butylene oxide. The copolymer comprises a block of propylene and/or butylene oxide units on to which is grafted the ethylene oxide. The block preferably comprises 20 to 40 propylene oxide units, especially about 30 such units and 20 to 30 especially about 26 ethylene oxide units.

It is a feature of the composition according to the invention that the dispersion of the solids in the non-ionic surfactant is particularly stable. If the solids do separate at all then the resulting phase is loosely flocculated and is readily redispersible while if the relative amounts of the solids and non-ionic surfactant in the composition is correctly chosen there is little phase separation as the liquid fills the space between the loosely packed solid particles. The composition may contain 20 to 70% by weight builder(s). It is preferred that the composition contain 30 to 60% and more preferably 40 to 60% by weight builder(s). The composition preferably contains 1 to 20% and more preferably 2 to 15% by weight of bleach. The remainder is preferably substantially non-ionic surfactant. The composition may also contain additives conventionally found in detergent compositions e.g. optical brighteners, ethylene diamine tetra acetic acid, dyes, perfumes or enzymes. The invention will now be further described with reference to the following Example:

Example

A heavy duty laundry liquid was produced as follows:

Sodium tripolyphosphate (40 g), sodium percarbonate (5 g) and miscellaneous ingredients (colour, perfume, optical brighteners, carboxymethylcellulose and anticorrosion agents) (5 g) and polyethylene glycol (molecular weight 200, 5 g) were added to a non-ionic surfactant mixture (45 g) comprising "Synperonic" K 87, (a C_{13} to C_{15} primary alcohol alkoxylated to an average of 7 moles of alkylene oxide per mole of alcohol the alkylene oxide being a mixture of 8% propylene oxide and 92% ethylene oxide) (36.6 g) and "Alphanol" 6 (a C_7 to C_9 primary alcohol, average molecular weight 126 ethoxylated with six moles per mole of ethylene oxide) (8.4 g).

The whole of the ingredients were mixed by hand to form a stiff paste which was then mixed in a Silverson mixer and then a Dyno Mill bead mill to reduce the mean diameter of the particles to about 2.5 μm. The product was a suspension stable for at least three months, at the end of which there was slight settling readily reversible by shaking. The mixture had a pour point of 7°C.

The product was tested by measuring the change in reflectance of a standard soiled Krefeld cloth using a Gardner reflectometer, brought about by washing the cloth in a Terg-O-Tometer manufactured by the US Testing Company, at 100 rpm for 10 minutes followed by hand rinsing.

Results	Water hardness ppm		
Polyester cotton 60°C	50	300	150
Change in % reflectance on cleaning cloths			
Heavy duty liquid 1.25 gm/litre	18.0	10.8	—
Heavy duty liquid 2.5 gm/litre	—	—	17.9
Market laundry powder 5.0 gm/litre	11.6	8.7	10.8
Cotton 60°C			
Change in reflectance on cleaning cloths			
Heavy duty liquid 1.25 gm/litre	28.9	—	—
Heavy duty liquid 2.5 gm/litre	—	—	31.1
Market laundry powder 5.0 gm/litre	29.6	—	31.1

The composition of the invention thus shows superior washing performance with polyester/cotton and substantially equal performance with cotton compared with a commercially marketed laundry powder.

"Synperonic" and "Alphanol" are trade marks of Imperial Chemical Industries Limited.

"Silverson", "Dyno Mill", "Krefeld", "Gardner" and "Terg-O-Tometer" are trade marks.

The pour points of materials for use in this invention are those determined by the test method of ASTM D

97/66.

Claims

1. A liquid detergent composition which comprises a dispersion of solids comprising at least one builder and at least one bleach, the mean diameter of the solids of the composition being at least 2.5 μm and at most 10 μm, in a substantially water free non-ionic liquid surfactant which composition has a pour point of less than 10°C, the composition being free from dispersants for the solids and free from soaps. and at least 90% of the solid particles have diameters less than 10μm.

2. A composition as claimed in claim 1 in which the builder is sodium or potassium tripolyphosphate.

3. A composition as claimed in claim 1 or 2 in which the bleach is sodium or potassium perborate or percarbonate.

4. A composition as claimed in claim 1, 2 or 3 in which the average particle diameter of the solids is at most 5μm.

5. A composition as claimed in any preceding claim in which the non-ionic surfactant is an alkylene oxide derivative of an amide, alkylphenol or alkanol.

6. A composition as claimed in any preceding claim which comprises two non-ionic surfactants one of which reduces the pour point of the composition.

7. A composition as claimed in any preceding claim which contains 30 to 60% by weight of builder(s).

8. A composition as claimed in any preceding claim which contains 2 to 15% by weight of bleach.

Patentansprüche

1. Flüssiges Waschmittel, das eine Dispersion von Feststoffen, die mindestens einen Gerüststoff (Builder) und mindestens ein Bleichmittel enthalten, wobei der mittlere Durchmesser der Feststoffe des Waschmittels mindestens 2,5 μm und höchstens 10 μm beträgt, in einem im wesentlichen wasserfreien, nichtionogenen, flüssigen Tensid enthält, wobei dieses Waschmittel einen Fließpunkt von weniger als 10 °C hat, wobei das Waschmittel frei von Dispergiermitteln für die Feststoffe und frei von Seifen ist und mindestens 90 % der Feststoffteilchen Durchmesser von weniger als 10 μm haben.

2. Waschmittel nach Anspruch 1, bei dem der Gerüststoff Natrium- oder Kaliumtripolyphosphat ist.

3. Waschmittel nach Anspruch 1 oder 2, bei dem das Bleichmittel Natrium- oder Kaliumperborat oder -percarbonat ist.

4. Waschmittel nach Anspruch 1, 2 oder 3, bei dem der mittlere Teilchendurchmesser der Feststoffe höchstens 5 μm beträgt.

5. Waschmittel nach einem der vorhergehenden Ansprüche, bei dem das nichtionogene Tensid ein Alkylenoxidderivat eines Amids, Alkylphenols oder Alkanols ist.

6. Waschmittel nach einem der vorhergehenden Ansprüche, das zwei nichtionogene Tenside enthält, von denen eines den Fließpunkt des Waschmittels vermindert.

7. Waschmittel nach einem der vorhergehenden Ansprüche, das 30 bis 60 Masse% Gerüststoff(e) enthält.

8. Waschmittel nach einem der vorhergehenden Ansprüche, das 2 bis 15 Masse% Bleichmittel enthält.

Revendications

1. Composition détergente liquide, qui comprend une dispersion de solides comprenant au moins un adjuvant actif et au moins un agent de blanchiment, le diamètre moyen des particules des solides de la composition étant de 2,5 µm au minimum et de 10 µm au maximum, dans un surfactif liquide non ionique sensiblement exempt d'eau, composition qui a un point d'écoulement inférieur à 10°C, la composition étant exempte de dispersants pour les solides et exempte de savons.

2. Composition suivant la revendication 1, dans laquelle l'adjuvant actif est le tripolyphosphate de sodium ou de potassium.

3. Composition suivant la revendication 1 ou 2, dans laquelle l'agent de blanchiment est le perborate ou percarbonate de sodium ou de potassium.

4. Composition suivant la revendication 1, 2 ou 3, dans laquelle le diamètre moyen des particules des solides est de 5 µm au maximum.

5. Composition suivant l'une quelconque des revendications précédentes, dans laquelle le surfactif non ionique est un dérivé d'oxyde d'alcoylène d'un amide, d'un alcoylphénol ou d'un alcanol.

6. Composition suivant l'une quelconque des revendications précédentes, qui comprend deux surfactifs non ioniques dont l'un abaisse le point d'écoulement de la composition.

7. Composition suivant l'une quelconque des revendications précédentes, qui contient 30 à 60% en poids d'un ou plusieurs adjuvants actifs.

8. Composition suivant l'une quelconque des revendications précédentes, qui contient 2 à 15% en poids d'agent de blanchiment.