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(72) Inventors:
• **VAN ROMPAEY, Luc Raymond**
1853 Strombeek-Bever (BE)
• **YAMADA, Kaori**
Kobe, 651-0088 (JP)

(74) Representative: **P&G Patent Belgium UK**
N.V. Procter & Gamble Services Company S.A.
Temselaan 100
1853 Strombeek-Bever (BE)

(71) Applicant: **The Procter & Gamble Company**
Cincinnati, OH 45202 (US)

(54) **CONSUMER PRODUCT**

(57) Consumer product having a flexible package and at least one water-soluble unit dose article. The at least one water-soluble unit dose article comprises at least one water-soluble film orientated to create at least

one unit dose internal compartment. The at least one unit dose internal compartment comprises a detergent composition. The flexible package comprises paper-based material.

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Description

FIELD OF THE INVENTION

5 **[0001]** Consumer product comprising a package and at least one water-soluble unit dose article.

BACKGROUND OF THE INVENTION

10 **[0002]** Water-soluble unit dose articles are liked by consumers due to their convenience and ease of use. Water-soluble unit dose articles comprise a water-soluble film shaped to form at least one internal compartment which houses a single use dose of a detergent. Upon addition of the water-soluble unit dose article to water, the water-soluble film dissolves and/or disintegrates releasing the detergent into the surrounding water to produce a wash liquor.

[0003] Such water-soluble unit dose articles are generally stored and transported in rigid plastic containers or plastic bags. However, such rigid or flexible plastic containers may be undesirable for various reasons, including concerns for environmental sustainability and lack of consumer appeal.

15 **[0004]** Therefore, there is a need for a consumer product comprising a package, that protects the water-soluble unit dose articles and is environmentally friendly.

SUMMARY OF THE INVENTION

20 **[0005]** A consumer product comprising at least one water-soluble unit dose article disposed inside a flexible package; wherein the at least one water-soluble unit dose article comprises at least one water-soluble film orientated to create at least one unit dose internal compartment, wherein the at least one unit dose internal compartment comprises a detergent composition; and wherein at least a part of the flexible package is constructed from paper-based material (including materials containing cellulose and/or non-cellulose fibre).

25 **[0006]** In some embodiments, the paper-based material comprises a laminate comprising at least one paper-based layer.

[0007] In some embodiments, the laminate further comprises one or more plastic layers.

30 **[0008]** In some embodiments, the laminate comprises a paper-based layer and a plastic layer from the outside to the inside of the package.

[0009] In some embodiments, the paper-based layer is made from a cellulose-based pulp, and/or the plastic layer comprises polyethylene (PE).

[0010] In some embodiments, the paper-based layer is made from a cellulose-based pulp, and/or the plastic layer comprises polypropylene (PP).

35 **[0011]** In some embodiments, the laminate comprises a paper-based layer and a first plastic layer, and a second plastic layer from outside to inside.

[0012] In some embodiments, the paper-based layer is made from a cellulose-based pulp, and/or the first plastic layer comprises polyethylene terephthalate (PET) and/or the second plastic layer comprises polyethylene (PE) and/or polypropylene (PP).

40 **[0013]** In some embodiments, a metal layer is applied onto a plastic layer, preferably, the metal layer is a vacuum metal layer onto the plastic layer.

[0014] In some embodiments, a layer of polyamida (PA) is applied onto a PET layer in order to improve the strength of the package.

45 **[0015]** In some embodiments, the paper-based layer is characterized by a thickness ranging from 1 to 150 microns, or from 2 to 30 microns, or from 5 to 20 microns, or from 8 to 15 microns; and/or wherein the plastic layer is characterized by a thickness ranging from 5 to 100 microns, or from 10 to 80 microns, or from 15 to 60 microns, or from 30 to 50 microns.

[0016] In some embodiments, the package comprises one or more closure or locking mechanism selected from the group consisting of a zipper, a latch, a flap, a hook, and any combinations thereof, preferably the locking mechanism is a press to close zipper mechanism. It may be made of plastic.

50 **[0017]** In some embodiments, the water-soluble film comprises polyvinyl alcohol polymer or copolymer, and/or the detergent composition is a laundry detergent composition which preferably comprises a non-soap surfactant, a non-aqueous solvent and/or a perfume.

BRIEF DESCRIPTION OF THE DRAWINGS

55 **[0018]** The embodiments set forth in the drawings are illustrative in nature and not intended to limit the invention defined by the claims. The following detailed description of the illustrative embodiments can be understood when read in conjunction with the following drawings, and in which:

Figure 1 illustrates an embodiment of the opening mechanism according to the present disclosure. Particularly, the opening mechanism as shown is a perforation pattern which comprises 6 lines of v shape. An exemplary manufacturing process for this perforation pattern is to apply a perforation knife from outside to inside the paper, and then the paper is laminated to other layer if needed. This enables consumers to open the flexible package along the perforation line without paper breakage.

DETAILED DESCRIPTION OF THE INVENTION

Consumer product

[0019] The present invention provides a consumer product comprising at least one water-soluble unit dose article in a paper-based flexible package. The water-soluble unit dose article and the paper-based flexible package are described in more detail below.

[0020] The consumer product can be sold 'as is', in other words the consumer product is the item that the consumer picks up from the shelf. Alternatively, the consumer product could be housed as one unit of a multi-component product. For example, more than one consumer product could be housed within an outer package and the multiple packaged consumer products sold together in a single purchase.

[0021] The consumer product may comprise aesthetic elements, for example labels, attached to the flexible package. Alternatively, the flexible package may be coloured or printed with aesthetic elements or informative print such as usage instructions.

Paper-based flexible package

[0022] The consumer product comprises a paper-based flexible package, which refers to a flexible package with at least a portion or a part thereof being constructed from paper-based material(s).

[0023] The flexible package may be formed by a single layer of paper-based material(s), or it can be formed by a single layer with some regions constructed from paper-based material(s) and other regions constructed from plastic or other non-paper-based material(s), such as fabric, metal, glass, and the like.

[0024] Optionally, the flexible package is formed by a laminate structure with multiple layers of paper-based and/or non-paper-based materials bound together (e.g., by adhesives or thermal seal or extruded polymer), wherein at least one of said multiple layers is constructed from a paper-based material.

[0025] Specifically, the laminate structure may comprise an exterior (i.e., outermost) layer of paper-based material(s), with one or more interior (i.e., innermost) and/or intermediate layers (i.e., the layer(s) between the exterior layer and the interior layer) of paper-based and/or non-paper-based material(s). More specifically, the laminate structure may comprise an interior layer of non-paper-based material(s), and optionally one or more intermediate layers of paper-based and/or non-paper-based material(s). Alternatively, the laminate structure may comprise an interior layer of paper-based material(s), and optionally one or more intermediate layers of paper-based and/or non-paper-based material(s).

[0026] Alternatively, the laminate structure may comprise an exterior (i.e., outermost) layer of non-paper-based material(s), with one or more interior (i.e., innermost) and/or intermediate layers (i.e., the layer(s) between the exterior layer and the interior layer) of paper-based material(s).

[0027] The term "paper-based material" refers to a material comprising paper or any material made from a cellulose-based pulp and/or a non-cellulose-based fibre (e.g. fibre from *Silphium perfoliatum*). Preferably, the paper-based material comprises paper, cardboard, or a mixture thereof, wherein preferably, cardboard comprises paper-board, corrugated fibre-board, or a mixture thereof. The paper-based material may comprise a printed image thereon.

[0028] Those skilled in the art will be aware of suitable non-paper-based materials. Preferably, the non-paper-based material comprises a plastic material. Preferably, the plastic material comprises polyethylene terephthalate (PET); polyethylene (PE), such as high density polyethylene (HDPE), medium density polyethylene (MDPE), low density polyethylene (LDPE), linear low density polyethylene (LLDPE), and ultra-low linear low density polyethylene (ULDPE); polypropylene (PP); polylactic acid (PLA); polyhydroxyalkanoates (PHA); poly(ethylene-2,5-furandicarboxylate) (PEF); nylon, such as NYLON 11; bio-polyesters; polybutylene succinate (PBS); polyglycolic acid (PGA); polyvinyl alcohol (PVA); polyvinyl chloride (PVC); and mixtures thereof. Alternatively, the non-paper-based material may be a metal, a wax, a cellulose material, or any mixture thereof. Specifically, the plastic materials may comprise PET, LLDPE, LDPE, ULDPE, HDPE, or any mixture thereof.

[0029] In a specific embodiment, the flexible package is made of a laminate structure comprising: (a) an exterior layer of paper, which is characterized by a weight ranging from 50 gsm to 200 gsm, or from 60 gsm to 180 gsm, or from 70 gsm to 150 gsm, or from 80 gsm to 120 gsm; (b) an intermediate layer of PET, which is characterized by a thickness ranging from 1 to 50 microns, or from 2 to 30 microns, or from 5 to 20 microns, or from 8 to 15 microns; and (c) an interior layer of LLDPE, which is characterized by a thickness ranging from 5 to 100 microns, or from 10 to 80 microns, or from 15 to 60 microns, or

from 30 to 50 microns. The exterior, intermediate and interior layers are preferably bonded together by adhesives.

[0030] In a specific embodiment, the flexible package comprises a paper content from 20% to 80%, preferably 30% to 70% or 40% to 60% by weight of the flexible package.

[0031] The flexible package of the present invention may further comprise one or more closure or locking mechanism, such as a zipper, a latch, a flap, a hook, and the like. Preferably the locking mechanism is a press to close zipper mechanism, more preferably a plastic press to close zipper (e.g. PLALOC™ MFB-906Z1 sourcing from Idemitsu Unitech Co., Ltd.), a slider zipper or velcro solution. Particularly, the locking mechanism (e.g. a zipper) is attached to the flexible packaging by heat-sealing.

[0032] In a particular embodiment, the flexible package of the present invention comprises a press to close zipper which is preferably characterized in an opening force of 5 to 50 N/50mm, preferably 7 to 30 N/50mm, more preferably 10 to 20 N/50mm, and/or a closing force of 15 to 150 N/50mm, preferably 30 to 120 N/50mm, more preferably 50 to 100 N/50mm. In a more particular embodiment, the flexible package of the present invention comprises a press to close zipper which is preferably characterized in an opening force of about 12 N/50mm, and/or a closing force of about 75 N/50mm.

[0033] The flexible package of the present invention may further comprise one or more tamper opening mechanism, e.g. a perforation line to tear off the bag.

[0034] In a particular embodiment, the flexible package of the present invention is configured to contain from 3 to 200, preferably from 10 to 150, more preferably from 20 to 100, water-soluble unit dose articles having a volume of 10 to 25 ml (e.g. 10 ml, 15 ml, 20 ml, or 25 ml).

Water-soluble unit dose article

[0035] The consumer product further comprises at least one water-soluble unit dose article, which is placed in the paper-based flexible package described hereinabove. The water-soluble unit dose article comprises at least one water-soluble film orientated to create at least one unit dose internal compartment, wherein the at least one unit dose internal compartment comprises a detergent composition. The water-soluble film and the detergent composition are described in more detail below.

[0036] The consumer product comprises at least one water-soluble unit dose article, preferably at least two water-soluble unit dose articles.

[0037] A water-soluble unit dose article is generally in the form of a pouch. It comprises a unitary dose of a composition as a volume sufficient to provide a benefit in an end application.

[0038] The water-soluble unit dose article comprises at least one water-soluble film shaped such that the unit-dose article comprises at least one internal compartment surrounded by the water-soluble film. The at least one compartment comprises a cleaning composition. The water-soluble film is sealed such that the cleaning composition does not leak out of the compartment during storage. However, upon addition of the water-soluble unit dose article to water, the water-soluble film dissolves and releases the contents of the internal compartment into the wash liquor.

[0039] The unit dose article may comprise more than one compartment, even at least two compartments, or even at least three compartments, or even at least four compartments, or even at least five compartments. The compartments may be arranged in superposed orientation, i.e. one positioned on top of the other. Alternatively, the compartments may be positioned in a side-by-side orientation, i.e. one orientated next to the other. The compartments may even be orientated in a 'tyre and rim' arrangement, i.e. a first compartment is positioned next to a second compartment, but the first compartment at least partially surrounds the second compartment, but does not completely enclose the second compartment. Alternatively, one compartment may be completely enclosed within another compartment.

[0040] Wherein the unit dose article comprises at least two compartments, one of the compartments may be smaller than the other compartment. Wherein the unit dose article comprises at least three compartments, two of the compartments may be smaller than the third compartment, and preferably the smaller compartments are superposed on the larger compartment. The superposed compartments preferably are orientated side-by-side.

[0041] Each individual unit dose article may have a weight of between 10g and 40g, or even between 15g and 35g.

[0042] The film of the present invention is soluble or dispersible in water. Prior to being formed into a unit dose article, the water-soluble film preferably has a thickness of from 20 to 150 micron, preferably 35 to 125 micron, even more preferably 50 to 110 micron, most preferably about 76 micron.

[0043] Preferred film materials are preferably polymeric materials. The film material can, for example, be obtained by casting, blow-moulding, extrusion or blown extrusion of the polymeric material, as known in the art.

[0044] Preferably, the water-soluble film comprises polyvinyl alcohol homopolymer or polyvinyl alcohol copolymer, preferably a blend of polyvinylalcohol homopolymers and/or polyvinylalcohol copolymers, preferably wherein the polyvinyl alcohol copolymers are selected from sulphonated and carboxylated anionic polyvinylalcohol copolymers especially carboxylated anionic polyvinylalcohol copolymers, most preferably the polyvinyl alcohol comprises a blend of a polyvinylalcohol homopolymer and a carboxylated anionic polyvinylalcohol copolymer or a blend of polyvinyl alcohol homopolymers. Alternatively the polyvinylalcohol consists of a polyvinyl alcohol copolymer, preferably a carboxylated

polyvinyl alcohol copolymer.

[0045] Preferably, the water-soluble film comprises a polymer wherein the polymer comprises a homopolymer, copolymer, or mixture thereof selected from polyvinyl alcohols, polyvinyl pyrrolidone, polyalkylene oxides, acrylamide, acrylic acid, cellulose, cellulose ethers, cellulose esters, cellulose amides, polyvinyl acetates, polycarboxylic acids and salts, polyaminoacids or peptides, polyamides, polyacrylamide, copolymers of maleic/acrylic acids, polysaccharides including starch and gelatine, xanthum, carragum or a mixture thereof, preferably, polyvinylalcohol homopolymers and/or anionic polyvinylalcohol copolymers preferably selected from sulphonated and carboxylated anionic polyvinylalcohol copolymers especially carboxylated anionic polyvinylalcohol copolymers.

[0046] Preferred films are those supplied by Monosol under the trade references M8630, M8900, M8779, M8310.

[0047] The film may be opaque, transparent or translucent. The film may comprise a printed area.

[0048] The area of print may be achieved using standard techniques, such as flexographic printing or inkjet printing.

[0049] The film may comprise an aversive agent, for example a bittering agent. Suitable bittering agents include, but are not limited to, naringin, sucrose octaacetate, quinine hydrochloride, denatonium benzoate, or mixtures thereof. Any suitable level of aversive agent may be used in the film. Suitable levels include, but are not limited to, 1 to 5000ppm, or even 100 to 2500ppm, or even 250 to 2000ppm.

[0050] The water-soluble film or water-soluble unit dose article or both may be coated with a lubricating agent. Preferably, the lubricating agent is selected from talc, zinc oxide, silicas, siloxanes, zeolites, silicic acid, alumina, sodium sulphate, potassium sulphate, calcium carbonate, magnesium carbonate, sodium citrate, sodium tripolyphosphate, potassium citrate, potassium tripolyphosphate, calcium stearate, zinc stearate, magnesium stearate, starch, modified starches, clay, kaolin, gypsum, cyclodextrins or mixtures thereof.

Detergent composition

[0051] The detergent composition may be a laundry detergent composition, an automatic dishwashing composition, a hard surface cleaning composition, or a combination thereof. The detergent composition is a perfumed detergent composition. By 'perfumed detergent composition' we mean that free perfume has been added to the detergent composition. By 'free perfume' we herein mean perfume compounds are added directly to the detergent composition and are not present on encapsulates or on carrier materials. The composition might also comprise secondary perfume sources such as perfume capsule and/or pro-perfume e.g. perfume bound to a carrier material technology. The detergent composition may comprise a solid, a liquid or a mixture thereof. The term liquid includes a gel, a solution, a dispersion, a paste, or a mixture thereof.

[0052] The solid may be a powder. By powder we herein mean the detergent composition may comprise solid particulates or may be a single homogenous solid. Preferably, the powder detergent composition comprises particles. This means the powder detergent composition comprises individual solid particles as opposed to the solid being a single homogenous solid. The particles may be free-flowing or may be compacted, preferably free-flowing.

[0053] Preferably, the detergent composition is a laundry detergent composition, most preferably a liquid laundry detergent composition.

[0054] The laundry detergent composition can be used in a fabric hand wash operation or may be used in an automatic machine fabric wash operation, preferably an automatic machine fabric wash operation.

[0055] The laundry detergent composition comprises a non-soap surfactant, wherein the non-soap surfactant comprises an anionic non-soap surfactant and a non-ionic surfactant. Preferably, the laundry detergent composition comprises between 10% and 60%, more preferably between 20% and 55% by weight of the laundry detergent composition of the non-soap surfactant.

[0056] The weight ratio of non-soap anionic surfactant to nonionic surfactant is from 1:2 to 20:1, preferably from 1:1.5 to 10:1, more preferably from 1:1 to 7.5:1, most preferably from 1:1 to 5:1.

[0057] The non-soap anionic surfactant comprises linear alkylbenzene sulphonate, optionally alkoxylated alkyl sulphate or a mixture thereof. The weight ratio of linear alkylbenzene sulphonate to alkoxylated alkyl sulphate, when present, is from 1:2 to 9:1, preferably from 1:1 to 7:1, more preferably from 1.5:1 to 6:1, most preferably from 2:1 to 5:1. Alternatively the non-soap anionic surfactant system may be free of alkoxylated alkyl sulphate, more preferably the non-soap anionic surfactant consists of linear alkylbenzene sulphonate anionic surfactant.

[0058] Exemplary linear alkylbenzene sulphonates are C₁₀-C₁₆ alkyl benzene sulfonic acids, or C₁₁-C₁₄ alkyl benzene sulfonic acids. By 'linear', we herein mean the alkyl group is linear. Alkyl benzene sulfonates are well known in the art.

[0059] The alkyl sulphate anionic surfactant may comprise alkoxylated alkyl sulphate or nonalkoxylated alkyl sulphate or a mixture thereof. The alkoxylated alkyl sulphate anionic surfactant preferably is an ethoxylated alkyl sulphate anionic surfactant.

[0060] The alkyl sulphate anionic surfactant may comprise an ethoxylated alkyl sulphate anionic surfactant, preferably with a mol average degree of ethoxylation from 1 to 5, more preferably from 1 to 3, most preferably from 2 to 3.

[0061] The alkyl sulphate anionic surfactant may comprise a non-ethoxylated alkyl sulphate and an ethoxylated alkyl

sulphate wherein the mol average degree of ethoxylation of the alkyl sulphate anionic surfactant is from 1 to 5, more preferably from 1 to 3, most preferably from 2 to 3.

[0062] The alkyl fraction of the alkyl sulphate anionic surfactant can preferably be derived from fatty alcohols, oxo-synthesized alcohols, guerbet alcohols, or mixtures thereof.

[0063] Preferably, the laundry detergent composition comprises between 10% and 50%, more preferably between 15% and 45%, even more preferably between 20% and 40%, most preferably between 30% and 40% by weight of the laundry detergent composition of the non-soap anionic surfactant.

[0064] Preferably, the non-ionic surfactant is selected from fatty alcohol alkoxylate, an oxosynthesised alcohol alkoxylate, Guerbet alcohol alkoxylates, alkyl phenol alcohol alkoxylates, or a mixture thereof.

[0065] The laundry detergent composition comprises between 1% and 30%, preferably between 3% and 25%, more preferably between 5% and 20%, most preferably between 7.5% and 20% by weight of the liquid laundry detergent composition of a non-ionic surfactant.

[0066] Preferably, the laundry detergent composition comprises between 1.5% and 20%, more preferably between 2% and 15%, even more preferably between 3% and 10%, most preferably between 4% and 8% by weight of the laundry detergent composition of soap, preferably a fatty acid salt, more preferably an amine neutralized fatty acid salt, wherein preferably the amine is an alkanolamine more preferably selected from monoethanolamine, diethanolamine, triethanolamine, or a mixture thereof, more preferably monoethanolamine.

[0067] Preferably, the laundry detergent composition is a liquid laundry detergent composition, more preferably the liquid laundry detergent composition comprises less than 15%, more preferably less than 12% and more than 5% by weight of the liquid laundry detergent composition of water.

[0068] Preferably, the laundry detergent composition is a liquid laundry detergent composition comprising a non-aqueous solvent selected from 1,2-propanediol, dipropylene glycol, tripropyleneglycol, glycerol, sorbitol, polyethylene glycol or a mixture thereof. Preferably, the liquid laundry detergent composition comprises between 10% and 40%, preferably between 15% and 30% by weight of the liquid laundry detergent composition of the non-aqueous solvent.

[0069] The laundry detergent composition comprises a perfume, more specifically a free perfume. Those skilled in the art will know of possible free perfumes to be formulated inside a liquid laundry detergent composition to be formulated inside a water-soluble unit dose article. These free perfume compositions are composed of a broad range of individual perfume raw materials which are carefully balanced to create a desired perfumed character, perfume deposition and perfume longevity profile, and this across the different stages of the wash and wear process, e.g. upon dosing of the detergent composition, upon removal of the wet fabrics from the laundry washing machine or upon hand-washing, upon line-drying or at the end of tumble drying process, upon storage of the fabrics in consumers' wardrobe and upon wearing the fabrics. This balanced selection of individual perfume materials typically considers, in addition to the perfume character of an individual raw material, also its polarity, volatility and perceived intensity. The detergent composition preferably comprises between 0.01 and 10%, preferably between 0.1% and 5%, more preferably between 0.5% and 3% of free perfume. In addition to free perfume also a secondary source of perfume can be present, more particularly the detergent composition might also comprise encapsulated perfumes or pro-perfume technologies, or a mixture thereof. Preferably, the laundry detergent composition comprises an adjunct ingredient selected from the group comprising builders including enzymes, citrate, bleach, bleach catalyst, dye, hueing dye, brightener, cleaning polymers including alkoxylated polyamines and polyethyleneimines, soil release polymer, surfactant, solvent, dye transfer inhibitors, chelant, encapsulated perfume, polycarboxylates, structurant, pH trimming agents, and mixtures thereof.

[0070] Preferably, the laundry detergent composition has a pH between 6 and 10, more preferably between 6.5 and 8.9, most preferably between 7 and 8, wherein the pH of the laundry detergent composition is measured as a 10% product concentration in demineralized water at 20°C.

[0071] When liquid, the laundry detergent composition may be Newtonian or non-Newtonian. Preferably, the liquid laundry detergent composition is non-Newtonian. Without wishing to be bound by theory, a non-Newtonian liquid has properties that differ from those of a Newtonian liquid, more specifically, the viscosity of non-Newtonian liquids is dependent on shear rate, while a Newtonian liquid has a constant viscosity independent of the applied shear rate. The decreased viscosity upon shear application for non-Newtonian liquids is thought to further facilitate liquid detergent dissolution. The liquid laundry detergent composition described herein can have any suitable viscosity depending on factors such as formulated ingredients and purpose of the composition.

[0072] Those skilled in the art will know how to formulate and make a suitable detergent composition using known knowledge and techniques.

EXAMPLES

[0073] Three (3) different laminate structures (A)-(C) are provided:

TABLE 1

Layers	Materials	Weight (%)		
		A	B	C
Exterior	Aesthetic paper (83 gsm)	56.28	--	--
	Aesthetic paper (103 gsm)	--	61.79	61.79
--	Adhesive	1.49	1.31	1.31
Intermediate	PE (12 microns)	11.38	10.09	--
	PET (12 microns)	--	--	10.09
--	Adhesive	1.49	1.31	1.31
Interior	LLDPE (40 microns)	24.96	22.08	22.08
--	Zipper	4.41	3.42	3.42

[0074] The above-mentioned laminate structures are then made into flexible packages, such as pillow bags, gusset bags, and the like. Such flexible packages may be characterized by: (1) a width ranging from 100 mm to 500 mm, or from 120 mm to 400 mm, or from 150 mm to 300 mm; and (2) a length ranging from 150 mm to 800 mm, or from 200 mm to 600 mm, or from 250 mm to 400 mm. Specifically, the laminate structure (A) is made into a flexible package with a width of about 200-220 mm and a length of about 250-330 mm. The laminate structures (B) and (C) are made into a flexible package with a width of about 270-300 mm and a length of about 300-400 mm. The flexible package can contain from 20 to 100 unit dose articles having a volume of 10 to 25 ml. The package comprises a plastic based press to close zipper (PLALOC™ MFB-906Z1 sourcing from Idemitsu Unitech Co.,Ltd.). The package further comprises a perforation line with a tearing notch as shown in Figure 1.

[0075] The above-mentioned flexible packages are then used to house water-soluble unit dose articles.

[0076] The following is an example of such a multi-compartment water soluble unit dose laundry article comprising a larger bottom compartment while having two smaller compartments in a side by side configuration superposed on top of the bottom compartment, following the Ariel All-in-1 Pods design, as commercially available in the UK in June 2023 and produced by the Procter and Gamble company. The below compositions are enclosed in a polyvinyl alcohol based water soluble outer film, more specifically a water soluble film comprising a blend of a polyvinylalcohol homopolymer and a carboxylated anionic polyvinylalcohol copolymer, and a water soluble middle film comprising a blend of polyvinyl alcohol homopolymers, alternatively a blend of a polyvinylalcohol homopolymer and a carboxylated anionic polyvinylalcohol copolymer.

Table 2

<i>Ingredients (100% active basis)</i>	Full article Composition (wt%)	Bottom compartment Composition (wt%)	Top compartment Composition 1 (wt%)	Top compartment Composition 2 (wt%)
Volume	25.5ml	22.3ml	1.6ml	1.6ml
Fatty alcohol ethoxylate nonionic surfactant, C ₁₂₋₁₄ average degree of ethoxylation of 7	3.5	3.7	2.6	1.6
Lutensol XL100	0.4	0.5	-	-
Linear C ₁₁₋₁₄ alkylbenzene sulphonate	24.2	24.9	18.9	19.4
C12-15 AE3S Ethoxylated alkyl sulphate with an average degree of ethoxylation of 3	12.3	12.6	9.7	9.7
Citric acid	0.7	0.7	0.5	0.5
Palm Kernel Fatty acid	5.2	5.4	4.1	4.1
Nuclease enzyme* (wt% active protein)	0.009	0.011	-	-
Protease enzyme (wt% active protein)	0.05	0.06	-	-

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	<u>Ingredients (100% active basis)</u>	Full article Composition (wt%)	Bottom compartment Composition (wt%)	Top compartment Composition 1 (wt%)	Top compartment Composition 2 (wt%)
5	Amylase enzyme (wt% active protein)	0.004	0.005	-	-
10	Xyloglucanase enzyme (wt% active protein)	0.005	-	0.073	-
	Mannanase enzyme (wt% active protein)	0.003	0.003	-	-
	Lipase enzyme (wt% active protein)	0.012	-	0.187	-
15	Ethoxylated polyethyleneimine**	1.5	1.6	1.2	1.2
	Amphiphilic graft copolymer***	2.0	2.3	-	-
	Zwitterionic polyamine****	1.8	1.9	1.4	1.4
	Anionic polyester terephthalate *****	0.4	-	-	5.8
20	HEDP chelant	2.2	2.2	1.7	1.7
	Brightener 49	0.3	0.4	0.01	0.01
	Silicone anti-foam	0.3	0.3	-	-
25	Hueing dye	0.04	-	0.69	-
	1,2 PropaneDiol	13.6	12.8	11.3	26.4
	Glycerine	6.0	5.0	17.3	8.3
	DPG (DiPropyleneGlycol)	0.8	0.8	0.6	0.6
30	TPG (TriPropyleneGlycol)	0.06	0.06	-	-
	Sorbitol	0.6	0.05	8.8	-
	Monoethanolamine	10.0	10.4	7.9	8.0
35	K2SO3	0.4	0.4	0.04	0.4
	MgCl2	0.3	0.3	0.2	0.2
	water	10.9	10.9	11.8	9.9
	Hydrogenated castor oil	0.1	0.1	-	0.1
40	Perfume	1.6	1.9	-	-
	Aesthetic dye & Minors (incl. preservative)	Balance to 100	Balance to 100	Balance to 100	Balance to 100
45	pH (10% product concentration in demineralized water at 20°C)	7.4	7.4	7.4	7.4
50	<p>* Nuclease enzyme is as claimed in co-pending European application 19219568.3</p> <p>* Lutensol FP620 ex BASF - ethoxylated polyethyleneimine (PEI600 EO20)</p> <p>*** polyethylene glycol graft polymer comprising a polyethylene glycol backbone (Pluriol E6000) and hydrophobic vinyl acetate side chains, comprising 40% by weight of the polymer system of a polyethylene glycol backbone polymer and 60% by weight of the polymer system of the grafted vinyl acetate side chains</p> <p>**** Lutensit Z96 (zwitterionic polyamine ex BASF - zwitterionic hexamethylene diamine according to below formula : 100% quaternized and about 40% of the polyethoxy (EO24) groups are sulfonated).</p>				
55	<p>***** Texcare SRA300 ex Clariant</p>				

[0077] The following (tables 3 and 4) are examples of other multi-compartment water soluble unit dose laundry articles comprising a larger bottom compartment while having three smaller compartments in a side-by-side configuration superposed on top of the bottom compartment, equally sold by the Procter and Gamble company within the Japan consumer market. The below compositions are enclosed in a polyvinyl alcohol based water soluble outer film, more specifically a water soluble film comprising a blend of a polyvinylalcohol homopolymer and a carboxylated anionic polyvinylalcohol copolymer, and a water soluble middle film comprising a blend of polyvinyl alcohol homopolymers, alternatively a blend of a polyvinylalcohol homopolymer and a carboxylated anionic polyvinylalcohol copolymer.

Table 3

<u>Ingredients (100% active basis)</u>	Full article Composition (wt%)	Bottom compartment Composition (wt%)	Top compartment Composition 1 (wt%)	Top compartment Composition 2 (wt%)	Top compartment Composition 3 (wt%)
Volume	16.6ml	12.7ml	1.3ml	1.3ml	1.3ml
Fatty alcohol ethoxylate non-ionic surfactant, C ₁₂₋₁₄ average degree of ethoxylation of 9	9.2	9.4	9.2	7.6	9.2
Linear C ₁₁₋₁₄ alkylbenzene sulphonate	18.6	18.9	18.5	15.5	18.5
C12-14 AE3S Ethoxylated alkyl sulphate with an average degree of ethoxylation of 3	9.1	9.3	9.2	7.6	9.2
Citric acid	0.3	0.3	0.3	0.2	0.3
Palm Kernel Fatty acid	10.7	10.9	10.8	8.9	10.8
Protease enzyme (wt% active protein)	0.025	0.03	-	-	-
Ethoxylated polyethyleneimine**	2.0	2.0	2.0	1.6	2.0
Alkoxylated polyethyleneimine *****	1.0	1.0	1.0	0.8	1.0
Ralox antiooxidant	0.2	0.2	0.2	0.2	0.2
HEDP chelant	1.2	1.3	1.2	1.0	1.2
Cationic hydroxyethylcellulose	0.4	-	-	4.5	-
Brightener 49	0.02	0.02	0.02	0.01	0.02
Silicone anti-foam	0.08	0.1	-	-	-
1,2 PropaneDiol	10.8	9.7	14.1	14.8	14.1
Glycerine	11.6	11.7	11.6	9.6	11.6
PPG 400	0.6	-	-	7.4	-
Monoethanolamine	8.2	8.3	8.2	6.8	8.2
K ₂ SO ₃	0.4	0.4	0.5	0.5	0.5
MgCl ₂	0.2	0.2	0.2	0.1	0.2
water	11.5	11.6	11.5	11.0	11.5
Hydrogenated castor oil	0.1	0.1	0.1	0.1	0.1
Perfume	2.5	3.2	-	-	-

(continued)

<u>Ingredients (100% active basis)</u>	Full article Composition (wt%)	Bottom compartment Composition (wt%)	Top compartment Composition 1 (wt%)	Top compartment Composition 2 (wt%)	Top compartment Composition 3 (wt%)
Perfume capsules (polyacrylate based)	0.2	0.2	-	-	-
Aesthetic dye & Minors (incl. Acticide preservative)	Balance to 100	Balance to 100	Balance to 100	Balance to 100	Balance to 100
pH (10% product concentration in demineralized water at 20°C)	7.4	7.4	7.4	7.4	7.4
***** ethoxylated propoxylated polyethyleneimine (PEI600 EO24PO16)					

Table 4

<u>Ingredients (100% active basis)</u>	Full article Composition (wt%)	Bottom compartment Composition (wt%)	Top compartment Composition 1 (wt%)	Top compartment Composition 2 (wt%)	Top compartment Composition 3 (wt%)
Volume	17.7ml	13.0ml	1.6ml	1.6ml	1.5ml
Fatty alcohol ethoxylate non-ionic surfactant, C ₁₂₋₁₄ average degree of ethoxylation of 9	8.4	8.5	8.4	7.9	7.9
Linear C ₁₁₋₁₄ alkylbenzene sulphonate	18.8	18.8	18.3	18.8	19.1g
C12-14 AE3S Ethoxylated alkyl sulphate with an average degree of ethoxylation of 3	13.8	13.8	13.8	13.9	14.0
Citric acid	0.9	0.9	1.0	1.0	1.0
Palm Kernel Fatty acid	6.0	6.0	6.0	6.0	6.0
Protease enzyme (wt% active protein)	0.05	0.07	-	-	-
Amylase enzyme (wt% active protein)	0.002	0.002	-	-	-
Ethoxylated polyethyleneimine**	3.6	3.6	3.6	3.6	3.6
Alkoxylated polyethyleneimine *****	0.9	0.9	0.9	0.9	0.9
Ralox antiooxidant	0.2	0.2	0.2	0.2	0.2
HEDP chelant	0.9	1.0	1.0	1.0	1.0
Brightener 49	0.12	0.16	0.02	0.02	0.02
Silicone anti-foam	0.07	0.1	-	-	-
Hueing dye	0.04	-	0.4	-	-
Tinosan HP100	0.08	0.1	-	-	-
1,2 PropaneDiol	14.5	13.3	19.9	16.4	16.9

(continued)

	<u>Ingredients (100% active basis)</u>	Full article Composition (wt%)	Bottom compartment Composition (wt%)	Top compartment Composition 1 (wt%)	Top compartment Composition 2 (wt%)	Top compartment Composition 3 (wt%)
5	Glycerine	9.1	9.0	9.0	9.0	9.0
	sorbitol	0.01	0.02	-	-	-
10	Monoethanolamine	8.5	8.5	8.4	8.5	8.6
	K ₂ SO ₃	0.3	0.3	0.2	0.4	0.4
	MgCl ₂	0.1	0.1	0.1	0.1	0.1
15	water	10.3	10.7	7.5	10.4	10.2
	Hydrogenated castor oil	0.1	0.1	-	0.1	0.1
	Perfume	1.9	2.5	-	-	-
20	Perfume capsules (polyacrylate based)	0.1	0.1	-	-	-
	Aesthetic dye & Minors (incl. Acticide preservative)	Balance to 100	Balance to 100	Balance to 100	Balance to 100	Balance to 100
25	pH (10% product concentration in demineralized water at 20°C)	7.4	7.4	7.4	7.4	7.4

[0078] The following liquid laundry detergent compositions (~10ml) were encapsulated into one of the individual compartment(s) of a water-soluble unit dose by using a carboxylated polyvinyl alcohol based water-soluble film in which the PVA film and the shape of the unit dose were the same with China Ariel Laundry two chamber side-by-side pouches as produced by the Procter & Gamble company in 2022.

Table 5

	<u>Ingredients (100% active basis)</u>	Composition 1	Composition 2	Composition 3
35	Dodecyltrimethyl amine oxide	4.0	4.0	4.0
	Fatty alcohol ethoxylate non-ionic surfactant, C ₁₂₋₁₄ average degree of ethoxylation of 7	9.1	9.1	9.1
40	Fatty alcohol ethoxylate non-ionic surfactant, C ₁₄₋₁₅ average degree of ethoxylation of 7	9.1	9.1	9.1
	C12-14 AE1-3S Ethoxylated alkyl sulphate with an average degree of ethoxylation of 3	5.7	5.7	5.7
45	Linear C ₁₁₋₁₄ alkylbenzene sulphonate	7.5	7.5	7.5
	Dye fixative ¹	1.4	1.4	1.4
	Diol solvent ²	32.5	28.7	26.6
	Polyol solvent ³	10.9	14.7	16.8
50	Monoethanolamine	1.8	1.8	1.8
	Fatty acid	1.7	1.7	1.7
	Tinosan HP100	0.8	0.8	0.8
	Perfume	4.0	4.0	4.0
55	Dye	0.005	0.005	0.005

(continued)

<u>Ingredients (100% active basis)</u>	Composition 1	Composition 2	Composition 3
pH (10% product concentration in demineralized water at 20°C)	7.4	7.4	7.4
1: Dye fixative: poly(2-hydroxypropyldimethylammonium chloride) commercially available under the trade name of TEXCARE DFC 6 from Clariant. 2: 1,2-propanediol 3: Glycerine			

[0079] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm."

[0080] Every document cited herein, including any cross referenced or related patent or application, is hereby incorporated herein by reference in its entirety unless expressly excluded or otherwise limited. The citation of any document is not an admission that it is prior art with respect to any invention disclosed or claimed herein or that it alone, or in any combination with any other reference or references, teaches, suggests or discloses any such invention. Further, to the extent that any meaning or definition of a term in this document conflicts with any meaning or definition of the same term in a document incorporated by reference, the meaning or definition assigned to that term in this document shall govern.

[0081] While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

Claims

1. A consumer product comprising a flexible package and at least one water-soluble unit dose article, wherein the at least one water-soluble unit dose article comprises at least one water-soluble film orientated to create at least one unit dose internal compartment, wherein the at least one unit dose internal compartment comprises a detergent composition; and wherein at least a part of the flexible package is constructed from paper-based material.
2. The consumer product according to Claim 1, wherein the paper-based material comprises a laminate comprising at least one paper-based layer.
3. The consumer product according to Claim 2, wherein the laminate further comprises one or more plastic layers.
4. The consumer product according to Claim 3, wherein the laminate comprises a paper-based layer and a plastic layer from the outside to the inside of the package.
5. The consumer product according to any of Claims 3 or 4, wherein the paper-based layer is made from a cellulose-based pulp, and/or the plastic layer comprises polyethylene (PE).
6. The consumer product according to Claim 3, wherein the laminate comprises a paper-based layer and a first plastic layer, and a second plastic layer from the outside to the inside of the package.
7. The consumer product according to Claim 6, wherein the paper-based layer is made from a cellulose-based pulp, and/or the first plastic layer comprises polyethylene terephthalate (PET) or polyethylene (PE) and/or the second plastic layer comprises polyethylene (PE).
8. The consumer product according to any one of Claims 2 to 7, wherein the paper-based layer is **characterized by** a weight ranging from 50 gsm to 200 gsm, or from 60 gsm to 180 gsm, or from 70 gsm to 150 gsm, or from 80 gsm to 120 gsm.
9. The consumer product according to any one of Claims 7 or 8, wherein the PET-based layer is **characterized by** a thickness ranging from 1 to 50 microns, or from 2 to 30 microns, or from 5 to 20 microns, or from 8 to 15 microns.

10. The consumer product according to any one of Claims 7 to 9, wherein the PE plastic layer is **characterized by** a thickness ranging from 5 to 150 microns, or from 7 to 80 microns, or from 10 to 60 microns, or from 12 to 50 microns.
- 5 11. The consumer product according to any of the preceding claims, wherein the container comprises one or more closure or locking mechanism selected from the group consisting of a zipper, a latch, a flap, a hook, and any combinations thereof, preferably the locking mechanism is a press to close zipper mechanism, more preferably a plastic press to close zipper.
- 10 12. The consumer product according to any of the preceding claims, wherein the flexible package comprises a paper content of from 20% to 80%, preferably 30% to 70% or 40% to 60% by weight of the flexible package.
13. The consumer product according to any of the preceding claims, wherein the flexible package comprises a perforated tamper element.
- 15 14. The consumer product according to any of the preceding claims, wherein the water-soluble film comprises polyvinyl alcohol homopolymer and/or polyvinyl alcohol copolymer, and/or the detergent composition is a laundry detergent composition which preferably comprises a non-soap surfactant, a non-aqueous solvent and/or a perfume.

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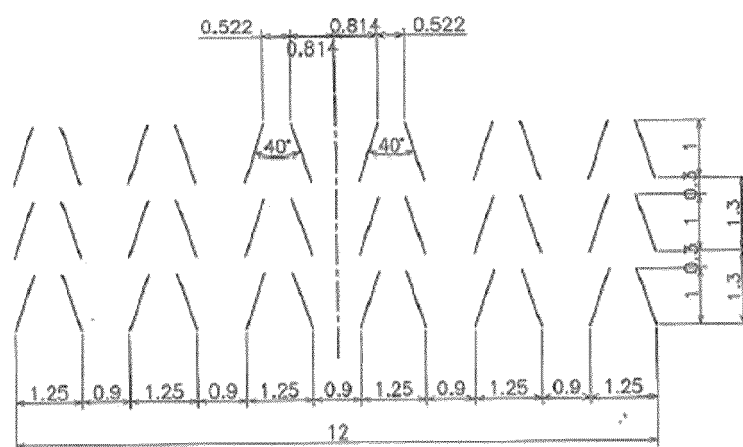


Figure 1



EUROPEAN SEARCH REPORT

Application Number

EP 23 18 8383

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Place of search The Hague		Date of completion of the search 31 January 2024	Examiner Agra-Gutierrez, C
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