



HARD SURFACE CLEANER

The present invention relates to compositions for cleaning hard surfaces, and in particular to
5 compositions suitable for cleaning glass and glossy or shiny surfaces.

10 A particularly important feature of such compositions is that the surface when cleaned must not have any streaks or smears and, although numerous compositions for cleaning glass and like materials have
15 been proposed, providing compositions which clean effectively whilst avoiding streaking or smearing has been a particular technical challenge.

20 A further desirable feature of cleaning compositions for glass and shiny or glossy surfaces is the ability to reduce or to avoid the build up of static charge. It will be appreciated that the presence of static
25 charge on the surface causes the rapid re-deposition of dust and like particles by attraction of such particles onto the surface from the air. The benefits achieved by cleaning of the surface are thus rapidly diminished.
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One known cleaning composition, in particular for glass, comprises an aqueous solution of less than 1%
35 sodium alkyl sulphate and sodium alkyl ether sulphate surfactants together with a grease removing solvent. Whilst this composition shows satisfactory cleaning and non-smearing or non-streaking properties, the
40 composition does not impart anti-static properties to the surface.

45 Accordingly, the present invention seeks to provide a cleaning composition, in particular for glass and



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glossy or shiny surfaces, which has good cleaning properties, does not cause smears or streaks, and also has anti-static properties, that is, the ability to
5 reduce or prevent the build up of static charge on the surface.

10 According to the present invention, there is provided a cleaning composition for hard surfaces comprising by weight, in addition to water

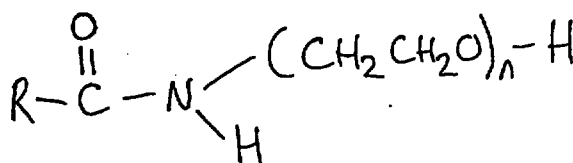
15 0.01% - 5% of one or more alkyl or alkenyl ethoxylated amides;

20 1% - 10% of at least one member selected from the group comprising glycol ethers and C₆ - C₁₁ alcohols and, optionally,

25 0.005% to 0.5% of an anti-static agent.

30 The compositions may also include minor amounts (usually less than 1%) of further optional ingredients such as fragrances colourants and the like, as known in the art.

35 Particularly preferred for use in the present invention are ethoxylated amides having the general structure:



45 Where R is an alkyl or alkenyl radical having from 10 to 25 carbon atoms, preferably 12 to 22 carbon atoms,

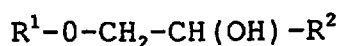
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and n is preferably an integer in the range of from 10 to 20. Especially suitable are mono-unsaturated alkenyl ethoxylated amides of which oleyl ethoxylated amide and erucic ethoxylated amide are especially preferred. Suitable ethoxylated amides are available in the Cromidets™ series from Croda Chemicals Ltd, UK.

In preferred formulations, the ethoxylated amides are present in amounts of from 0.1% to 0.5% and more preferably from 0.2% to 0.5%.

The glycol ethers and/or alcohols of the inventive compositions are preferably present in a total amount of from 1% to 10%, more preferably from 3% - 6%, and especially from 3.5% to 5.5%. Preferred glycol ethers have the general formula



where R^1 is a straight chain or branched lower alkyl radical, preferably having from 1 to 6 carbon atoms and R^2 is a lower alkyl radical which may be straight chained or branched and preferably has from 1 to 4 carbon atoms. Particularly preferred glycol ethers are butoxypropanol and methoxyisopropanol. Ethylene glycol monobutyl ether is also efficacious, but is less preferred for environmental reasons.

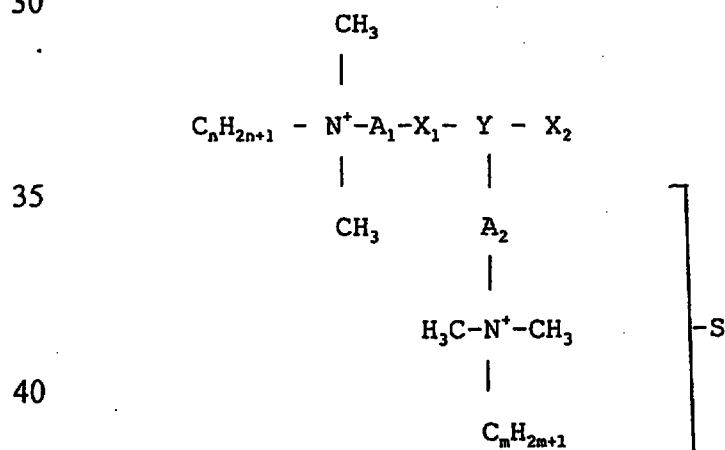
Whilst formulations comprising essentially the above ethoxylated amides, and glycol ethers and/or alcohols provide excellent cleaning, anti-smear and anti-static properties on surfaces such as glass and many shiny or glossy hard surfaces, a sufficient reduction of the

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static charge on plastic surfaces (such as vinyl, acrylic or polycarbonate surfaces) may not be achieved. Such static charges are generated by the tribological effects of cleaning the surface with, for example, a cloth and also simply by movement of air across the surface. As mentioned above, dissipation of such static charge is important in order to avoid re-deposition of dust particles from the air. Plastic surfaces are, by their nature, more susceptible than is glass to tribologically induced charge, and this charge is not easily dissipated.

The inventors have found that the static charge on such plastic surfaces after cleaning can be significantly reduced by incorporating an antistatic agent into the above compositions.

The anti-static agents of the invention are water soluble quaternary ammonium compounds which contain a polypeptide chain coupled to fatty alkyl groups. A typical structure of these compounds may be schematically represented as:



where A_1 and A_2 are portions of amino acids, X_1 is a portion of the polypeptide chain, X_2 is another portion of the polypeptide chain ending in a carboxy terminal

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amino acid, Y represents a carbon atom in the polypeptide chain and n and m may be the same or different and are integers in the range 8 to 20, preferably 10 to 18, especially 12. The anti-static agents may include one or more further side chains S and have a molecular weight of not more than 10,000, preferably not more than about 2000 and especially about 1000. Particularly preferred compounds may be based on collagen or keratin proteins. Especially preferred is a keratin based fatty (C₁₂ H₂₅) quaternary derivative of hydrolysed keratin (lauryldimonium hydroxypropyl hydrolysed keratin protein) which is commercially available as Croquat K (TM) from Croda Colloids Ltd, UK. The antistatic agent is preferably included in an amount of from 0.01% to 0.3%, and especially an amount of from 0.05% to 0.15%.

It is believed that the instant inventive formulations are particularly advantageous with regard to the prior art formulations based on sodium alkyl sulphate and sodium alkyl ether sulphate surfactants in that addition of antistatic agent to formulations including these surfactants results in smearing on cleaning.

Thus, the combination of the ethoxylated amides and the antistatic agent, together with the glycol ethers provides excellent charge reduction on plastic surfaces whilst also avoiding streaking and smearing on the surface. The inventors believe that this combination of charge dissipation and non-streaking/smearing is not achieved by the prior art compositions.



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The compositions of the invention may also advantageously include a wetting agent, in particular a fatty alcohol ethoxylate such as Volpo T7 available from Croda. Such a wetting agent may be present in amount of from 0.001% to 0.5%, more especially from 0.002% to 0.1%

10 The compositions of the invention may also include minor amounts of optional ingredients such as fragrances or colourants, provided that such optional ingredients do not deleteriously affect the anti-smearing or anti-static properties of the compositions.

20 In order to better illustrate the invention, Examples and Comparative Examples were prepared and tested as illustrated in table 1 below. Examples 1 and 2 are examples of the invention and Examples V to Z are comparative examples.

30 In order to assess the level of smearing caused by these formulations, samples of the formulations were applied in predetermined amounts to a clean dry paper towel which was then applied to a clean glass mirror tile and moved once with even pressure across the tile. After allowing the tile to dry, the level of smearing was assessed using a scale of 0 to 4 where 4 indicates severe smears or streaks and 0 indicates no smears or streaks.

40 The antistatic properties of the formulations were tested using a Charge Decay Test Unit from John Chubb Instrumentation, Cheltenham, UK. The test procedure involves the induction of a static charge on a surface

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and measurement of the time taken for the charge to
dissipate. The latter time is expressed as $1/e$ and a
lower value indicates a higher rate of charge

5 dissipation and better antistatic properties. Tests
were carried out on glass and on polycarbonate surfaces
and the results are indicated in Table 1 below.

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TABLE 1								
5 Example/Comparative Example	% w/w							
	1.	2	V	W	X	Y	Z ⁽²⁾	
Butoxypropanol	2.1	2.1	2.1	2.1	2.1	2.1		
Methoxyisopropanol	1.8	1.8	1.8	1.8	1.8	1.8		
10 Polyoxyethylene (15) oleylamide	0.3	0.3	0.3					
15 Sodium laurylether sulphate			0.29	0.29				
Sodium lauryl sulphate			0.43	0.43				
20 Trideceth 7	0.006		0.006					
Quaternised hydrolysed keratin	0.1		0.1					
25 Polyethoxy lauryl amide ⁽¹⁾					0.3			
Lactamide monoethanolamide ⁽¹⁾						0.3		
30 Water	100%	100%	100%	100%	100%	100%		
Smearing level	0.56	0.25	1.89	0.8				
35 Charge dissipation time (glass)	0.3				0.77	6.9	0.3	
40 Charge dissipation time (polycarbonate)	47.9				>600	>600	>600	

(1) Polyethoxy lauryl amide and lactamide
monoethanolamide are antistatic agents known in the
45 art.

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(2) Commercially available product claiming anti-static properties.

5 Untreated surfaces were also tested for which the charge dissipation times were: glass 1.6; polycarbonate >600.

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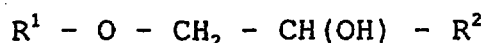


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Claims

- 5 1. A hard surface cleaning composition comprising, by weight, in addition to water
0.01% -5% of one or more alkyl or alkenyl
ethoxylated amides
10 1% - 10% of at least one member selected from the group comprising glycol ethers and C₆ - C₁₁ alcohols and, optionally,
15 0.005 % to 0.5% of an anti-static agent.
2. A composition according to claim 1 wherein the
ethoxylated amide is present in an amount of 0.1% to
20 0.5%, preferably 0.2% to 0.5%.
3. A composition according to claim 1 or 2 wherein the
ethoxylated amide has an alkyl or alkenyl chain
25 comprising from 10 to 25 carbon atoms.
4. A composition as claimed in claim 3 wherein the
ethoxylated amide is oleyl ethoxylated amide and/or
30 erucic ethoxylated amide.
5. A composition as claimed in any preceding claim
35 wherein the glycol ether has the general formula



- 40 where R¹ is a straight chain or branched lower alkyl radical of from 1 to 6 carbon atoms and R² is a straight chain or branched lower alkyl radical of
45 from 1 to 4 carbon atoms.



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6. A composition according to claim 5 wherein the glycol ether is butoxypropanol or methoxyisopropanol.

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7. A composition according to any preceding claim wherein the glycol ether is present in an amount of from 3.5% to 5.5%.

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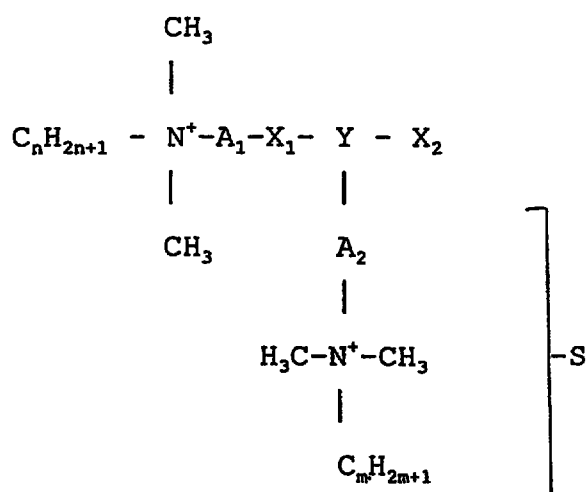
8. A composition according to any preceding claim further comprising from 0.01 % to 0.3 % of an anti-static agent which comprises a water soluble quaternary ammonium compound including a polypeptide chain coupled to fatty acid groups and having the general formula:

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where A_1 and A_2 are portions of amino acids, X_1 is a portion of the polypeptide chain, X_2 is another portion of the polypeptide chain ending in a carboxy terminal amino acid, Y represents a carbon atom in the polypeptide chain and n and m may be the same or different and are integers in the range 8 to 20.

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9. A composition according to claim 8 wherein the antistatic agent is a quaternised hydrolysed keratin.

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10. A composition according to any preceding claim further comprising from 0.001% to 0.5% of a wetting agent, preferably a fatty alcohol ethoxylate.

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11. A composition according to claim 1 substantially as hereinbefore described with reference to Example 1 or 2.

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