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(54) **An adhesive detergent and/or perfuming and/or sanitizing composition**

(57) It is disclosed an adhesive detergent and/or perfuming and/or sanitizing composition, in gel form, directly applicable to the surface of interest, to which it adheres without the aid of a support and/or container, and from which, if subjected to the action of water, is removed only after a great number of water flushings, said composition being characterized in that it comprises

- i) an adhesion promoter which is ethoxylated hydrogenated castor oil;
- ii) a thickening agent;
- iii) a perfuming agent;
- iv) possibly a non-ionic surfactant as detergent/foaming agent;
- v) water.

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Description

[0001] The present invention refers to a detergent and/or perfuming and or sanitizing adhesive composition.

[0002] The present invention falls within the technical field of detergent and/or perfuming and/or sanitizing products, in the solid, gel or pasty form, to be applied to the internal wall of sanitary objects such as WC, bidet, washbasins, pissoirs, for the interior of dishwashing machines, washing machines, to be applied to walls, furniture, etc., in particular the present invention falls within the technical field of detergent and/or perfuming and/or sanitizing products, in the solid, gel or pasty form, directly applied to the surface of interest, to which they adhere thanks to their intrinsic features, that is, without the aid of means and/or containers, namely of external devices. Adhesive detergent and/or perfuming and/or sanitizing compositions are known and subject-matter of wide commercialization, capable to adhere to the walls of the WC without the aid of any external device, specifically without the need to be inserted into conventional plastic cages.

[0003] The existing formulations according to the state of the art are mainly based on the use of a group of components, the alcohol ethoxylates, known as having adhesive properties.

[0004] More specifically, the alcohol ethoxylates are non-ionic surfactants which, in order to have also adhesive properties, they must be characterized by a long hydrocarbon chain and by a high degree of ethoxylation. Examples of adhesive compositions which can be directly applied to sanitary objects without the aid of any support and/or container, based on alcohol ethoxylates, are described in EP1086199 and EP1325103.

[0005] As previously observed, in order to have a sufficient adhesiveness, alcohol ethoxylates must be alcohols with a high ethoxylation, present in high concentration, as also required for every non-ionic surfactant acting as adhesion promoter. These raw materials usually present the feature to be solid at room temperature.

[0006] It should be also kept in mind that, in general, the gel formulations are rich in solvent (usually water), said solvent being necessary right for structuring the surfactants in a gel phase. The gel formulations, once exposed to air, if not kept under highly controlled conditions of temperature and relative moisture, tend to lose the solvent more or less quickly. The natural loss of water of such a type of formulations implies a dramatic change of appearance of the gel.

[0007] In the case of adhesive compositions in the form of gel, such as for example the compositions of the state of the art previously considered, once they are applied to the internal surface of the WC, it is apparent how the product starts to acquire a dry and opaque appearance yet after 12 hours of exposure to air, without water flushing in the WC, said dry and opaque appearance extending to the whole surface of the product after 24-36 hours. Since the "drying" process of the gel, as it concentrates the formulation, tends to make the formulation assume a texture increasingly closer to the texture of the starting raw materials, when the gel phase is dispersed due to the loss of water, the above said non-ionic products return to their original physical state of opaque solids.

[0008] This phenomenon is first of all anti-aesthetic, drastically changing the original form and aspect of the product, but it has also an important effect on the functionality of the end-product. Indeed, while the gel phase presents an optimal consumption profile, the non-ionic surfactants, once returned to the original solid phase, present a consumption profile necessarily different. It is indeed necessary a rehydration step requiring a certain period of time, affecting therefore the original consumption profile.

[0009] It is also necessary to point out that a key feature of this type of products is that of being directly applied to the wall of the sanitary object or of the household appliance as desired by the end-user. Such an application is achieved in many ways, some of which provide the use of specific applicators allowing to dose and apply the product to the wall of interest, and others provide the use of single-dose applicators through which is applied a pre-dosed quantity of the product to the wall.

[0010] Mostly in the case of single-dose applicators (where the application is achieved by the user through simple pressure of fingers), particularly stiff compositions make the application more difficult.

[0011] The Applicant has now surprisingly found an adhesive detergent and/or perfuming and/or sanitizing composition, in gel form, which overcomes the drawbacks of the state of the art.

[0012] The main purpose of the present invention is therefore that of finding an adhesive detergent and/or perfuming and/or sanitizing composition, in gel form, which can be directly applied to the surface of interest, adhering thereto without the aid of means and/or containers, presenting also both an optimal adhesion to the surface and length, also in the presence of a short frequency of flushings.

[0013] A further purpose of the present invention is also that of identifying an adhesive detergent and/or perfuming and/or sanitizing composition, in gel form, which, when applied to the wall of the sanitary object and subjected to the process of evaporation of the solvent, maintains a transparent look, the closest as possible to that of the originally applied product, also with an unquestionable aesthetic advantage for the user.

[0014] A purpose of the present invention is also that of achieving an adhesive composition which, along with the optimal adhesiveness and length, presents a lower stiffness which makes it easier to be extruded by means of application systems through which it is applied to the wall to which it exerts its action.

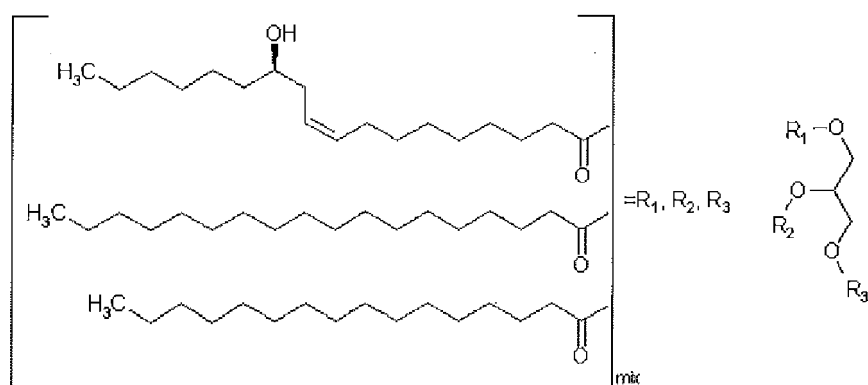
[0015] The subject-matter of the present invention is therefore an adhesive detergent and/or perfuming and/or sanitizing composition, in gel form, directly applicable to the surface of interest, adhering thereto without the aid of a support and/or

container, and from which, if subjected to the action of water, is removed only after a great number of water flushings, said composition being characterized by comprising

- i) an adhesion promoter which is ethoxylated hydrogenated castor oil;
- ii) a thickening agent;
- iii) a perfuming agent;
- iv) optionally a non-ionic surfactant as a detergent/foaming agent;
- v) water.

[0016] The adhesive composition, in gel, according to the present invention provides a viscosity, measured through a plate-plate system viscometer, with a diameter of the plate of 10 mm, applying a constant shear rate of $2,62 \text{ s}^{-1}$ at 20°C , comprised between 100 and $1500 \text{ Pa}\cdot\text{s}$, preferably comprised between 500 and $1200 \text{ Pa}\cdot\text{s}$ and still more preferably equal to $1000 \text{ Pa}\cdot\text{s}$. The adhesion promoter in the adhesive composition according to the present invention is ethoxylated hydrogenated castor oil.

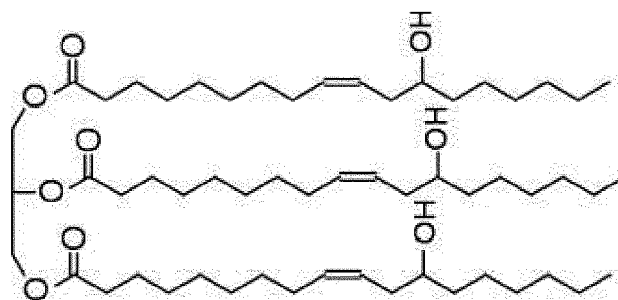
[0017] The ethoxylated hydrogenated castor oil is a mixture mainly composed of esters (ethoxylated) of glycerol trihydroxystearate.



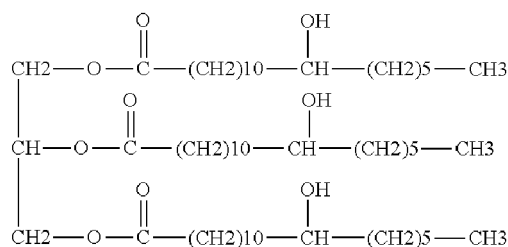
To better identify the nature of the mixture constituting castor oil, it is reported the average composition of residues of fatty acids present in the castor oil seeds

Acid	Percentage
Ricinoleic	95-85%
Oleic	6-2%
Linoleic	5-1%
Linolenic	1-0.5%
Stearic	1-0.5%
Palmitic	1-0.5%
Dihydroxystearic	0.5-0.3%
Others	0.5-0.2%

[0018] The preponderant residue of fatty acid R1, R2 and R3 present in castor oil derives thus from the ricinoleic acid.



and after hydrogenation the main component of castor oil is



Trihydroxystearin

[0019] Therefore, after hydrogenation, the chains R1, R2 and R3 in the mixture are residues of monohydroxystearic acid in a percentage from 85 to 95% and, with the ethoxylation phase, the OH groups present in the chains R1, R2, R3 are ethoxylated.

[0020] The phase of ethoxylation provides the achieving of addition products of 20-80 moles of ethylene oxide to hydrogenated castor oil, preferably the adhesion promoter according to the present invention is hydrogenated castor oil, alkoxylated with 40 EO units. The adhesive composition according to the present invention comprises the adhesion promoter in amount ranging from 20 to 60% by weight, preferably ranging from 38 to 45% and still more preferably it is equal to 40% by weight, with respect to the total weight of the adhesive composition.

[0021] The adhesive composition according to the present invention comprises as component ii) a thickening agent. Preferably the thickening agent is Xanthan Gum. The amount of thickening agent ranges from 0.05 to 0.8% by weight, preferably ranging from 0.1 to 0.3% by weight and still more preferably is equal to 0.2% by weight, with respect to the total weight of the adhesive composition.

[0022] The preferred thickening agent is Xanthan Gum, in amount equal to 0.2% by weight with respect to the total weight of the detergent composition. It allows indeed to optimize the features of the adhesive composition according to the present invention, in particular giving the gel the right degree of viscoelasticity which allows its proper dispensing during use.

[0023] The adhesive composition according to the present invention comprises as component iii) a perfuming agent.

[0024] The perfuming agent is present in amount ranging from 2 to 10% by weight, preferably ranging from 4 to 8% by weight and still more preferably it is equal to 6% by weight, with respect to the total weight of the adhesive composition.

[0025] The presence of detergent/foaming agents, as component (iv) of the adhesive composition according to the present invention, is provided for example in case of adhesive compositions for WC, washbasins, dishwashing machines and washing machines, and said detergent/foaming agent can be preferably selected from two non-ionic surfactants and precisely from isotridecanol ethoxylate with 30 moles EO and a mixture of oleyl and cetyl alcohol ethoxylates with 55 moles EO, still more preferably it is a mixture of cetyl and oleyl alcohol ethoxylates with 55 moles EO, usually it is a mixture of cetyl (C16) and oleyl (C18) alcohol ethoxylates with 55 moles EO, wherein the alcohols C16/C18, ethoxylated with 55 moles of EO, are in a weight ratio equal to 20:80.

[0026] The adhesive composition according to the present invention, in the applications which provide component iv), comprises the detergent/foaming agent in amount ranging from 15 to 60% by weight, preferably from 25 to 55% by weight, with respect to the total weight of the adhesive composition.

[0027] Still more preferably, isotridecanol ethoxylate with 30 moles EO is present in amount equal to 8% by weight with respect to the total weight of the adhesive composition, whereas the mixture of cetyl and oleyl alcohol ethoxylates with 55 moles EO is present in amount equal to 4% by weight with respect to the total weight of the adhesive composition.

[0028] The own specific non-ionic surfactants of the adhesive composition according to the present invention confer a good foaming capability to the adhesive composition, obtaining a good cleaning effect and a good foam profile, without damaging the gel structure. Conversely, the use of anionic surfactants, which however allows a good foaming capability, causes a strong instability of the adhesive composition structure, which leads to collapse of the gel in a very short time (often instantaneous). The cationic surfactants which, with respect to the anionic surfactants, allow to maintain the structure of the adhesive composition, set instead the foam profile to zero.

[0029] The adhesive composition according to the present invention provides the presence of water, in amount ranging from 20 to 70% by weight, preferably from 35 to 60% by weight, with respect to the total weight of the adhesive composition.

[0030] The adhesive composition according to the present invention provides an adhesion promoter/water weight ratio ranging from 20:80 to 70:30, preferably equal to 40:60.

[0031] In particular the adhesive composition, in gel, according to the present invention, provides that said promoting

agent/water ratio presents an optimal combination of features of transparency and adhesiveness.

[0032] The adhesive composition according to the present invention may also provide colorants, as minority components, in order to confer a more pleasant appearance to the adhesive composition, and/or preservatives and/or sanitizing agents, selected from those commonly known to the skilled person in the art. The adhesive composition in gel according to the present invention preferably provides the following composition

- i) ethoxylated hydrogenated castor oil;
- ii) Xanthan Gum;
- iii) a perfuming agent;
- iv) a mixture of cetyl and oleyl alcohol ethoxylates with 55 moles;
- v) water.

[0033] Still more preferably, the adhesive composition in gel according to the present invention is composed 40% by weight of ethoxylated hydrogenated castor oil, 0.2% by weight of Xanthan Gum, 6% by weight of perfume, 4% by weight of the mixture of cetyl and oleyl alcohol ethoxylates with 55 moles and 49.8 % by weight of water. The percentages are all percentages by weight with respect to the total weight of the adhesive composition.

[0034] A further subject-matter of the present invention is the use of said adhesive composition, in gel, as detergent and/or perfuming and/or sanitizing agent, by direct application to the surface of interest of sanitary objects, household appliances, walls, furniture, etc.

[0035] A further subject-matter of the present invention is the process of application of said adhesive composition directly to the surface of interest, adhering thereto without the aid of means and/or containers.

[0036] The process to obtain an adhesive composition in gel form according to the present invention comprises the following phases:

Xanthan Gum is dispersed in water in a mixer at a temperature of about 40°C, the ethoxylated hydrogenated castor oil is added and the whole is subjected to stirring until complete dissolution.

[0037] The water temperature can be increased if the time of mixing is reduced.

[0038] All the other components provided in the adhesive composition according to the present invention are then added, concluding the preparation with the addition of the perfuming agent.

[0039] A further subject-matter of the present invention is therefore a process for the preparation of said adhesive detergent and/or perfuming and/or sanitizing composition in gel, comprising the following operating steps:

- dissolving in water all the components of the solid composition according to the present invention, under the condition that the perfuming agent is added once all the other components are dissolved;
- homogenizing the composition through mixing at a temperature comprised between 35°C and 55°C for a variable time from 5 to 30 minutes,
- pouring the composition thus obtained in a container and cooling the composition until formation of a gel. With respect to the processes of preparation of analogous sanitizing products, the above process presents the following advantages:

the heating of the composition is extremely limited;
this avoids evaporation of volatile substances as the perfuming agents;
the composition is poured and the gel forms in a container which confers the final shape of the product ready for use;
according to the shape of the container, end-products having numerous forms can be obtained, differently from the conventional extrusion processes which strongly limit the variety of possible configurations.

[0040] The adhesive composition in gel according to the present invention can be applied in a form having a size of about 4 x 2 x 1 cm, making it not much visible inside the surface of interest to which it is applied, differently from the much more cumbersome products present in the state of the art.

[0041] The size of the adhesive composition according to the present invention mainly depends on the length of the sanitizing efficacy to obtain.

[0042] If, for the sanitization of a home-WC, an adhesive composition is subjected to flushings with a volume variable from 6 to 9 litres each, the adhesive composition according to the present invention, having a weight of about 10 grams, is completely rinsed off only after about 90-130 washings, taking into account that the number of flushings necessary to the complete washout also depends on the geometry of the tablet and on the modes of flushing of water in the WC.

[0043] The adhesive composition in gel according to the present invention, applied to the wall of the WC, and subjected

to a normal flushing cycle (about 12 rinses a day) presents thus an average length of about ten days. In particular, in order to facilitate the application of the adhesive composition to the sanitary object, the composition can be provided with a support, such as for example a thermoformed plastic support from which the adhesive composition can be easily extruded by pressing the thumb, thanks to the characteristic of lower stiffness of the adhesive composition as above described.

[0044] Additional to the above outlined advantages, a further key advantage of the adhesive composition according to the present invention is represented by the fact that it is capable to maintain its aesthetic features under non-flushing operations for at least 2 days. Such a result is much relevant for the end-user who may often face situations in which the time range elapsing between one water flushing and the other is very broad, such as for example a single person, or a family leaving the main house empty for the weekend.

[0045] Moreover, the particular combination of components constituting the adhesive composition according to the present invention, and in particular the selection of castor oil as adhesion promoter, preferably with the presence of Xanthan gum as thickening agent and the weight ratios between solvent and thickening agent, allows to obtain an end-product which, surprisingly, is capable to maintain the adhesiveness features for a long time and the gel aesthetic features also under conditions of short flushing, and presents an optimal rheology for the application of the product directly to the wall of the sanitary object.

[0046] The following examples are provided with a mere exemplificative purpose.

Examples 1-5.

[0047] Using the previously described preparation process for the adhesive compositions in form of gel, three different adhesive compositions in gel have been prepared, according to the present invention, having the formulation reported in Table 1 below.

Composition	Example 1	Example 2	Example 3	Example 4	Example 5
Adhesion Promoter	Ethoxylated Hydrogenated Castor oil 40 EO 40%	Ethoxylated Hydrogenated Castor oil 40 EO 40%	Ethoxylated Hydrogenated Castor oil 40 EO 40%	Ethoxylated Hydrogenated Castor oil 40 EO 40%	Ethoxylated Hydrogenated Castor oil 40 EO 40%
Solvent	Water 49.8%	Water 45.8%	Water 50.4%	Water 53.8%	Water 56.8%
	Xanthan Gum 0.2%	Xanthan Gum 0.2%	Xanthan Gum 0.1%	Xanthan Gum 0.2%	Xanthan Gum 0.2%
Surfactant/foaming Agent	mixture of oleyl and cetyl alcohol ethoxylates 55 moles EO 4%	isotridecanol ethoxylate 30 moles EO 8%	mixture of oleyl and cetyl alcohol ethoxylates 55 moles EO 3.5%		
	Perfume 6%	Perfume 6%	Perfume 6%	Perfume 6%	Perfume 3%
Look	Transparent Gel	Transparent Gel	Transparent Gel	Transparent Gel	Transparent Gel
Deformation without flushing	> 36 hours	> 36 hours	> 36 hours	> 36 hours	> 36 hours

[0048] The adhesive compositions in gel according to the formulations reported in Table 1 are completely transparent and adhere firmly, when applied to the wall of the WC and subjected to a normal flushing cycle (about 12 rinses a day).

[0049] Moreover, the outer appearance and adhesiveness do not change not even under a non-flushing regimen longer than 2 days.

[0050] The viscosity, measured through a plate/plate system Haake viscometer, with a plate having a diameter of 10 mm, a shear gradient of 2,62 Hertz, at 20°C is equal to 1000 Pa*S.

[0051] The perfume used in the present examples is PURPLE LAVENDER 299469 ex Firmenich, but it can be substituted with any other perfume suited to the purpose.

[0052] The colorant used in a percentage equal to 0.003% is Rhodamine B, which can be however substituted with any other colorant suited to the purpose.

[0053] Then, the loss of water under a non-flushing regimen of the composition according to the above reported example 1 has been measured:

the loss of water occurs in amount of about 0.23 grams per hour as long as the formula does not reach a state of minimal moisture content. To determine the speed of water loss relating to the formulation of interest for us, it has been applied an amount equal to 7.8 grams of product on a greaseproof paper, and the whole has been placed on an analytical balance. At regular intervals of 5 minutes, it has then measured the weight loss of the product. The product used in the measurements is analogous to formula 1 but without perfume, whereby the gap related to the absence of perfume has been filled with water. This has been done to avoid that the natural evaporation of perfume from the matrix affected the measurement.

[0054] The same measurement has been however carried out also using the exact formulation of the product according to example 1 (thus containing perfume) and it was determined a water loss equal to 0.27 grams per hour. Such a value is absolutely congruent with the value previously determined.

Examples 6-8 (comparatives).

[0055] Into the comparative examples 6-8, we have modified the various components of the formulation to illustrate how each of them has a relevance for obtaining the adhesive composition provided with the peculiar features of the present invention.

Composition	Example 1	Example 6	Example 7	Example 8
Adhesion Promoter	Ethoxylated Hydrogenated Castor oil 40 EO 40%	Ethoxylated Castor oil 40 EO 40%	Ethoxylated Hydrogenated Castor oil 40 EO 40%	Ethoxylated Hydrogenated Castor oil 40 EO 40%
Solvent	Water 49.8%	Water 49.8%	Water 51.3%	Water 55.8%
	Xanthan Gum 0.2%	Xanthan Gum 0.2%	Xanthan Gum 0.2%	Xanthan Gum 0.2%
Surfactant/Foaming Agent	mixture of oleyl and cetyl alcohol ethoxylates 55 moles EO 4%	mixture of oleyl and cetyl alcohol ethoxylates 55 moles EO 4%	Anionic Surfactant (Nansa LSS 480/H ex Huntsmann) 8.5%	Cationic Surfactant (Arquad 2H 7 55, ex Akzo Nobel) 4%
	Perfume 6%	Perfume 6%		
Appearance	Transparent Gel	Liquid	Opaque Gel	Opaque Gel
Deformation without flushing	> 36 hours	N.A.	immediate	1-2 hours

[0056] The adhesive composition according to the comparative example 6, which provides ethoxylated not hydrogenated castor oil 40 EO as adhesion promoter, does not allow to obtain a gel phase at room temperature, in whichever ratio with water.

[0057] The adhesive compositions according to the comparative examples 7 and 8 which provide respectively an anionic and a cationic surfactant as detergents/foaming agents, present a deformation without flushing substantially immediate and in the case of the cationic surfactant a foam capability almost absent.

[0058] At last, the water loss under a non-flushing regimen of the composition according to the above reported example 1, experimentally measured, has been compared with that of an adhesive detergent composition in form of gel available on the market and containing a non-ionic surfactant and precisely an ethoxylated alcohol as adhesion promoter.

[0059] Such a composition according to the state of the art presents a weight loss equal to 0.23 grams per hour (it should be observed that in this case the condition of absence of perfume is not possible, see above).

Claims

1. An adhesive detergent and/or perfuming and/or sanitizing composition, in gel form, directly applicable to a surface of interest, to which it adheres without the aid of a support and/or a container, and from which, if subjected to the action of flushings of water, is washed away only after a large number of water flushings, said composition being characterized by comprising

- i) an adhesion promoter which is ethoxylated hydrogenated castor oil;
- ii) a thickening agent;
- iii) a perfuming agent;
- iv) optionally a non-ionic surfactant as a detergent/foaming agent;
- v) water.

2. An adhesive composition according to claim 1, wherein it has a viscosity between 100 and 1500 Pa*s, preferably between 500 and 1200 Pa*s and more preferably equal to 1000 Pa*s.

3. An adhesive composition according to any one of the preceding claims, wherein the thickening agent is Xanthan gum.

4. An adhesive composition according to any one of the preceding claims, wherein the amount of thickening agent ranges of from 0.05 to 0.8% by weight, preferably ranges from 0.1 to 0.3% by weight and more preferably is equal to 0.2% by weight with respect to the total weight of the adhesive composition.

5. An adhesive composition according to any one of the preceding claims, wherein the perfuming agent is present in an amount ranging from 2 to 10% by weight, preferably ranges from 4 to 8% and more preferably is equal to 6% by weight with respect to the total weight of the adhesive composition.

6. An adhesive composition according to any one of the preceding claims, wherein the foaming agent is selected from isotridecanol ethoxylate with 30 moles EO and a mixture of oleyl and cetyl alcohol ethoxylates with 55 moles EO, more preferably is a mixture of oleyl (C18) and cetyl (C16) alcohol ethoxylates with 55 moles EO, wherein the C16/C18 alcohol ethoxylates with 55 moles EO are in a weight ratio equal to 20/80.

7. An adhesive composition according to any one of the preceding claims, wherein the foaming agent is present in an amount ranging from 15 to 60% by weight, preferably from 25 to 55% by weight with respect to the total weight of the adhesive composition.

8. An adhesive composition according to any one of the preceding claims, wherein the foaming agent is selected from isotridecanol ethoxylate with 30 moles EO in an amount equal to 8% by weight with respect to the total weight of the adhesive composition and a mixture of oleyl and cetyl alcohol ethoxylates with 55 moles EO in an amount equal to 4% by weight with respect to the total weight of the adhesive composition.

9. An adhesive composition according to any one of the preceding claims, wherein water is present in an amount ranging from 20 to 70% by weight, preferably from 35 to 60% by weight with respect to the total weight of the adhesive composition.

10. An adhesive composition according to any one of the preceding claims, wherein it presents a weight ratio of adhesion promoter/water ranging from 20:80 to 70:30, preferably equal to 40:60.

11. An adhesive composition according to any one of the preceding claims, having the following composition:

- i) ethoxylated hydrogenated castor oil;
- ii) Xanthan gum;
- iii) a perfuming agent ;
- iv) a mixture of oleyl and cetyl alcohol ethoxylates with 55 moles EO;
- v) water.

12. An adhesive composition according to any one of the preceding claims, having the following composition: 40% by weight of ethoxylated hydrogenated castor oil, 0.2% by weight of Xanthan gum, 6% by weight of perfume, 4% by weight of a mixture of oleyl and cetyl alcohol ethoxylates with 55 moles EO and 49.8% by weight of water, all percentages being indicated with respect to the total weight of the adhesive composition.

13. Use of the adhesive composition, in gel, according to any one of the preceding claims, as a detergent and/or perfuming and/or sanitizing agent, by direct application on the surface of interest in lavatory, appliances, walls, furniture.

14. A process of application of the adhesive composition according to any one of the preceding claims, directly applicable

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to a surface of interest, to which it adheres without the aid of a support and/or a container.

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EUROPEAN SEARCH REPORT

Application Number
EP 14 18 5358

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 6 February 2015	Examiner Hillebrecht, Dieter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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