CLEANING WIPE WITH ACTIVE GRAPHIC

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Appl. No.: 11/043,571

Filed: Jan. 26, 2005

The present invention relates to a cleaning article, preferably a cleaning wipe, comprising a water-insoluble substrate and a cleaning composition, characterised in that the water-insoluble substrate is printed, coated or has applied thereto, an active graphic.
CLEANING WIPE WITH ACTIVE GRAPHIC

CROSS REFERENCE TO RELATED APPLICATION

This application claims priority to U.S. Provisional Application Ser. No. 60/539,296, filed Jan. 26, 2004, the disclosure of which is incorporated by reference.

TECHNICAL FIELD

The present invention relates to a disposable cleaning wipe comprising a cleaning composition and being printed with an active graphic. The active graphic changes over time during use of the cleaning wipe and provides a signalling method to the user. The signal may for example and in a preferred embodiment, inform the user when the cleaning wipe should be discarded and swapped for a new one.

BACKGROUND OF THE INVENTION

Dish care products, particularly hand dishwashing products, have traditionally been marketed in a variety of forms such as scouring powders, pastes, aqueous liquids and gels. Typically, these products have attempted to satisfy a number of criteria to be acceptable to consumers. These criteria include cleaning effectiveness, in particular effective grease removal, rinsability and sudsing volume. It is also highly desirable to deliver the above described cleaning benefits from a disposable product. Disposable products are convenient because they obviate the need to store cumbersome bottles, jars, sprayers, sponges, reusable dishware cloths, brushes and other forms of clutter including hand dishcare products capable of providing the cleaning, rinsing and sudsing benefits. Disposable products are also a more sanitary alternative to the use of a sponge, reusable dishware cloth, brush or other cleaning implements intended for extensive reuse, because such implements can develop bacterial growth, unpleasant odors, and other undesirable characteristics related to repeated use.

The wipes of the present invention surprisingly provide effective cleaning and additional hand dishcare benefits in a convenient, inexpensive and hygienic manner. The present invention provides the convenience of not needing to carry, store or use a separate implement (such as a dish cloth, brush, sponge and the like) and a liquid or powder hand dishwashing detergent. These wipes are convenient to use because they are in the form of either a single-use disposable wipe or multiple-use disposable wipe which after being moistened are ready for cleaning dishes in a hand dishwashing operation. In addition, the disposable wipes of the present invention may be removably attached to a handle or grip suitable for moving the wipe over the surface to be cleansed.

The wipes of the present invention are suitable for hand dishcare applications to clean “dishware” including dishes, cups, cutlery, glassware, food storage containers, cooking utensils (cookware) and the like. They may also be useful in cleaning household hard surfaces, in particular hard surfaces found in kitchens such as sinks, worktops, fixtures, appliances etc.

BACKGROUND ART

U.S. Pat. No. 5,368,188 relates to a stack of folded fabric products which comprise a visual indicator to signal the whereabouts of the edge of the products to aid the removal of the product from the folded stack. US2002/0164910 describes a wipe comprising a piece of sheet material which is impregnated with a solution. The wipe may comprise a visual representation. U.S. Pat. No. 5,853,859 relates to a printed substrate, the substrate being printed with a printing composition comprising crosslinkable latex polymer, pigment and cure promoter to a nonwoven thermoplastic polyolefin polymer fibre substrate.

SUMMARY OF THE INVENTION

The present invention relates to a disposable, non-woven cleaning wipe comprising a water-insoluble substrate and a cleaning composition, wherein said water-insoluble substrate is printed, coated or has applied thereto, an active graphic.

DETAILED DESCRIPTION OF THE INVENTION

As used herein, “disposable” is used in its ordinary sense to mean an article that is disposed or discarded after a limited number of usage events, preferably less than about 15, more preferably less than about 10, and most preferably less than about 2 usage events. For example, a usage event in a hand dishcare operation is defined as being the cleaning by hand dishwashing of a load of dishes that accumulates during one day in a four person family household.

In a preferred embodiment herein the disposable wipes according to the present invention are dry-to-the-touch. By ‘dry-to-the-touch’ it is meant that the wipes are substantially free of water or other solvents in an amount that would make them feel damp or wet to the touch as compared to the touch of a wet wipe or pre-moistened wipe, wherein a substrate is impregnated (i.e., soaked) in a liquid. The cleaning composition carried by the wipes of the present invention preferably comprises from 0.01% to 20% water, more preferably from 2% to 15% water and most preferably from 5% to 12% water. The wipes according to the present invention preferably remain dry-to-the-touch until it is required for use in cleaning a surface as described herein, this means until they are intentionally moistened with water in the process of cleaning a surface, preferably dishware, according to the present invention.

The wipes of the present invention are preferably water-activated and are therefore intended to be moistened with water prior to use. As used herein, “water-activated” means that the present invention is presented to the consumer in dry-to-the-touch form to be used after wetting/moistening with water. Accordingly, the wipe is moistened by contacting it with water, including dipping or immersion in water or by placing it under a stream of water.

The wipes according to the present invention may have a length of from about 10 to about 20 cm, a width of from about 10 to about 20 cm and a thickness of from about 2 to about 5 mm.

The wipes of the present invention comprise a water-insoluble substrate, which preferably comprises at least two layers, a cleaning layer and a scrubbing layer. The layers herein have an interior and exterior surface. The interior surfaces of the layers are those which face the inside or innermost portion of the wipe of the present invention.
whereas the exterior surfaces of the layers are those which face the outside or outermost portion of the article. Indeed, in one embodiment the two interior sides or surfaces of said cleaning and said scrubbing layer face each other and are positioned adjacent to one another. However, as described herein below one or more additional layers may be present between said cleaning and said scrubbing layers. These additional layers, when present, are sandwiched between said cleaning and said scrubbing layer.

[0013] The substrate layers of the wipe are designed for different applications and thus preferably have different textures. The cleaning layer is designed to be used to wipe soil from the surface being cleaned and clean delicate surfaces. The scrubbing layer is designed for scrubbing tough to remove soils, such as burnt-on, baked-on soils. The scrubbing layer is therefore comparatively more abrasive than the cleaning layer.

[0014] The cleaning layer and scrubbing layers, as well as any additional layers, are preferably bonded to one another in order to maintain the integrity of the wipe. The layers are preferably heat spot bonded together more preferably the wipes are high pressure welded. The bonding may be arranged such that geometric shapes and patterns, e.g., diamonds, circles, squares, etc., are created on the exterior surfaces of the layers and the resulting wipe.

[0015] The substrate is preferably flexible and even more preferably the substrate is also resilient, meaning that once applied external pressure has been removed the substrate regains its original shape.

[0016] The disposable dish care and hard surface cleaning wipe of the present invention preferably comprise the following components:

[0017] The Cleaning Layer

The cleaning layer of the present wipe preferably comprises a cleaning layer. Said cleaning layer is preferably a substrate composed of nonwoven fibers or paper. The term nonwoven is to be defined according to the commonly known definition provided by the “Nonwoven Fabrics Handbook” published by the Association of the Nonwoven Fabric Industry. A paper substrate is defined by EDANA (note 1 of ISO 9002-EN 29002) as a substrate comprising more than 50% by mass of its fibrous content is made up of fibres (excluding chemically digested vegetable fibres) with a length to diameter ratio of greater than 300, and more preferably also has density of less than 0.040 g/cm³. To be clear, the definitions of both nonwoven and paper substrates do not include woven fabric or cloth or sponge. The cleaning substrate is preferably partially or fully permeable to water and the cleaning composition.

[0019] The cleaning substrate may comprise natural or synthetic fibres. Natural fibres include all those which are naturally available without being modified, regenerated or produced by man and are generated from plants, animals, insects or by-products of plants, animals and insects. Preferred examples of natural fibres include keratin fibres and cellulose fibres, including wood pulp, cotton, hemp, jute, flax and combinations thereof. Natural material nonwovens useful in the present invention may be obtained from a wide variety of commercial sources. Nonlimiting examples of suitable commercially available paper useful herein include Airtex®, an embossed airlaid cellulosic having a base weight of about 71 gsm, available from James River, Green Bay, Wis.; and Walkisoft®, an embossed airlaid cellulosic having a base weight of about 75 gsm, available from Walkisoft U.S.A., Mount Holly, N.C.

[0020] As used herein, “synthetic” means that the materials are obtained primarily from various man-made materials or from natural materials that have been further altered. Nonlimiting examples of synthetic materials useful in the present invention include those selected from the group consisting of acetate fibers, acrylic fibers, cellulose ester fibers, modacrylic fibers, polypamide fibers, polyester fibers, polyolefin fibers, polystyrene fibers, polyvinyl alcohol fibers, rayon fibers and combinations thereof. Examples of suitable synthetic materials include acrylics such as acrilan, creslan, and the acrylonitrile-based fiber, orlon; cellulose ester fibers such as cellulose acetate, arnel, and acela; polyamides such as nylons (e.g., nylon 6, nylon 66, nylon 610, and the like); polystyres such as forcel, kodel, and the polyethylene terephthalate fiber, polylactone terephthalate fiber, dacron; polyolefins such as propylene, polyethylene; polyvinyl acetate fibers and combinations thereof. These and other suitable fibers and the nonwovens prepared therefrom are generally described in Riedel, “Nonwoven Bonding Methods and Materials,” Nonwoven World (1987); Encyclopedia Americana, vol. 11, pp. 147-153, and vol. 26, pp. 566-581 (1984); U.S. Pat. No. 4,891,227, to Thaman et al., issued Jan. 2, 1990, and U.S. Pat. No. 4,891,228, each of which is incorporated by reference herein in its entirety.

[0021] Preferred polyolefin fibers are fibers selected from the group consisting of polyethylene, polypropylene, polybutylene, polypropylene, and combinations and copolymers thereof. More preferred polyolefin fibers are fibers selected from the group consisting of polyethylene, polypropylene, and combinations and copolymers thereof. Preferred polyester fibers are fibers selected from the group consisting of polyethylene terephthalate, polylactone terephthalate, polypropylene terephthalate, and combinations and copolymers thereof. More preferred polyester fibers are fibers selected from the group consisting of polyethylene terephthalate, polylactone terephthalate, and combinations and copolymers thereof. Most preferred synthetic fibers of the first layer comprise solid staple polymer fibers, which comprise polyethylene terephthalate homopolymers. Suitable synthetic materials may include solid single component (i.e., chemically homogenous) fibers, multiconstituent fibers (i.e., more than one type of material making up each fiber), and multicomponent fibers (i.e., synthetic fibers which comprise two or more distinct filament types which are somehow intertwined to produce a larger fiber), hollow fibers and combinations thereof. Preferred fibers include bicomponent fibers, multiconstituent fibers, and combinations thereof. Such bicomponent fibers may have a core-sheath configuration or a side-by-side configuration. In either instance, the first layer may comprise either a combination of fibers comprising the above-listed materials or fibers which themselves comprise a combination of the above-listed materials.

[0022] Methods of making nonwovens are well known in the art. Generally, these nonwovens can be made by air-laying, water-laying, meltblowing, comforming, spunbonding, or carding processes in which the fibers or filaments are first cut to desired lengths from long strands, passed into a water
In addition to the fibres used to make the substrate, the substrate can comprise other components or materials added thereto as known in the art, including binders, dry strength and lint control additives.

In a preferred embodiment the cleaning substrate is a partially hydrophobic nonwoven. By “partially hydrophobic” it is meant herein that the nonwoven at least partially comprises hydrophobic material. Preferably the nonwoven substrate comprises at least about 40%, more preferably at least about 50%, even more preferably from about 55% to about 75% hydrophobic material. Hydrophilic materials are generally based on synthetic organic polymers. Suitable hydrophobic materials herein are selected from the group consisting of synthetic organic polymers such as, acrylic fibers, modacrylic fibers, polyamide fibers, polyester fibers, polyolefin fibers, polyethylene foam, polyurethane foam, and combinations thereof. Examples of suitable synthetic materials include acrylics such as acrylic, creslan, and the acrylonitrile-based fiber, orlon; polyamides such as nylons (e.g., nylon 6, nylon 66, nylon 610, and the like); polyesters such as terephthalate fiber, polyethylene terephthalate fiber, dacron; polyolefins such as polypropylene, polyethylene, and polyurethane foams. Preferably, said hydrophobic materials herein are selected from the group consisting of polyamides, polyethylene terephthalate, and polyolefins. More preferably said partially hydrophobic nonwoven of said cleaning layer comprises a carded, hydroentangled substrate comprising 60% polypropylene and 40% rayon fibres.

Hydrophobic materials suitable for the cleaning layer are selected from the group consisting of cellulosic nonwovens, non-loyfny nonwovens, and absorbent nonwovens and combinations thereof. Preferably the substrate of the cleaning layer in this embodiment is a non-loyfny nonwoven substrate.

The substrate preferably has a weight of from about 20 gm⁻² to about 200 gm⁻². More preferably, the substrate has a weight of at least about 20 gm⁻² and more preferably less than about 150 gm⁻², preferably the base weight is in the range of about 20 gm⁻² to about 120 gm⁻², and most preferably from about 30 gm⁻² to about 110 gm⁻². The substrate may have any caliper. Typically, when the substrate is made by hydroentangling, the average substrate caliper is less than about 1.2 mm at a pressure of about 0.1 pounds per square inch. More preferably the average caliper of the substrate is from about 0.1 mm to about 1.0 mm at a pressure of about 0.1 pounds per square inch (about 0.007 kilograms per square meter). The substrate caliper is measured according to standard EDANA nonwoven industry methodology, reference method #30.4.89.

In the most preferred embodiment according to the present invention said cleaning layer is a carded, spunlaced partially hydrophobic nonwoven.

In another preferred embodiment according to the present invention said partially hydrophobic nonwoven of said cleaning layer consists of at least about 40%, preferably of from about 50% to about 75%, more preferably of from about 55% to about 65% of synthetic fibres.

The Scrubbing Layer

As defined above, the scrubbing layer provides a comparatively more abrasive surface than the cleaning layer and as such is useful in scrubbing food residue/soil, especially tough to remove residue/soil, from dishware. The abrasive nature of the layer may be provided by a substrate which is inherently abrasive or a substrate wherein the abrasiveness is provided by additional elements adhered or in some way fixed to the substrate.

In one embodiment of the present invention the scrubbing substrate comprises an abrasive net of fibres, otherwise known as a scrim. By the term ‘net’ it is meant a structure made directly from melts or fibres which are at least 0.2 mm long and are held together by systems other than hydrogen bonding. The fibres may be selected from metal, natural or synthetic wires, filaments or stands or mixtures thereof as long as the resulting web provides a surface which is more abrasive than the cleaning substrate. Preferred fibres are selected from those of synthetic organic origin, more preferably from polymeric synthetic organic origin and thermoplastic polymers. The fibres are preferably selected from polyamide, polyethylene, polypropylene fibres and mixtures thereof.

The fibres may be randomly arranged, but are preferably ordered. The net may be made using any known process, including those described above for preparing nonwoven substrates. In a preferred embodiment the fibres are arranged in an open lattice wherein the fibres are, for example, knitted or extruded together to form the net. In a particularly preferred embodiment of the present invention the scrubbing substrate comprises a polymeric mesh, scrim or combinations thereof. In an alternative embodiment the scrubbing layer may be made from a web which is macroscopically expanded. By the term ‘macroscopically expanded, we mean webs which have been caused to conform to the surface of a three-dimensional forming structure so that both surfaces thereof exhibit a three-dimensional forming pattern of surface aberrations corresponding to the macroscopic cross-section of the forming structure, wherein the surface aberrations comprising the pattern are individually discernible to the normal naked eye (i.e., normal naked eye having 20/20 vision) when the perpendicular distance between the viewer’s eye and the plane of the web is about 12 inches. For example the web may be embossed, meaning that the web exhibits a pattern comprised primarily of male projections. On the other hand, the web may be debossed, meaning that the web exhibits a pattern comprised primarily of female capillary networks. As with the cleaning substrate it is highly preferred that the scrubbing substrate is flexible and even more preferably the substrate is also resilient meaning that once applied pressure has been removed the substrate regains its original shape.

In an alternative embodiment the scrubbing layer may be a nonwoven substrate as described above comprising a layer of thermoplastic nubs or hooks are melded onto one surface of the substrate, the surface comprising said nubs or hooks forming the scrubbing layer. A suitable thermoplastic material for use as abrasive coating is selected from the group consisting of thermoplastic polymers preferably including: polyethylene and polyethylene copolymers; polypropylene; and polyethylene terephthalate. Preferably, said thermoplastic material is a hot melt adhesive. Suitable
hot melt adhesives are commercially available from HB Fuller under the trade names NW1034® or HL1014X®. Furthermore, suitable hot melt adhesives are commercially available under the trade name H2128® from Ato F indley.

0034 Preferably said nubs or hooks have a substantially globular shape having a diameter of at least about 200 micro-meter, preferably a diameter of from about 300 to about 600 micrometer, more preferably of from about 300 to about 500 micrometer. The abrasive coating of thermoplastic material nubs or hooks is preferably applied onto said scrubbing substrate by screen printing.

0035 The cleaning and scrubbing substrates are preferably attached, potentially reversibly attached, to one another. The point of attachment can be at any point over the surface of the wipe, as long as the scrubbing substrate(s) and cleaning substrate(s) are attached to one another. Even more preferably the cleaning and scrubbing substrates are attached to one another around the perimeter of the scrubbing and/or cleaning substrates. The substrates may be attached to one another using any commonly known method, for example using heat sealing, adhesive, ultrasonic sealing, stitching and combinations thereof. Preferably the substrates are attached to one another using heat sealing. Even more preferably the substrates are attached to one another, by a combination of heat sealing around the perimeter of the substrate and dot heat sealing, preferably in a pattern, across the surface area of the wipe. Where heat sealing is used, it is necessary that the cleaning and/or scrubbing substrate comprise thermoplastic polymers. The greater the content of thermoplastic polymers the stronger is the sealing.

0036 Additional Layers

0037 Optionally, but preferably the substrate may comprise one or more additional layers located between said cleaning layer and said scrubbing layer.

0038 In one preferred embodiment the wipe comprises an additional layer made from a loft substrate, more preferably a batting substrate. Batting is defined according to the TAPPI Association of the Nonwoven Fabrics Industry as a soft bulky assembly of fibres. Batting preferably comprises synthetic materials as described in more detail above.

0039 Preferred fibers of the cleaning substrate are those susceptible of heat sealing. In a particularly preferred embodiment the cleaning substrate comprises a combination of single component and bicomponent fibres. More specifically it is preferred that the cleaning substrate comprises polyester single component fibres and polyester core, polyethylene sheath bicomponent fibres.

0040 The batting may also comprise natural fibers. Suitable natural fibers are described above.

0041 In a further preferred embodiment according to the present invention, the water-insoluble substrate herein additionally comprises a substantially water-impermeable layer again located in-between said cleaning layer and said scrubbing layer. By ‘substantially water-impermeable’ it is meant herein that the layer has a low but not significant level of permeability for water.

0042 Preferably, said substantially water-impermeable layer is a plastic film more preferably a plastic film made from linear low density polyethylene (LDPE) and metalloene catalyzed low density polyethylene. Preferably, said plastic film has a thickness of about 0.8 mm. Preferably, said third water-impermeable layer has an embossed micropattern. It has been found that such an embossed micropattern provides low noise during use. A suitable material for said water-impermeable layer is commercially available from Tregedar under the trade name EMB-6685®.

0043 Graphics, Active and Permanent

0044 The water-insoluble substrate according to the present invention is printed, coated with or has applied thereto an active graphic. By the term ‘active graphic’ it is meant a disappearing, fading, appearing, reappearing or otherwise changing graphical representation. The wipes of the present invention are disposable. They comprise a pre-defined quantity of cleaning composition and are therefore intended to be discarded when the cleaning composition has been exhausted. Traditionally the consumer has believed that the presence of Suds in the dishwashing water is a signal of the activity of the cleaning composition. However, this is an inaccurate assumption. The cleaning composition is still active in the dishwashing water even when the Suds have disappeared. The present invention provides an alternative signal to the user of when the wipe should be exchanged for a new one and thus new detergent added to the washwater.

0045 The active graphic can also be used to indicate other changes in the wipe. For example, the release of a new or specific ingredient into the wash water or the dissolution of a second or subsequent cleaning composition. The trigger for the change in the graphic may for example be the release of an ingredient from the composition, the depletion of an ingredient, the change in temperature or pH brought about by the release of an ingredient.
described ink types in half tones. By the term “printing in half tones” it is meant printing the ink in the form of very small dots, the combination of which provide the viewer with overall graphical representation. The dots can be various colours, shades of colour, size or shape. The smaller and lighter shade dots will thus tend to fade or become solubilised faster than the larger or stronger shade dots. The result is a change in shade, colour, shape or overall appearance of the graphic through use.

[0047] Equally it is envisaged that the graphic may be printed using two or more inks, such that the change in the visual appearance of the graphic over use may be one of a change the format of the graphic as opposed to an appearance, disappearance or change in colour or tone. It is envisaged that the substrate may be printed with 1 repeating graphic or alternatively may be printed with 2 or more different graphics. Those graphics, may be printed with the inks or combinations of inks, or indeed may be printed with different inks.

[0048] The active graphic may be in any form, but may include the brand name of the wipe; the manufacturers name; graphic elements, like stripes, circles, dots; a character, for example a cartoon character depicting how to use the wipe; a graphic connoting dishwashing, for example bubbles; a graphic representation of the scent of the wipe, for example lemons on a wipe comprising lemon-scented cleaning composition; a word, for example the name of a particular ingredient indicating to the consumer that that ingredient is now active e.g. bleach; an instruction, for example an instruction to use the cleaning side of the wipe for cleaning glassware and other delicate items or an instruction on the scrubbing layer of the wipe indicating its use for cleaning tough to remove soils; and mixture thereof.

[0049] The water-insoluble substrate may also be printed with a permanent graphic. By the term “permanent graphic” it is meant a graphic that does not disappear, visibly fade or change in visual appearance during the use of the wipe. This can be achieved by selecting specific ink compositions that neither partially nor totally dissolve, do not visibly fade during use and are substrate substantive. This is achievable owing to the chemical composition of the ink as well as the successful adhesion of the ink onto the fibers of the substrate. Alternatively this can be achieved by coating the ink with an additional chemical to “seal” the ink and to both protect it from the wipe cleaning composition ingredients and from the rub-off due to friction in-use. Thus the wipe may comprise a combination of an active and permanent graphic, wherein the active graphic changes during use of the wipe, whereas the permanent graphic remains the same through use.

[0050] The graphics may be printed onto the water-insoluble substrate using known techniques. Such processes include flexographic printing, ink-jet printing, screen printing, thermal transfer printing, or rotogravure printing. Flexographic printing is preferable because of the suitability of the method in printing soft substrates as well as considering the speed of the production and cost factors. The flexographic printing process uses a raised printing surface made of flexible material to transfer an ink image to the substrate. The flexible surface is able to transfer a good image even to a rough substrate web. A liquid ink is used which may be solvent or water based, and dries mainly by evaporation and the printing may be made in either mono-color or multi-color.

[0051] The graphic may be printed in one or several colours or different shades of the same colour. In one embodiment wipe may also be printed with a permanent graphic or may comprise a coloured cleaning composition. In said embodiment, the active graphic, permanent graphic and/or cleaning composition can be the same or individually different colours.

[0052] Preferred inks are those that solubilise on contact with water over a period of time or rub-off during use of the wipe. Preferred inks are those that are sufficiently solubilised or are rubbed-off during the test described below to produce a colour difference, ΔE, of greater than 10. Preferably the ΔE value is greater than 12, more preferably greater than 15, even more preferably greater than 20.

[0053] The ΔE value can be determined using the test method described in U.S. Pat. No. 5,458,59 issued Oct. 17, 1995 to Kimberly-Clark, column 8, line 54 to column 10, line 49. This test method essentially consists of rubbing the sample substrate printed with an ink onto a reference white cloth and measuring the level of colour transferred onto this reference cloth via a hunter colorimeter as a ΔE value. The more ink that is transferred from the sample substrate onto the reference cloth and hence the more the ink fades or disappears, the higher the ΔE value. Examples of inks which are not suitable as described above are Sunchemical inks XO-92 (tradename) and Sunpli (tradename) as well as Markem’s ink know as Touch dry (tradename). These inks result in a ΔE value of less than 10. Examples of suitable types of ink for use herein include

<table>
<thead>
<tr>
<th>Ink Tradename</th>
<th>Color</th>
<th>Manufacturer</th>
<th>Fading Degree</th>
<th>Wet Rub-off as ΔE</th>
</tr>
</thead>
<tbody>
<tr>
<td>XO-92</td>
<td>Light Blue</td>
<td>Sun Chemical</td>
<td>minimally visible</td>
<td>2.48</td>
</tr>
<tr>
<td>Sunpli</td>
<td>Blue</td>
<td>Sun Chemical</td>
<td>slightly visible</td>
<td>5.67</td>
</tr>
<tr>
<td>Touch Dry</td>
<td>Black</td>
<td>Markem</td>
<td>little slightly visible</td>
<td>5.95</td>
</tr>
<tr>
<td>Hydroplast</td>
<td>Blue</td>
<td>Sun Chemical</td>
<td>Visible</td>
<td>11.76</td>
</tr>
<tr>
<td>Insulor cup in</td>
<td>Blue</td>
<td>Sun Chemical</td>
<td>Visible</td>
<td>12.06</td>
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<tr>
<td>25Q R-6</td>
<td>Blue</td>
<td>Sun Chemical</td>
<td>Visible</td>
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<td>Visible</td>
<td>19.51</td>
</tr>
<tr>
<td>Aquabond AP</td>
<td>Blue</td>
<td>Sun Chemical</td>
<td>largely visible</td>
<td>25.44</td>
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<tr>
<td>NexoPro</td>
<td>Blue</td>
<td>Sun Chemical</td>
<td>largely visible</td>
<td>25.44</td>
</tr>
</tbody>
</table>

[0054] Preferably the ink is non-toxic to both humans and animals. Other suitable inks are those available from Chromatic Technologies Inc. under the tradename Dynacolor Thermachrome Inks. Said inks are temperature sensitive inks that change colour when exposed to different temperatures. For example the available dyes for use in flexographic printing change from being coloured in cold conditions, to being colourless in warm conditions. The temperature of activation of the change in colour of the ink can be customised depending on the use requirement, as is generally from -5 to 65° C.

[0055] The wipes of the present invention are intended for use in the direct application method of dishwashing, wherein the user applies water to the wipe and/or to the dishware and
then applies the wipe to the dishware. The wipe is not immersed in water. Wipes with the active graphics of the present invention can however be applied to wipes that are intended for use in the full sink method of dishwashing wherein the wipe and/or the dishware are full immersed in a sink or bowl of water. In this embodiment the selection of inks can be a little different. For example an ink according to the above test that has a ΔE value of less than 10 may be useful, since the wipes are subjected to more rigorous conditions in use. Hence when the wipe is intended for use in a full sink dishwashing method, the wipes preferably comprises an ink which has a ΔE value of less than 10, such as Sunpli. The graphic may be printed on to either outside surface of the wipe or alternatively may be reverse printed onto the backside (i.e. internal facing surface of the wipe) of the outer layers of the substrate as long as the graphic is discernible through the layer of substrate. The graphic can alternatively be printed onto a plastic film (either on the internal or external surface) that is then laminated (thermally or by other mechanical and/or chemical means) onto one of an outer surface of the wipe so that the graphic is clearly visible on or through the thin layer of the clear or semi-clear plastic film. The graphic may also be printed onto an internal (additional) layer of the substrate, as long as the graphic is discernible through the outer layer. For example the graphic may be printed onto a layer directly underlying the scrubbing layer scrim and is thus visible through the mesh like web of the scrim.

[0056] It is also envisaged that the active graphic may in fact be provided by the cleaning composition itself, when the cleaning composition comprises a dye. In this embodiment the graphic is printed using rotogravure, ink-jet or screen printing techniques. The cleaning composition may be printed onto an internal layer of the substrate, may be printed onto a internal surface of one of the outer layers, may be printed onto an external surface of one of the outer layers and optionally covered with a coating layer made of a suitable varnish or lacquer. Change of the graphic is achieved on dissolution of the cleaning composition.

[0057] Cleaning Composition

[0058] The wipes of the present invention comprise a cleaning composition. All levels (weight %) of the ingredient(s) of the cleaning composition herein are given for the cleaning composition as applied onto one or a multitude of the layers of the substrate herein. It has been observed, that upon storage solvents, such as water, when present, or other volatile compounds, when present, may evaporate. This will lead to an increase in the concentration of the non- evaporating compound(s) of the cleaning composition. Furthermore, the solvents, when present, evaporation will lead to a change in the rheology and morphology of said cleaning composition.

[0059] In a preferred aspect of the present invention the composition is in the form of a paste. By ‘paste’ it is meant herein that the material is in a solid state and does not continuously change its shape when subjected to a given yield stress.

[0060] The cleaning composition, preferably cleaning paste herein may be applied onto said cleaning layer, said scrubbing layer and/or optional additional layer(s), when present. Furthermore, the cleaning composition herein may be applied onto the interior and/or exterior surfaces of one or several layer(s) of the substrate of the wipe.

[0061] The cleaning composition herein may be equally distributed over the full surface of the layer(s) it is deposited on or applied onto a part of the surface of the layer(s) it is deposited on. In a preferred embodiment, the cleaning composition is applied onto parts of at least one of the layers herein, preferably an internal layer, in a stripe pattern. More preferably, said stripe pattern comprises at least 1 stripe, preferably of from about 1 to about 6 stripes, more preferably about 3 to about 6 stripes, and even more preferably about 5 stripes. Preferably, the stripe or stripes of the stripe pattern extend over the full length of the substrate. The stripe or stripes of the stripe pattern may have a width of at least about 3 mm, preferably of from about 5 mm to about 15 mm.

[0062] In a particularly preferred embodiment of the present invention, the cleaning composition comprises a colouring agent, for example ink, dye or pigment. The cleaning composition may comprise one colouring agent and thus all be the same colour. Alternatively however it is also envisaged that different stripes of the cleaning composition may be differently coloured. Additionally different coloured stripes of cleaning composition could be used to indicate the presence of different ingredients in the cleaning composition. For example a bleach-containing stripe of cleaning composition may be differently coloured to a surfactant- or enzyme-containing cleaning composition stripe. It is envisaged that the cleaning composition may be the same or similar colour to the active and/or permanent graphic. Alternatively it is also envisaged that the cleaning composition, active and/or permanent graphic may be individually different colours. In a preferred embodiment herein, the cleaning composition herein covers at least about 30% of the surface of at least one of the layers herein, preferably, the cleaning composition herein covers of from about 40% to about 60% of the surface of at least one of the layers herein.

[0063] The wipes of the present invention comprise from about 10% to about 1,000%, preferably from about 50% to about 600%, and more preferably from about 100% to about 250%, based on the weight of the water insoluble substrate, of the cleaning composition. The wipes of the present invention preferably comprise at least about 4.5 grams of said cleaning composition.

[0064] Optional Ingredients of Cleaning Composition

[0065] Surfactant

[0066] The cleaning composition of the present invention may comprise a surfactant or a mixture thereof. Preferably, said surfactant is selected from the group consisting of: anionic surfactant, amphoteric surfactant, nonionic surfactant, zwitterionic surfactant, and mixtures thereof.

[0067] Suitable anionic surfactants are those commercially available surfactants typically used in dishwashing composition. Especially preferred anionic surfactants are those selected from alkyl, alkyl aryl, alkyl alkoxy sulphates, sulphonates, carboxylates and mixtures thereof. Especially suitable anionic surfactants for use in the compositions herein include water-soluble salts or acids of the formula ROSO₃M or RO(A)nSO₃M wherein R preferably is a C₈-C₂₀ linear or branched hydrocarbyl, preferably an alkyl or hydroxyalkyl having a C₁₀-C₂₀ alkyl component, more preferably a C₁₀-C₁₄ alkyl or hydroxyalkyl, A is an ethoxy or propoxy unit, m is greater than zero, typically between about 0.5 and about 5, more preferably between about 0.5 and
about 2, and M is H or a cation, e.g., an alkali metal cation or ammonium or substituted ammonium, but preferably sodium.

[0068] Amphoteric surfactants are preferred additional surfactants. The amphoteric surfactants useful in the present invention are preferably selected from amine oxide surfactants.

[0069] Amine oxides are semi-polar nonionic surfactants and include water-soluble amine oxides containing one alkyl moiety of from about 10 to about 18 carbon atoms and about 2 moieties selected from the group consisting of alkyl groups and hydroxyalkyl groups containing from about 1 to about 3 carbon atoms;

[0070] Other suitable, non-limiting examples of amphoteric detergent surfactants that are useful in the present invention include amido propyl betaines and derivatives of aliphatic or heterocyclic secondary and tertiary amines in which the aliphatic moiety can be straight chain or branched and wherein one of the aliphatic substituents contains from about 8 to about 24 carbon atoms and at least one aliphatic substituent contains an anionic water-solubilizing group.

[0071] Preferred nonionic detergent surfactants are the condensation products of aliphatic alcohols with from about 1 to about 25 moles of ethylene oxide. The alkyl chain of the aliphatic alcohol can either be straight or branched, primary or secondary, and generally contains from about 8 to about 22 carbon atoms.

[0072] Other suitable nonionic surfactants include the alkylpolyglycosides have the formula

\[ R^1\text{O}(\text{glycosyl})_n \]

wherein \( R^1 \) is selected from the group consisting of alkyl, alkyl-phenyl, hydroxyalkyl, hydroxyalkylyphenyl, and mixtures thereof in which the alkyl groups contain from about 10 to about 18, preferably from about 12 to about 14, carbon atoms; \( n \) is about 2 or about 3, preferably about 2; \( t \) is from 0 to about 10, preferably 0; and \( x \) is from about 1 to about 10, preferably from about 1.3 to about 3, most preferably from about 1.3 to about 2.7. The glycosyl is preferably derived from glucose.

[0074] The surfactant component of the cleaning composition may comprise of from about 15% to about 100%, preferably of from about 20% to about 85%, more preferably of from about 25% to about 60% by weight of the total cleaning composition of surfactant.

[0075] Water

[0076] The cleaning composition preferably comprises from about 0.01% to about 20%, preferably of from about 2% to about 15%, more preferably of from about 5% to about 12% by weight of the total composition of water. As outlined above, water may evaporate from the cleaning composition once applied onto the substrate.

[0077] Water Transfer Agent

[0078] An optional ingredient of the composition is a water transfer agent which acts as a structurant. Suitable water transfer agents are particulate materials which are capable of absorbing free water from the composition, in particular free water associated with the surfactant and/or the bleach. The water transfer agent is capable of withdrawing water from the surfactant. By "capable of withdrawing water from the surfactant" it is meant that there is a greater affinity between water and the water-transfer agent than there is between water and the surfactant.

[0079] In a preferred embodiment of the invention the water-transfer agent is selected from the group consisting of inorganic oxides and salts, especially hydratable oxides and salts, in particular oxides and salts of silicon, aluminium, zinc, boron, phosphorus, alkaline earth metals and alkali metals and mixtures thereof. Examples include silicates, silicic acid and silica, citric acid, citrates, sodium and potassium tripolyphosphates, sodium and potassium sulphates, magnesium and calcium sulhates. Preferably, the water-transfer agent is selected from the group consisting of silica, salts of magnesium and mixtures thereof.

[0080] More preferably the water-transfer agent is silica, preferably amorphous fumed silica. Hydrophobic silica does not act as water transfer agent as it does not possess the necessary hydrophilicity. Preferably the water transfer agent has surface area measured by BET (described in DIN 66131 and as originally described in JACS, Vol. 60, 1938, p309 by Brunauer, Emmet and Teller) of from 5 to 800 m²/g. More preferably the water-transfer agent has a surface area of from 100 to 400 m²/g. In an alternative preferred embodiment, the silica has an average particle size of from 0.05 to 1 μm, preferably from 0.2 to 0.3 μm.

[0081] Preferably the composition applied to the substrate comprises from 2.5 to 15% water-transfer agent, more preferably 5 to 10% and most preferably about 6%.

[0082] Bleach

[0083] In a particularly preferred embodiment of the present invention the cleaning composition or at least one cleaning composition if several are present, comprises a bleach or bleach system. Any bleach known for detergent use may be used, as appropriate. In the first aspect of the invention the bleach is a peroxy carboxylic acid bleach or a hydrophilic precursor thereof. Preferably the bleach is chosen from aliphatic C₃₋C₈ peroxy carboxylic acids and precursors thereof, in particular aliphatic C₆ t o C₁₆ peroxy carboxylic acids and precursors thereof. Particularly suitable peroxy carboxylic acids in this class include permonanoic acid, n-nonanoyl-6-aminoperacapoic acid and diperoxodecanoic dicoic acid.

[0084] Other preferred bleaches are aromatic C₇ to C₃₀ peroxy carboxylic acids and precursors thereof, preferably C₁ to C₁₀, heteroaromatic peroxy carboxylic acids. Particularly preferred examples include phthalimidoperoxyhexanoic acid (PAP), described in EP-A-349940, and other compounds of the formula:

\[
\begin{align*}
\text{O} & \quad \text{O} \\
\text{N-(CH₂)} & \quad \text{COOH}
\end{align*}
\]

[n] in which n can be from 1 to 18. In PAP n is 5.

[0086] Other preferred aromatic bleaches are substituted perbenzoic acids (e.g. meta-chloroperoxybenzoic acid, magnesium monoperoxyphthalate).
The bleach system may also comprise other components such as bleach activators to boost the action of the bleach. Examples of bleach activators are tetracetyl ethylene diamine (TAED), NOBS, acyl triethyl citrate, nonylamide of peracidic acid (e.g. as discussed in U.S. Pat. No. 4,259,201), sodium 3,5,5-trimethylhexanoyloxybenzene sulfonate (e.g. as discussed in U.S. Pat. No. 4,818,425), N-acetyl caprolactams (acetolundecanoyl caprolactams), imine and oxaziridine based bleach activators.

In another aspect of the invention, the bleach is a hydrophilic bleach or precursors thereof. Preferably, the hydrophilic bleach is a peracetic acid, percarbonic acid, hypochloric acid or a hypobromite acid; salts thereof; or precursors thereof. Hydrophilic bleaches and precursors thereof have been found to provide excellent cleaning performance in removing highly coloured soils, especially carotenoid soils, from plastic dishes. Carotenoid soils, such as α-, β-, γ-carotene and lycoene and xanthophylls (zeaxanthin or capsanthin), are derived from carrots and tomatoes and in any processed products containing these components, as well as certain tropical fruits and saffron.

Exothermically hydrating salts, such as for example K₂CO₃ or MgSO₄, may be used in combination with these hydrophilic bleaches, to generate heat when contacted with water, to increase the bleach activity.

The total amount of bleach in the composition applied to the substrate can range from 1 to 30%, preferably 3 to 20%, by weight of composition.

We find that the inclusion of bleach in the wipe provides the benefit of reduction of malodor. In particular, we find that inclusion of bleach reduces malodor from the wipe itself, which can otherwise arise after one or more uses.

In the present invention the bleach acts by formation of a peroxy anion. Thus it does not act by means of a free radical reaction (the composition applied to the substrate generally does not contain free radical initiators). The composition applied to the substrate is thus preferably such that in use it provides an alkaline aqueous environment, generally of pH from 8 to 12, preferably 8 to 10.

Diamines

An optional although preferred ingredient of the cleaning composition according to the present invention when used as a hand dishwashing wipe, is a diamine.

The cleaning composition will preferably contain at least about 0.1%, more preferably at least about 0.2%, even more preferably, at least about 0.25%, even more preferably still, at least about 0.5% by weight of said composition of diamine. The composition will also preferably contain no more than about 15%, more preferably no more than 10%, even more preferably, no more than about 6%, even more preferably, no more than about 5%, even more preferably still, no more than about 1.5% by weight of said composition of diamine.

Preferred organic diamines are those in which pK1 and pK2 are in the range of about 8.0 to about 11.5, preferably in the range of about 8.4 to about 11, even more preferably about 8.6 to about 10.75. Preferred materials for performance and supply considerations are 1,3-bis(m-ethylamine)-cyclohexane (pK1=10.5, pK2=8.8), 1,6 hexane diamine (pK1=11, pK2=10), 1,3 pentane diamine (Dytek EP) (pK1=10.5, pK2=8.9), 2-methyl 1,5 pentane diamine (Dytek A) (pK1=11.2, pK2=10.0). Other preferred materials are the primary/primary diamines with alkylenec spacers ranging from about 4 to about 8. In general, it is believed that primary diamines are preferred over secondary and tertiary diamines.

The diamines useful herein can be defined by the following structure:

\[
\begin{align*}
R_2 & - N - C_2 & N - \text{Alkyl - } N & A & N \\
R & & R & & R
\end{align*}
\]

wherein R₂₋₅ are independently selected from H, methyl, -CH₂, and ethylene oxides, C₃ and C₄ are independently selected from methylene groups or branched alkyl groups where x+y is from about 3 to about 6; and A is optionally present and is selected from electron donating or withdrawing moieties chosen to adjust the diamine pKₐ's to the desired range. If A is present, then x and y must both be about 1 or greater.

Polymeric Suds Stabilizer

The cleaning composition of the present invention may optionally contain a polymeric suds stabilizer. These polymeric suds stabilizers provide extended suds volume and suds duration without sacrificing the grease cutting ability of the liquid detergent compositions. These polymeric suds stabilizers are selected from:

- homopolymers of (N,N-dialkylamino)alkyl acrylate esters having the formula:

\[
\begin{align*}
R & - \text{H} & - \text{NH} & \text{CH} & \text{CH}_2 & \text{O} & \text{O} & \text{R}
\end{align*}
\]

wherein each R is independently hydrogen, C₁-C₈ alkyl, and mixtures thereof; R¹ is hydrogen, C₁-C₈ alkyl, and mixtures thereof, n is from about 2 to about 6; and

- copolymers of (i) and
wherein R¹ is hydrogen, C₁-C₆ alkyl, and mixtures thereof, provided that the ratio of (ii) to (i) is from about 2 to about 1 to about 1 to about 2; Another preferred polymeric suds stabilizer is a copolymer of (i) and hydroxy ethyl acrylate or hydroxy propyl acrylate.

The molecular weight of the polymeric suds boosters, determined via conventional gel permeation chromatography, is from about 1,000 to about 2,000,000, preferably from about 5,000 to about 1,000,000, more preferably from about 10,000 to about 750,000, more preferably from about 20,000 to about 500,000, even more preferably from about 35,000 to about 200,000. The polymeric suds stabilizer can optionally be present in the form of a salt, either an inorganic or organic salt, for example the citrate, sulfate, or nitrate salt of (N,N-dimethylamino)alkyl acrylate ester.

One preferred polymeric suds stabilizer is (N,N-dimethylamino)alkyl acrylate esters, namely

When present in the cleaning composition herein, the polymeric suds booster may be present in the composition from about 0.01% to about 15%, preferably from about 0.05% to about 10%, more preferably from about 0.1% to about 5%, by weight.

Other Optional Ingredients

The cleaning composition may comprise additional ingredients selected from the group consisting of thickening polymers, film-forming polymers, cyclodextrin, colorants, perfume and perfume delivery agents, stabilizers, solvents, density control agents, drying agents, hydrotropes, salt, solidification agents, preservation agents, water spotting/filming/drying control agents, and mixtures thereof.

Thickening polymers may be employed to impart increases in the yield value or shear viscosity at a given shear rate. They may also improve smear and extrusion properties due to their viscoelastic nature in concentrated surfactant products. They also may assist in achieving the desired processing properties for such requirements as during application of the surfactant system to the substrate (die extension). Preferred examples of thickening polymers include those that have anionic side chains, and/or side chains which are anionic when in the cleaning composition itself, and preferably has a pKa in the range of 4 to 20.

Thus the side chains may be acid groups provided that the pKa of those acid groups is sufficiently low that under the pH conditions prevailing in the cleaning composition they are in the solv form. Generally acid groups having pKa 8.5 or below form anionic side chains in the cleaning composition and preferably pKa is not more than 8. Generally it is at least 4 and is preferably from 4 to 7. The side chains can be for instance carboxylate, sulfate or sulfonate and the polymer can be provided to the composition in the acid or the salt form provided that the salt form is present in the composition. Particularly preferred polymers include xanthan gum, cellulose, modified cellulose, guar gum, gum Arabic, polysaccharides, polyvinyl alcohols, polyvinyl pyrrolidone and mixtures thereof. An example of a thickening polymer is polyacrylic acid, commercially available as Carbopol ETD2623® from Noveon. The preferred polymeric suds stabilizer is polyvinyl alcohol (PVA). The anionic charge is then formed in the composition by deprotonation of the hydroxyl groups, converting them to alkoxide groups having a pKa of between 8 and 14. The PVA preferably has a molecular weight of between 10,000 and 60,000 daltons, and is preferably partially hydrolysed to improve its dispersibility in the cleaning composition. The degree of hydrolysis is preferably 85% to 90%. In the partially hydrolysed form, PVA has both anionic and hydrophobic characteristics that are surfactant-like, resulting in excellent sudsing characteristics.

Film forming polymers may be employed to inhibit surfactant release, water migration, or prevent undesired environmental influences on the stability of the one or more components of the surfactant present in the cleaning composition. An example of a film forming polymer is polyvinylpyrrolidone (PVP) commercially available as Molviol brand® from Clariant.

Cyclodextrin may be used to encapsulate peroxo carboxylic acid bleach or hydrophilic peroxo carboxylic acid bleach precursor. This can also provide the benefit of controlling release of bleach over time. Any of the known cyclodextrins can be used, for instance α-cyclodextrin, β-cyclodextrin and γ-cyclodextrin, with hydroxypropyl-beta-cyclodextrin and methyl-beta-cyclodextrin being preferred.

Stabilizers may be employed to protect one or more components of the surfactant system. Stabilizers may include butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA), sodium benzoate for radical scavenging, benzophenone-4 for color stability, and silicates for undesired surfactant aging. Benzophenone-4 is commercially available as UVINUL® MS-40 from BASF.

Solvents may be employed to control the phase chemistry of the surfactant system. Solvents examples such as polyethylene glycol, polypropylene glycol, and polybutylene glycol available from Dow Chemical.

Density control agents may be employed to modify the density of the phase(s) to improve stability. An example of a suitable density control agent is air or sodium sulfate available from Saskatchewan Minerals.

Drying agents may be employed to improve the aging and final properties of the surfactant. An example of a drying agent to bind free water is magnesium sulfate available from Aldrich.

Hydrotropes may be employed to modify the phase chemistry to improve stability or modify dissolution properties of the surfactant. An example of a hydrotrope is sodium cumene sulfonate Naxonate SC® available from Rutgers Organics.

Salts may be employed to modify the phase chemistry to improve stability or modify dissolution properties of the surfactant. Preferably, the salt added is a magnesium and/or calcium salt in order to provide magnesium and/or calcium to the cleaning composition. An example of a salt is magnesium chloride available from Dow Chemical.
Solidification agents may be used to improve the solid properties and rheology of the final surfactant. An example of a few solidification agents are stearyl alcohol sulfates (Lanette® available from Cognis), stearyl alcohols available from P&G Chemicals, fatty acids like stearic acid available from P&G Chemicals, PEG 4000-20000 available from Dow Chemical/Union Carbide, sodium sulfate available from Saskatchewan Minerals, and the like.

Preservation agents may be employed to prevent microbial growth in the surfactant. An example of a preservation is methylchloroisothiazolinone/methylisothiazolinone mixture (Kathon CG/ICP-II® available from Rohm & Haas).

Water spotting and film control agents may be employed to improve the final rinsing and subsequent drying. An example of a water spotting/filming agent is a copolymer of acrylic acid and methacrylic acid (Acusol 44SN® available from Rohm and Haas). An example of a water drying agent is a tallow alcohol ethoxylate (18 mole EO) available from Texaco.

In a highly preferred embodiment according to the present invention, the cleaning composition additionally comprises 1,3-bisaminomethyl cyclohexane, magnesium and/or calcium ions, and poly(dimethylaminoethyl methacrylate) acetate.

Methods of Manufacture

The wipes of the present invention are manufactured by adding the cleaning composition to the preferably internal surface of the cleaning substrate layer or additional layers when present. The composition is added to the substrate by conventional methods that may include, but is not limited to, sprinkling, dip coating, spraying, slot coating, and roll transfer (e.g., pressure roll or kiss roll). The remaining layers are then placed on the top of the cleaning layer. The layers are preferably sealed together by heat seal coating. The sealed sheets are then partition into units for the consumer’s use. Optional manufacturing steps may include calendaring to flatten the article, drying, creping, shrinking, stretching, or otherwise mechanically deforming.

The graphic is preferably printed onto the external surface of the wipe. More preferably the graphic is printed onto the external surface of the cleaning layer of the wipe. The graphic may be printed onto the substrate using any know and convenient printing mechanism. Preferably the graphic is printed onto the substrate using the flexographic printing process.

Process of Cleaning Dishware

The present invention also encompasses a process of cleaning dishware, preferably to a process of cleaning dishware by hand.

This process comprises the steps of: a) wetting the wipe according to the present invention with water and b) contacting the dishware with the wetted wipe.

Additionally the process of cleaning dishware herein additionally comprises the step of mechanically agitating the wipe over said dishware (wiping) and/or rinsing said dishware with water.

In a preferred embodiment, the present invention also relates to a process of cleaning a hard surface, preferably a kitchen hard surface. The process of cleaning a hard surface comprises the steps of: a) wetting the wipe according to the present invention with water and b) contacting the hard surface with the wetted wipe. Additionally the process of cleaning a hard surface herein additionally comprises the step of mechanically agitating the wipe over said hard surface (wiping) and/or rinsing said hard surface with water.

The wipes of the present invention are water-activated and are therefore intended to be wetted with water prior to use. As used herein, “water-activated” means that the present invention is presented to the consumer in dry form to be used after wetting with water. Accordingly, the article is wetted by immersion in water or by placing it under a stream of water.

EXAMPLES

The following examples further describe and demonstrate embodiments within the scope of the present invention. In the following examples, all ingredients are listed at an active level. The examples are given solely for the purpose of illustration and are not to be construed as limitations of the present invention, as many variations thereof are possible without departing from the spirit and scope of the invention.

Prepare a representative disposable dish care and hard surface cleaning wipe article in the following manner:

Prepare a cleaning composition, which includes the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Alkyl Ethoxyx-0.9 Sulfate</td>
<td>63.62</td>
</tr>
<tr>
<td>C_{12-18} dimethyl amine oxide</td>
<td>14.41</td>
</tr>
<tr>
<td>C_{14-18} nonionic</td>
<td>4.97</td>
</tr>
<tr>
<td>Diamine(^\d)</td>
<td>1.0</td>
</tr>
<tr>
<td>Poly DMAM(^\d)</td>
<td>0.48</td>
</tr>
<tr>
<td>Polyvinyl alcohol</td>
<td>2.0</td>
</tr>
<tr>
<td>Perfume</td>
<td>2.0</td>
</tr>
<tr>
<td>Blue Dye</td>
<td>0.005827</td>
</tr>
<tr>
<td>Yellow Dye</td>
<td>0.0000684</td>
</tr>
<tr>
<td>Water</td>
<td>13.00</td>
</tr>
</tbody>
</table>

Diamine\(^\d\) is 1,3-bis (methylene)-cyclohexane.
Poly DMAM\(^\d\) is (N,N-dimethylinamino) ethyl methacrylate homopolymer.

Add the fumed silica to the surfactant premix while stirring continuously. Add the remaining aesthetic ingredi-
ents under agitation. The cleaning composition advantageously is easy to process with substrate layers and requires no further drying. The cleaning composition is applied to one side of the batting layer of the substrate by extruding it through a coating head continuously in five lines about 12 mm wide separated by a distance of 20 mm, measuring widthwise across the web, making parallel lines on each side of the web. The cleaning composition is extruded at a rate to yield 7.5 grams of cleaning composition per finished article.

[0140] The second layer that already carries the cleaning composition (see above) is continuously fed over the first substrate placing the first layer in contact with the surfactant-containing layer. The webs are continuously fed to an ultrasonic sealer, which seals a tilde shaped dot pattern comprising a grid of 8 mm long sealing points spaced evenly across the web. The web is cut into individual articles measuring about 120 mm×160 mm rectangles with rounded corners, which has a total of about 70 sealing points per article.

1. A disposable, nonwoven cleaning wipe comprising a water-insoluble substrate and a cleaning composition, wherein said water-insoluble substrate is printed, coated or has applied thereto, an active graphic.

2. A disposable wipe according to the preceding claim wherein the wipe additionally comprises a permanent graphic.

3. A disposable wipe according to claim 1 comprising an active graphic, permanent graphic and cleaning composition, wherein the active graphic, permanent graphic and cleaning composition are the same or individually different colours.

4. A disposable wipe according to claim 1, the wipe having opposing external faces and the active graphic being printed on one or both faces of the wipe.

5. A disposable wipe according to claim 1 wherein the active graphic is made using an ink selected from the group consisting of water-soluble inks, fading inks that are rubbed-off the substrate during use, pH sensitive inks, temperature-sensitive inks and mixtures thereof.

6. A disposable wipe according to claim 1 wherein the active graphic is made using an ink that is sufficiently solubilised or are rubbed-off to produce a colour difference, ΔE of greater than 10, more preferably greater than 12, more preferably greater than 15, even more preferably greater than 20.

7. A disposable wipe according to claim 1, wherein the graphic is printed with two or more inks of different colours.

8. A disposable wipe according to claim 7 wherein at least one ink is removed from the substrate at a faster rate than the other.

9. A disposable wipe according to claim 1 wherein the water insoluble substrate comprises a laminate structure, including at least a cleaning layer and a scrubbing layer.

10. A disposable wipe according to claim 9 wherein a graphic is printed on the outer facing surface of the cleaning layer and indicates the use of said surface.

11. A disposable wipe according to claim 1 wherein the cleaning composition is such that the wipe is substantially dry.

12. A disposable wipe according to claim 1 wherein the cleaning composition is in the form of a paste.

13. A disposable wipe according to claim 1 wherein the cleaning composition is coloured.

14. A process of cleaning dishware, preferably by hand, which comprises the steps of:

   a) moistening the disposable wipe according to claim 1 with water and b) contacting the dishware with said wetted wipe.