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NOTICE OF ENTITLEMENT

I, Dr. Georg Zeit, of Falkenweg 2, 4018 Langenfeld / Federal Republic of Germany, being authorised by the Applicant/Nominated Person in respect of Application No 72361/91 state the following:-

The Applicant/Nominated Person has entitlement from the actual inventor(s) as follows:-

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DATED this Twelfth day of January 1993.

Dr. Georg Zeit

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CASTABLE FLUID TENSIDE CONCENTRATE

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(57) Claim

1. A pourable liquid surfactant concentrate comprising 50 to 90% by weight of a surfactant mixture in water, which surfactant mixture comprises one or more compounds corresponding to general formula I

$$R^1-O-(CH_2-CH_2O)_n-H \qquad (I)$$

in which R^1 is a saturated or unsaturated hydrocarbon radical of a primary C_{6-22} alcohol attached by carbon and n is a number of 25 to 60;
and of one or more compounds corresponding to general formula II

$$\begin{array}{ccc} & R^2-CH & -\ CH_2 \\ & | & | \\ H-(OCH_2-CH_2)_p-O & & O-(CH_2-CH_2O)_q-H \end{array} \qquad (II)$$

in which R^2 is a saturated or unsaturated C_{8-16} radical attached by carbon and p and q are each a number of 0 to 25, the sum of p and q being a number of 5 to 25.

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(54) Title: CASTABLE FLUID TENSIDE CONCENTRATE

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(57) Abstract

Castable fluid tenside concentrate of non-ionogenic tenside mixtures in water and a process for producing the tenside concentrates and their use as emulsifiers in polymerisation.

(57) Zusammenfassung

Gießbare, flüssige Tensidkonzentrate von nichtionogenen Tensidmischungen in Wasser sowie Verfahren zur Herstellung der Tensidkonzentrate und deren Anwendung als Emulgator bei Polymerisationen.

Castable Fluid Tenside Concentrate

This invention relates generally to surface-active agents and, more particularly, to pourable, liquid surfactant concentrates of nonionic surfactant mixtures in water, to a process for the production of the surfactant concentrates and to their use as a polymerization emulsifier.

Adducts of ethylene oxide with alcohols, above all fatty alcohols, are classified as nonionic surfactants (nonionics) by virtue of their detergent properties. An obstacle to the even broader use of the adducts of ethylene oxide with alcohols (so-called alcohol ethyloxylates) is their poor pourability or rather their high viscosity at temperatures in the range from 5 to 20°C. Attempts to reduce their viscosity by addition of water result either in unwanted gel formation or in surfactant solutions of comparatively low concentrations.

DE-PS 2,829,697 describes liquid detergent compositions of adducts of ethylene oxide with fatty alcohols and adducts of ethylene oxide with internal vicinal alkanediols which do not gel on addition of water. However, internal vicinal diols are unsuitable for a number of applications. Accordingly, the liquid detergent compositions according to DE-PS 2,829,697 are of only limited use.

The problem addressed by the present invention, therefore, was to provide pourable liquid surfactant concentrates which would not contain internal vicinal diols.

Accordingly, the present invention relates to a pourable liquid surfactant concentrate comprising 50 to 90% by weight of a surfactant mixture in water, which surfactant mixture comprises one or more compounds corresponding to general formula I

$$R^1—O—(CH_2—CH_2O)_n—H \qquad (I)$$

in which R^1 is a saturated or unsaturated hydrocarbon radical of a primary C_{6-22} alcohol attached by carbon and n is a number of 25 to 60;

and of one or more compounds corresponding to general formula II

$$\begin{array}{ccc} & R^2—CH & — \; CH_2 \\ & | & \quad | \\ H—(OCH_2—CH_2)_p—O & & O—(CH_2—CH_2O)_q—H \end{array} \qquad (II)$$

in which R^2 is a saturated or unsaturated C_{8-16} radical attached by carbon and p and q are each a number of 0 to 25, the sum of p and q being a number of 5 to 25.

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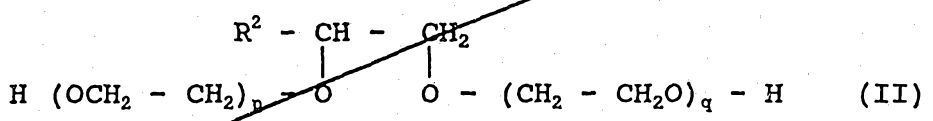
in which R^1 is a saturated or unsaturated hydrocarbon radical of a primary C_{6-22} alcohol attached by carbon and n is a number of 10 to 60,
and of compounds corresponding to general formula II



$$H(OCH_2 - CH_2)_p - O - CH(R^2) - CH_2 - O - (CH_2 - CH_2O)_q - H \quad (II)$$

in which R^2 is a saturated or unsaturated C_{8-16} radical attached by carbon and p and q are each a number of 0 to 25, the sum of p and q being a number of 5 to 25.

The compounds corresponding to general formula I are adducts of ethylene oxide with saturated and/or unsaturated primary alcohols containing 6 to 22 carbon atoms and having a degree of ethoxylation n of 10 to 60. The adducts of ethylene oxide with primary alcohols are produced by known methods. Saturated and/or unsaturated primary alcohols containing 6 up to and including 22 carbon atoms and preferably 6 to 20 carbon atoms may be used as the starting material. Branched, unbranched, even-numbered or odd-numbered primary alcohols and mixtures thereof may also be used. Even-numbered, unbranched and saturated primary alcohols and mixtures thereof are preferably used. Fatty alcohol mixtures of the type obtained in the sodium reduction or catalytic hydrogenation of fatty acid mixtures from the hydrolysis of native fats and oils are particularly suitable. Examples of such fatty alcohol mixtures are the technical coconut oil, palm kernel oil, tallow, soybean oil and linseed oil fatty alcohols and, in particular, hydrogenation products thereof.

The ethoxylation of the primary (fatty) alcohols or mixtures thereof is carried out at elevated temperature and pressure in the presence of suitable alkoxylation catalysts. The choice of the alkoxylation catalyst influences the width of the spectrum of adducts, the so-called homolog

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distribution, of ethylene oxide with the alcohol. Thus, so-called broad-range adducts are obtained in the presence of the catalytically active alkali metal alcoholates, such as sodium ethylate, while so-called narrow-range products are obtained, for example, in the presence of hydrotalcite as catalyst (P 38 13 910.3).

In one particular embodiment of the present invention, the compounds corresponding to general formula I are prepared by ethoxylation of C_{6-20} fatty alcohols using catalytically active sodium ethylate, 10 to 60 mol ethylene oxide being reacted per mol fatty alcohol depending on the required degree of ethoxylation n.

Compounds corresponding to general formula II are already known as reaction products of ethylene oxide with aliphatic vicinal terminal diols. Thus, DE-PS 11 90 927 describes the reaction of 1,2-diols containing 8 to 26 carbon atoms with ethylene oxide. DE-OS 29 00 030 describes a process for the ring-opening of internal or terminal olefin epoxides containing 6 to 18 carbon atoms with polyhydric alcohols, such as ethylene glycol, and subsequent ethoxylation of the reaction products.

According to the invention, reaction products of ethylene oxide with saturated or unsaturated 1,2-diols containing 8 to 16 carbon atoms are used as the compounds of general formula II. Adducts of ethylene oxide with linear 1,2-diols containing an odd and even number of carbon atoms or mixtures thereof are preferably used as the compounds corresponding to formula II. Ethoxylated 1,2-diols containing 12 and/or 14 carbon atoms are particularly suitable. These ethoxylated 1,2-alkanediols are produced in known manner from olefins and olefin mixtures containing terminal double bonds by epoxidation and subsequent catalytic ring opening of the resulting terminal epoxyalkanes with ethylene glycol. The ring opening of the 1,2-epoxyalkanes with ethylene glycol may be catalyzed by acids or

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bases. Acid-catalyzed ring opening gives approximately 50% of 1-hydroxy-2-(2-hydroxyethoxy)-2-alkanes which contain two primary hydroxyl groups and which can further react with ethylene oxide in substantially the same way. Ring opening of the 1,2-epoxyalkanes with an excess of ethylene glycol can also be catalyzed with a base. Base-catalyzed ring opening largely produces 1-(2-hydroxyethoxy)-2-hydroxyalkanes which contain one primary and one secondary hydroxyl group and which continue reacting with ethylene oxide, preferably at the primary hydroxyl group. Compounds corresponding to general formula II which have been obtained by the acid-catalyzed ring opening of terminal epoxyalkanes with ethylene glycol are preferably used for the purposes of the invention.

The 1,2-diols are converted into the compounds of general formula II by ethoxylation. The ethoxylation can be carried out by the methods already described in connection with the compounds of general formula I which, depending on the choice of the alkoxylation catalysts, lead to narrow-range products or to relatively broad-range products. The 1,2-diols are preferably ethoxylated using sodium methylate which leads to broad-range adducts. Compounds of general formula II obtained by reaction of aliphatic vicinal diols with up to 25 mol ethylene oxide per mol diol, the two hydroxyl groups of the 1,2-diols optionally differing in their degrees of ethoxylation p and q, are used for the purposes of the invention. The degrees of ethoxylation p and q independently of one another may be numbers of 0 to 25, with the proviso that the sum of p and q is in the range from 5 to 25, preferably in the range from 5 to 20, more preferably in the range from 5 to 15 and, most preferably, in the range from 8 to 12.

In one particular embodiment, ethoxylation of the primary alcohols and the 1,2-diols by the methods already described may even be carried out in a single reaction step

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providing the degree of ethoxylation n of the primary alcohols and the degree of ethoxylation of the 1,2-diols as the sum of p and q are in the same range.

The surfactant concentrate according to the invention contains the compounds corresponding to general formula I and the compounds corresponding to general formula II as a surfactant mixture. The surfactant mixtures present consist of 10 to 90% by weight, preferably 30 to 85% by weight and, more preferably, 50 to 80% by weight of compounds corresponding to general formula I and of 10 to 90% by weight, preferably 15 to 70% by weight and, more preferably, 20 to 50% by weight of compounds corresponding to general formula II, based on non-aqueous components of the surfactant mixtures.

The pourable liquid surfactant concentrate according to the invention consists of surfactant mixture and water. The surfactant mixture is present in the surfactant concentrate according to the invention in quantities of 50 to 90% by weight and preferably in quantities of 60 to 90% by weight, based on surfactant concentrate.

In one preferred embodiment of the invention, the surfactant concentrate contains 80 to 90% by weight, based on the concentrate, of a surfactant mixture consisting of the preferred fatty alcohols having a degree of ethoxylation n, where n is a number of 10 to 25, and an ethoxylated 1,2-diol, the degrees of ethoxylation p and q of the two hydroxyl groups being a number of 0 to 12 and the sum of p and q being in the range from 8 to 12.

In another preferred embodiment of the invention, the surfactant concentrate contains 60 to 80% by weight, based on concentrate, of a surfactant mixture consisting of fatty alcohols having a degree of ethoxylation n of 25 to 60 and ethoxylated 1,2-diols, the degrees of ethoxylation p and q of the two hydroxyl groups being a number of 0 to 12 and the sum of p and q being in the range from 8 to 12.

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The surfactant concentrates according to the invention are liquid and pourable over wide temperature ranges. All the surfactant concentrates are liquid and pourable at room temperature (20°C to 25°C). The lower limit to the temperature range in which the surfactant concentrates according to the invention are still liquid and pourable varies with the composition of the surfactant mixture, the primary alcohols and 1,2-diols used and their degrees of ethoxylation. In principle, it may be said that the surfactant concentrates according to the invention are pourable above their solidification points and preferably at about 3°C above their solidification points. The surfactant concentrates according to the invention have Höppler viscosities at 20°C (DIN 53015) in the range from 0.1 to 2 Pas.

The present invention also relates to a process for the production of the surfactant concentrates according to the invention. According to the invention, the compounds corresponding to general formula I, which are produced by methods known *per se*, are mixed while stirring with compounds corresponding to general formula II, which are also produced by methods known *per se*, at slightly elevated temperatures and preferably at temperatures of 40°C to 70°C and water is then added with stirring in the required ratio at temperatures of 20°C to 100°C and preferably at temperatures of 40°C to 70°C. If any loss of water should occur at the temperatures mentioned, it can be made up by addition of more water after cooling. According to the invention, liquid surfactant concentrates containing - per 100 parts by weight - 50 to 90% by weight surfactant mixture consisting of compounds corresponding to general formula I and compounds corresponding to general formula II in water are obtained by this process.

The present invention also relates to the use of the surfactant concentrates according to the invention as an emulsifier in the polymerization of ethylenically unsatura-

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ted monomers. According to the invention, the surfactant concentrates may be used as sole emulsifiers (primary emulsifiers) or even together with anionic, nonionic or cationic emulsifiers. According to the invention, the surfactant concentrates are used as emulsifier in a quantity of 0.5 to 10% by weight, preferably in a quantity of 1 to 5% by weight and, more preferably, in a quantity of 1 to 3% by weight, expressed as surfactant concentrate and based on polymerization mixture.

Examples

A) Production of the surfactant mixtures

Example 1

A fatty alcohol mixture (component A) containing 0 to 2% by weight n-decanol (C_{10}), 70 to 75% by weight lauric alcohol (C_{12}), 24 to 30% by weight myristic alcohol (C_{14}) and 0 to 2% by weight cetyl alcohol (C_{16}) was reacted in known manner with various molar quantities of ethylene oxide (see Table 1). The product obtained was melted, which required temperatures of 40 to 70°C according to the degree of ethoxylation. Component B was added with stirring to the molten product in various quantities (Table 1). Component B had been prepared by ring-opening of a terminally epoxidized $C_{12/14}$ alkane mixture (67% by weight C_{12} and approx. 33% by weight C_{14}) with equimolar quantities of ethylene glycol, based on the epoxide content, and by subsequent reaction with 10 mol ethylene oxide.

Example 2

Beef tallow fatty alcohol (component A), an alcohol mixture containing 0 to 2% by weight lauric alcohol, 1 to 75 by weight myristic alcohol, 20 to 30% by weight cetyl alcohol, 60 to 67% by weight oleic alcohol (C_{18}) and 0 to 3%

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by weight arachidyl alcohol (C_{20}) was ethoxylated in known manner with various molar quantities of ethylene oxide (Table 2). The product obtained was reacted in various quantities (see Table 2) with component B used in Example 1.

Example 3

Ethylene oxide was added in various quantities (see Table 3) in known manner to the fatty alcohol mixture (component A) of Example 1 containing n-decanol, lauric alcohol, myristic alcohol and also cetyl alcohol. The product obtained was melted and component B (Table 3) was added with stirring in various quantities to the melt (at 40 to 70°C, depending on the degree of ethoxylation). A mixture of terminally epoxidized $C_{12/14}$ alkanes (67% by weight C_{12} and approx. 33% by weight C_{14}) which had been ring-opened with equimolar quantities of ethylene glycol and then reacted with 7 mol ethylene oxide was used as component B.

B) Production of the surfactant concentrates

Example 4

The surfactant mixtures obtained in accordance with A) were converted with water at temperatures of about 40 to 70°C into surfactant concentrates which differed in their total surfactant content and in the composition of the surfactant mixture. Water was added to a certain quantity of surfactant mixture in a quantity sufficient to give 100 g of surfactant concentrate. After cooling to room temperature, any water lost was replaced. Table 1 shows the surfactant concentrates of Example 1 in the order of the degree of ethoxylation of the $C_{12/14}$ alcohol mixture and the total content of the formulation. Similarly, Tables 2 and 3 show the surfactant concentrates of Examples 2 and 3 in

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the order of the degree of ethoxylation of the fatty alcohol mixture and the total content of surfactant mixture in the surfactant concentrate. Accordingly, the notation M/A/B: x °C used in all the Tables means that, of 100 parts surfactant concentrate, M are parts by weight surfactant mixture, the surfactant mixture consisting of A parts of component A and B parts of component B. The surfactant concentrate has a solidification point of x °C. The solidification point was determined by the cryoscopic method, i.e. the surfactant concentrate was cooled by 2°C every 60 minutes until it soldified.

All the surfactant concentrates were pourable at room temprature and had Höppler viscosities at 20°C (DIN 53015) of up to 2 Pas.

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Table 1

Surfactant concentrate produced in accordance with Example 4 containing surfactant mixtures according to Example 1 with fatty alcohol mixture as component A which has an average degree of ethoxylation of

10 EO	14 EO
80/80/20: 2°C	60/60/40: 0°C
80/70/30: 2°C	60/50/50:<0°C
80/60/40: 1°C	70/50/50:15°C
80/50/50: 0°C	80/80/20:11°C
90/80/20:10°C	80/70/30:10°C
90/70/30: 9°C	80/60/40: 9°C
90/60/40: 9°C	80/50/50: 8°C
90/50/50: 7°C	90/50/50:17°C

25 EO	30 EO
60/70/30: 8°C	60/70/30:12°C
60/60/40: 0°C	60/60/40:<0°C
60/50/50:<0°C	60/50/50:<0°C
70/80/20: 8°C	70/80/20:13°C
70/70/30: 6°C	70/70/30:11°C
70/60/40: 4°C	70/60/40: 8°C
70/50/50: 2°C	70/50/50: 3°C
80/70/30:16°C	
80/60/40:16°C	
80/50/50:14°C	

60 EO		
60/80/20: 5°C	60/50/50:<0°C	70/60/40: 9°C
60/70/30: 2°C	70/80/20:14°C	70/50/50: 3°C
60/60/40: 0°C	70/70/30:11°C	80/50/50:15°C

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Table 2

Surfactant concentrate produced in accordance with Example 4 containing surfactant mixtures according to Example 2 with beef tallow fatty alcohol as component A which has an average degree of ethoxylation of

25 EO	40 EO
60/50/50: 6°C	60/60/40: 0°C
65/60/40:18°C	60/50/50:<0°C
65/50/50:<0°C	65/70/30:12°C
70/50/50: 8°C	65/60/40: 9°C
	65/50/50: 6°C
	70/50/50:13°C

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Table 3

Surfactant concentrate produced in accordance with Example 4 containing surfactant mixture according to Example 3 with fatty alcohol mixture as component A which has an average degree of ethoxylation of

10 EO	14 EO
80/80/20: 4°C	80/80/20: 8°C
80/70/30: 3°C	80/70/30: 6°C
80/60/40:<0°C	80/60/40: 4°C
80/50/50:<0°C	80/50/50: 2°C

25 EO	30 EO
60/80/20:12°C	60/80/20: 6°C
60/70/30:<0°C	60/70/30: 3°C
60/60/40:<0°C	60/60/40:<0°C
60/50/50:<0°C	60/50/50:<0°C
65/80/20:16°C	65/80/20: 4°C
65/70/30:14°C	65/70/30: 0°C
65/60/40:14°C	65/60/40:<0°C
65/50/50: 0°C	65/50/50:<0°C
70/80/20:11°C	70/80/20:12°C
70/70/30:10°C	70/70/30: 9°C
70/60/40: 9°C	70/60/40: 6°C
70/50/50: 0°C	70/50/50: 4°C
80/70/30:10°C	80/50/50:14°C
80/60/40:10°C	
80/50/50:10°C	

60 EO		
60/80/20: 8°C	65/70/30:11°C	70/60/40:12°C
60/70/30: 2°C	65/60/40: 6°C	70/50/50: 8°C
60/60/40: 0°C	65/50/50: 0°C	80/50/50:12°C
60/50/50:<0°C	70/70/30:12°C	



C) **Comparison Examples**

Example 5

The fatty alcohol mixture (component A) according to Example 1 containing n-decanol, lauric alcohol, myristic alcohol and cetyl alcohol was reacted in known manner with

5.1 40 mol ethylene oxide,
5.2 50 mol ethylene oxide,
5.3 60 mol ethylene oxide.

The ethoxylated fatty alcohol mixture obtained was melted at 40 to 70°C and fully deionized water was added to the resulting melt at those temperatures. All the fatty alcohols ethoxylated in accordance with 5.1 to 5.3 were gel-like or solid at room temperature as aqueous preparations containing 50 to 80% by weight surfactant, expressed as fatty alcohol ethoxylate and based on aqueous preparation.

Example 6

The fatty alcohol mixture (component A) according to Example 1 containing n-decanol, lauric alcohol, myristic alcohol and also cetyl alcohol was reacted in known manner with 30 mol ethylene oxide, 70 parts by weight of the product mixture obtained were melted (40 to 70°C) and 30% by weight of the following components were added with stirring to the resulting melt:

6.1 nonylphenol reacted with 10 mol ethylene oxide,
6.2 a synthetic alcohol mixture containing 67% by weight of a primary C_{13} alcohol and 33% by weight of a primary C_{15} alcohol which had been reacted with 10.5 mol ethylene oxide
6.3 1,1-dibutylpentan-1-ol which had been reacted with 10

mol ethylene oxide.

35 Parts by weight water were added at temperatures of 40°C to 70°C to 65 parts by weight of the surfactant mixtures obtained in accordance with 6.1 to 6.3. After cooling, any water lost was replaced. The surfactant concentrates all have solidification points above 70°C, i.e. they are not pourable at room temperature.

D) Use as emulsifier for emulsion polymerization

Example 7

Various nonionic surfactants were tested for their suitability as emulsifiers for emulsion polymerization. 140.0 g ethyl acrylate, 140.0 g methyl methacrylate, 52.5 g butyl acrylate and acrylic acid were used as the monomers. 10% by weight of the particular monomers were first dissolved in approx. 600 g fully deionized water and, after the addition of 2.0 g Na lauryl sulfate and potassium peroxodisulfate, the resulting solutions were heated to 80°C. After the beginning of polymerization, 10 g nonionic surfactant and the remaining monomers were added to the mixture. After a reaction time of about 2.5 hours, the polymer dispersion was cooled and filtered through an 80 μ mesh filter. The quantity of solids remaining in the filter, the coagulate content, is expressed in % by weight solids and based on the solids content of the polymer dispersion.

Nonionic surfactant (mixture)	Coagulate content [%]
- Nonylphenol EO_{30}	Approx. 3
- C_{11} synthetic alcohol EO_{40}	Approx. 9
- Isotridecyl alcohol EO_{30}	Approx. 7
- Beef tallow alcohol EO_{40}	< 3
- Surfactant concentrate [65/70/30] containing the surfactant mixture acc. to Ex. 1 (component A containing 30 EO)	< 1
- Surfactant concentrate [80/70/30] containing the surfactant mixture acc. to Ex. 1 (component A containing 10 EO)	< 1
- Surfactant concentrate [80/70/30] containing the surfactant mixture acc. to Ex. 3 (component A containing 10 EO)	< 1

The results show that the surfactant concentrates according to the invention stabilize the emulsions excellently during the polymerization reaction.

Example 8

Various nonionic surfactant (mixture)s were tested for their suitabibility as emulsifiers for emulsion polymerization. 240.0 g styrene, 240.0 g butyl acrylate, 10.0 g acrylamide and 10.0 g acrylic acid were used as the monomers. 7.5 g nonylphenol sulfate EO_{28}, 5.0 g nonionic surfactant (mixture), 10% by weight of the monomer mixture and 10% by weight of an initiator solution of 2 g potassium peroxodisulfate in 98.0 g water were first added to 387.5 g water, followed by heating to around 80 to 85°C. After the beginning of polymerization, the remaining monomers and the remaining initiator solution were added dropwise over a period of 2 hours.

After the dropwise addition, the reaction mixture was post-polymerized for about 1.5 hours at the temperatures



mentioned above. After cooling, 3.0 g of a 25% by weight ammonia were added to the polymer dispersion.

The polymer dispersion was analyzed for coagulate content as in Example 7. The minimum film-forming temperature of the emulsion (DIN 53782), the particle size and also the water absorption of the films drawn from the dispersions were also determined.

To determine water absorption, the polymer dispersion was poured into a Teflon mold (75 x 35 x 5) and dried for 48 hours at 50°C in a recirculating air drying cabinet. The plastic molding obtained was weighed and then left standing for 24 hours in fully deionized water, blotted with a cellular cloth and reweighed. The water absorption is expressed in % by weight, based on the weight of the plastic molding.

Nonionic surfactant	Coagulate [%]	Particle size [nm]	Water absorption [%]	Minimum film forming temperature [°C]
Nonylphenol EO_{30}	2	136	4.0	19
Surfactant concentrate [65/70/30] containing the surfactant mixture acc. to Ex. 1 (component A EO_{30})	2	131	4.7	18
Surfactant concentrate [80/70/30] containing the surfactant mixture acc. to Ex. 1 (component A EO_{10})	1	136	4.5	18
Surfactant concentrate [65/70/30] containing the surfactant mixture acc. to Ex. 2 (component A EO_{40})	5	132	4.4	20



Example 8 shows that the toxicologically unsafe nonionic surfactant nonylphenol EO_{30} can be replaced by the detergent formulations according to the invention without any deterioration in performance properties.



The claims defining the invention are as follows:-

1. A pourable liquid surfactant concentrate comprising 50 to 90% by weight of a surfactant mixture in water, which surfactant mixture comprises one or more compounds corresponding to general formula I

$$R^1—O—(CH_2—CH_2O)_n—H \qquad (I)$$

in which R^1 is a saturated or unsaturated hydrocarbon radical of a primary C_{6-22} alcohol attached by carbon and n is a number of 25 to 60;
and of one or more compounds corresponding to general formula II

$$\begin{array}{l} R^2—CH - CH_2 \\ H—(OCH_2—CH_2)_p—O \quad O—(CH_2—CH_2O)_q—H \end{array} \qquad (II)$$

in which R^2 is a saturated or unsaturated C_{8-16} radical attached by carbon and p and q are each a number of 0 to 25, the sum of p and q being a number of 5 to 25.

2. A concentrate as claimed in claim 1, wherein n is a number of 20 to 60.

3. A concentrate as claimed in claim 1 or claim 2, which comprises 60 to 90% by weight surfactant.

4. A concentrate as claimed in any one of claims 1 to 3, which has a viscosity of 0.1 to 2Pas.

5. A concentrate as claimed in any one of claims 1 to 4, wherein R^2 has 10 to 16 carbon atoms.

6. A concentrate as claimed in any one of claims 1 to 4, wherein R^2 has 12 and/or 14 carbon atoms.

7. A concentrate as claimed in any one of claims 1 to 6, wherein R^1 has 6 to 20 carbon atoms.

8. A concentrate as claimed in any one of claims 1 to 7, wherein the sum of p and q is 5 to 25.

9. A concentrate as claimed in any one of claims 1 to 7, wherein the sum of p and q is 5 to 20.

10. A concentrate as claimed in any one of claims 1 to 7, wherein the sum of p and q is 5 to 15.

11. A concentrate as claimed in any one of claims 1 to 7, wherein the sum of p and q is 8 to 12.

12. A concentrate as claimed in any one of claims 1 to 11, which comprises 10 to 90% by weight of one or more compounds corresponding to general formula I and 10 to 90% by weight of one or more compounds corresponding to general formula II.

13. A concentrate as claimed in any one of claims 1 to 12, which comprises 30 to 85% by weight of one or more compounds corresponding to general formula I.

14. A concentrate as claimed in any one of claims 1 to 12, which comprises 50 to 80% by weight of one or more compounds corresponding to general formula I.

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15. A concentrate as claimed in any one of claims 1 to 14, which comprises 15 to 70% by weight of one or more compounds corresponding to general formula II.

16. A concentrate as claimed in any one of claims 1 to 14, which comprises 20 to 50% by weight of one or more compounds corresponding to general formula II.

17. A concentrate as claimed in any one of claims 1 to 16, which comprises 80 to 90% by weight of the surfactant mixture, n is a number of 16 to 25, p and q are numbers of 0 to 12 and the sum of p and q is a number of 8 to 12.

18. A pourable liquid surfactant concentrate substantially as hereinbefore described with reference to any one of Examples 1 to 4.

19. A process for preparing a concentrate as claimed in any one of claims 1 to 17 which process comprises mixing the compounds corresponding to general formulae I and II at temperatures of 20 to 100°C and adding water thereto.

20. A process as claimed in claim 19, wherein said temperature is 40 to 70°C.

21. A process as claimed in claim 19 or claim 20, wherein the mixture is cooled and any water lost during said process is replaced after said cooling.

22. A process for preparing a pourable liquid surfactant concentrate, substantially as hereinbefore described with reference to any one of Examples 1 to 4.

23. The product of the process of any one of claims 19 to 22.

24. An emulsifier for emulsion polymerization comprising a concentrate as claimed in any one of claims 1 to 18 or 23.

25. An emulsifier as claimed in claim 24, wherein said surfactants are anionic or cationic.

26. An emulsifier for emulsion polymerization, substantially as hereinbefore described with reference to Example 7 or 8.

Dated 21 December, 1993
Henkel Kommanditgesellschaft auf Aktien

Patent Attorneys for the Applicant/Nominated Person
SPRUSON & FERGUSON

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INTERNATIONAL SEARCH REPORT

International Application No PCT/EP 91/00310

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl.[5] C11D1/825 ; C08F2/30 ; C08G65/28

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
Int. Cl.[5]	C11D ; C08F

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	EP, A, 29965 (HENKEL KGAA) 10 June 1981 see the whole document	1-8, 10
Y		9, 11
Y	EP, A, 129720 (HENKEL KGAA) 02 January 1985 see page 3, line 10 - page 4, line 8; examples, Claims 1-4,6-7	9, 11
A	DE, A, 2829697 (HENKEL KGAA) 17 January 1980 see page 6, line 31 - page 7, line 20; claims; example 1,3,4 (cited in the application)	1
A	DE, B, 1190927 (HENKEL&CIE GMBH) 15 April 1965 see column 1, lines 22 - 40; claims (cited in the application)	1

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
25 April 1991 (25.04.91)	30 May 1991 (30.05.91)
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

EP 9100310

SA 44457

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 25/04/91

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-29965	10-06-81	DE-A- 2948100	11-06-81
		JP-A- 56088500	17-07-81
		US-A- 4338212	06-07-82
EP-A-129720	02-01-85	DE-A- 3319782	06-12-84
		JP-A- 60006706	14-01-85
		US-A- 4549002	22-10-85
DE-A-2829697	17-01-80	EP-A,B 0007049	23-01-80
		JP-C- 1472626	27-12-88
		JP-A- 55012194	28-01-80
		JP-B- 63014036	29-03-88
		US-A- 4234444	18-11-80
DE-B-1190927	31-07-75	BE-A- 635444	
		CH-A- 433768	
		FR-A- 1366307	
		GB-A- 1041036	
		NL-A- 295720	
		US-A- 3380925	
		US-A- 3406208	

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen PCT/EP 91/00310

I. KLASSIFIKATION DES ANMELDUNGSGEGENSTANDS (bei mehreren Klassifikationssymbolen sind alle anzugeben)[6]

Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC

Int.Kl. 5 C11D1/825 ; C08F2/30 ; C08G65/28

II. RECHERCHIERTE SACHGEBIETE

Recherchierter Mindestprüfstoff [7]

Klassifikationssytem	Klassifikationssymbole
Int.Kl. 5	C11D ; C08F

Recherchierte nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Sachgebiete fallen [8]

III. EINSCHLAGIGE VEROFFENTLICHUNGEN [9]

Art.°	Kennzeichnung der Veröffentlichung [11], soweit erforderlich unter Angabe der maßgeblichen Teile [12]	Betr. Anspruch Nr.[13]
X	EP,A,29965 (HENKEL KGAA) 10 Juni 1981 siehe das ganze Dokument	1-8, 10
Y		9, 11

Y	EP,A,129720 (HENKEL KGAA) 02 Januar 1985 siehe Seite 3, Zeile 10 - Seite 4, Zeile 8; Beispiele,Ansprüche 1-4,6-7	9, 11

A	DE,A,2829697 (HENKEL KGAA) 17 Januar 1980 siehe Seite 6, Zeile 31 - Seite 7, Zeile 20; Ansprüche; Beispiel 1,3,4 (in der Anmeldung erwähnt)	1

A	DE,B,1190927 (HENKEL&CIE GMBH) 15 April 1965 siehe Spalte 1, Zeilen 22 - 40; Ansprüche (in der Anmeldung erwähnt)	1

° Besondere Kategorien von angegebenen Veröffentlichungen [10] :

"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist

"E" älteres Dokument, das jedoch erst am oder nach dem internationalen Anmeldedatum veröffentlicht worden ist

"L" Veröffentlichung, die geeignet ist, einen Prioritätsanspruch zweifelhaft erscheinen zu lassen, oder durch die das Veröffentlichungsdatum einer anderen im Recherchenbericht genannten Veröffentlichung belegt werden soll oder die aus einem anderen besonderen Grund angegeben ist (wie ausgeführt)

"O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung, eine Ausstellung oder andere Maßnahmen bezieht

"P" Veröffentlichung, die vor dem internationalen Anmeldedatum, aber nach dem beanspruchten Prioritätsdatum veröffentlicht worden ist

"T" Spätere Veröffentlichung, die nach dem internationalen Anmeldedatum oder dem Prioritätsdatum veröffentlicht worden ist und mit der Anmeldung nicht kollidiert, sondern nur zum Verständnis des der Erfindung zugrundeliegenden Prinzips oder der ihr zugrundeliegenden Theorie angegeben ist

"X" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden

"Y" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann nahelegend ist

"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

IV. BESCHEINIGUNG

Datum des Abschlusses der Internationalen Recherche	Absendedatum des Internationalen Recherchenberichts
25.APRIL 1991	30.05.91
Internationale Recherchenbehörde	**Unterschrift des bevollmächtigten Bediensteten**
EUROPAISCHES PATENTAMT	WEIS R.E.

Formblatt PCT/ISA/210 (Blatt 2) (Januar 1985)

ANHANG ZUM INTERNATIONALEN RECHERCHENBERICHT ÜBER DIE INTERNATIONALE PATENTANMELDUNG NR. EP 9100310

SA 44457

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentdokumente angegeben.
Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am 25/04/91
Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie		Datum der Veröffentlichung
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		US-A-	4549002	22-10-85
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		JP-C-	1472626	27-12-88
		JP-A-	55012194	28-01-80
		JP-B-	63014036	29-03-88
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		CH-A-	433768	
		FR-A-	1366307	
		GB-A-	1041036	
		NL-A-	295720	
		US-A-	3380925	
		US-A-	3406208	

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