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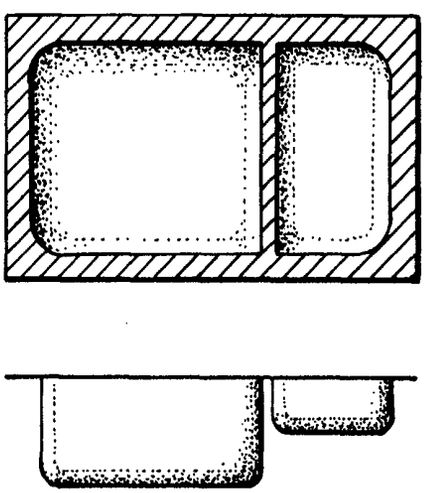
(54) Detergent sachets

(57) A multi-compartment package comprising from 2 to 5 compartments of water-soluble material, said package containing at least two different cleaning compositions and wherein said compartments are connected to each other and seperated by at least one flat seal area having a width of from 1 to 10 mm.

Fig.1A.



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Description

[0001] This invention relates to water soluble detergent sachets comprising a detergent composition, in particular a laundry detergent or machine dishwashing composition.

[0002] For many years detergent compositions, especially laundry detergent compositions, have been provided commercially in forms such as free-flowing powders and liquids. For these products the consumer is required to determine and provide the correct dosage of the product at the point of use. This may lead to over dosing of the product and/or to an increased risk of spillage or wastage.

[0003] More recently, detergent products have been commercially available in a form which provide a single dose of the detergent product for the consumer to add directly to the cleaning operation. Two examples of these single-dose products are laundry detergent tablets of compressed powder and water-soluble sachets of detergent composition which may contain the detergent product in liquid, paste or particulate form.

[0004] These single-dosage products are advantageous in that they obviate the need for the consumer to determine and measure the correct dosage and allow for more accurate dosing of the detergent product. They are also easier to handle and dispense, for example into the wash load, so reducing the risk of spillage and/or wastage.

[0005] Water-soluble sachets generally comprise a detergent composition encapsulated with water-soluble film, such as polyvinyl alcohol. Encapsulation allows for handling of the product without direct contact with the detergent composition. This is especially advantageous when the detergent composition comprises aggressive cleaning components which could irritate the skin on direct contact.

[0006] This invention relates to water-soluble sachets a detergent composition wherein the sachets comprise from 2 to 5 compartments.

[0007] In the production of multi-compartment sachets there is the risk that detergent ingredients leak from one compartments into the other. This problem is especially apparent where the compartments contain different compositions.

[0008] WO 01/85898 describes a multi-compartment pouch obtained by closing an open compartment with a pre-sealed second compartment. However the process as proposed requires a complicated process and may incur the risk that the pre-sealed compartment is damaged during the handling and secondary sealing.

[0009] WO 02/8380 describes a multicompartment pouch in pouch product wherein one ore more of the pouches may comprise a liquid detergent product.

[0010] W0 02/42408 descibes multicompartment pouches for dishwashing products wherein the compartments are superposed.

[0011] A problem with multi-compartment pouches, especially multicompartment pouches which contain two different cleaning compositions, is that often due to the difference is water activities between the different compositions there is a water migration between the compartments. This can lead to weakening or damaging of the partition between the compartments. Another potential problem due to interaction e.g. due to moisture migration between ingredients in the different compartments is that some ingredients e.g. bleach (activators), colorants, enzymes etc. may decompose.

[0012] Without waiting to be found by any theory it is believed that this stability might be caused by moisture migration leading to peroxide development in the presence of bleach, s... peroxide potentially being detrimental to the stability of ingredients such as enzymes, colorants, bleach activators etc.

[0013] The present invention aims at providing alternative multi-compartment pouches of water-soluble material which have a reduced tendency of water migration between the compartments and which accordingly have a reduced tendency of weakening or damaging the partition between compartments and/or which have an increased stability of the detergent ingredients in the compartments.

[0014] Accordingly in a first aspect the invention relates to a multi-compartment package comprising from 2 to 5 compartments of water-soluble material, said package containing at least two different cleaning compositions and wherein said compartments are connected to each other and seperated by at least one flat seal area having a width of from 1 to 10 mm.

[0015] Although the multicompartment packages of the invention can be made by any suitable process it is especially preferred to produce the multi-compartment packages by a process of thermoforming.

[0016] Such a process may advantageously comprise the following steps:

(a) placing a first sheet of water-soluble film over a forming die having at least two cavities;
(b) heating the film to mould the film into said cavities thereby forming at least two recesses in the film;
(c) placing at least two different cleaning compositions in at least two different adjacent recesses;
(d) sealing a second sheet of film across the formed recesses to produce at least two closed adjacent compartments comprising at least two different cleaning compositions wherein said compartments are connected to each other and seperated by at least one flat seal area having a width of from 1 to 10 mm;
(e) cutting in such manner that a package is formed having two to five compartments, said package containing at

least two different cleaning compositions and wherein said compartments are connected to each other by said seal area.

[0017] Sealing can be done by any suitable method for example heat-sealing, solvent sealing or UV sealing. Particularly preferred is water-sealing.

Detailed description of the invention

[0018] The present invention providing multi-compartment pouches of water-soluble material containing at least two different cleaning compositions which have a reduced tendency of water migration between the compartments and which accordingly have a reduced tendency of weakening of damaging of the partition between compartments.

[0019] Preferably the compartments are separated by a seal with a width of from 1 to 10 mm, more preferred 2 to 9 mm, most preferred 3 to 7 mm.

[0020] Typically each compartment will have a top surface area adjacent to the seal area of from 0.5 to 50 cm^2, more preferred from 1 to 40 cm^2, most preferred from 1.5 to 35 cm^2.

[0021] Furthermore each compartment can have various shapes composed of curved or straight lines or combinations thereof for example triangle, hexagonal, round, square, ellipsal, rectangular. Preferred are rectangular, square or round forms.

[0022] Equally the perimeter of the entire multi-compartment package can have any form. For example a rectangular form, but other forms may equally be applied for example various shapes composed of curved or straight lines or combinations thereof for example triangle, hexagonal, round, square or ellipsal.

[0023] Preferably each compartment has a maximum depth of from 1 to 40 mm, more preferred from 2 to 35 mm, most preferred from 5 to 30 mm.

[0024] Also preferably the sides of the compartments are relatively steep e.g. the angle between the top surface area of the package and the sides of the package can advantageously be from 90 to 30 degrees, more preferably from 90 to 45 degrees, most preferred from 90 to 60 degrees.

[0025] Also if desired the release time of product from each compartment can be adapted by changing the steepness of the sides of the pack and or the curvature between the sides and the bottom of the pack. For example a compartment made in cavity with a continuously curved side/bottom area which only involves rounded corners (for example with an internal radius of more than 20 mm, for example from 30 to 100, more preferred from 40 to 80 mm will have a more even film thickness distribution and will therefore release its contents relatively slower than a compartment with more steep and square sides. Typically a compartment with relatively steep and square sides is characterised by a relatively small internal radius of curvature in the corner, said radius being from 0 to 20 mm, more preferred from 1 to 15 mm, most preferred from 3 to 10 mm.

[0026] A preferred embodiment of the invention relates to multi-packs composed of compartments of different size and/or different depth.

[0027] For example the ratio of top surface areas of the largest and the smallest compartment may be from 20 : 1 to 1 : 1, most preferred from 10 : 1 to 1.2 : 1, most preferred from 5 : 1 to 1. 3: 1.

[0028] Also preferably the ratio of the depth of the deepest compartment and the least deepest compartment may be from 10 : 1 to 1 : 1, more preferred 5 : 1 to 1.1: 1, most preferred from 3 :1 to 1.3 : 1.

[0029] Especially preferably compartments are shaped in such manner that the average film-thickness in one of the compartments differs from the average film-thickness in one of the other compartments. For example one of the compartment may have an average film thickness which is at least 10 %, more preferred at least 20 %, most preferred at least 25 % more than the film thickness of the compartment with the least average film thickness.

[0030] For this purpose the average film thickness can be determined by the following methods:

Method 1: average film thickness of a thermoformed product can be determined by dividing the original film thickness by the stretch factor, whereby the ratio of internal surface area to top surface area of a compartment (or recess) is defined as the stretch factor.

Method 2: average film thickness can also be determined by measuring the film thickness at various points in the recessed area for example at the middle of each side and at the bottom of the recess. The average film thickness can then be calculated by adding up the measured thicknesses and dividing by the number of measuring points. Preferably at least 4 measuring points are taken and also preferably none of the measuring points is in or very near a steep corner area.

[0031] Suitable methods to reduce the average film thickness generally stem from a high ratio of the top-surface area of the recess to the total internal surface of the recess. For example for a square recess having a top surface area of p * p and a depth d resulting in an internal surface area of (p * p + 4p * d). The ratio of internal surface area to

top surface area is defined as the stretch factor. Preferably each recess has a stretch factor of from 1.2 to 20, more preferred from 1.5 to 15, most preferred from 2 to 12.

[0032] Also preferably in a package according to the invention the ratio of the highest stretch factor to the lowest stretch factor is from 1.0 to 5.0, more preferred from 1.1 to 4.5, most preferred from 1.2 to 4.0.

[0033] Again the difference in stretch factor leading to a difference in average film thickness between the various compartments can be used to manipulate the release times of the ingredients in the different compartment. For example, a compartment with a high stretch factor could be used to effect fast release of components, for example most of the builder material -which is advantageously released fast- is contained in a compartment with a relatively high stretch factor, whereas a compartment with low stretch factor could be used to release ingredients in a more delayed fashion (e.g. advantageously perfume or softener ingredients). It will be understood that by changing the stretch factor per compartment a wide flexibility can be obtained to tailor the release profile of the various ingredients.

[0034] Preferably the film thickness to form the recessed compartments (before use, hence in unstretched form) is from 30 to 150 micrometer, more preferred from 40 to to 100 micrometer, most preferred from 60 to 90 micrometer. After stretching generally the average thickness will be from 10 to 150 micrometer, more preferred from 20 to 100 micrometer, most preferred from 30 to 80 micrometer. It will be appreciated that the film thickness used for preparing the recessed compartments -especially if they have a relatively high stretch factor- may advantageously be higher than the film thickness used for preparing the top surface area. In an advantageous embodiment of the invention the ratio of thickness of the first film to the thickness of the second film is therefore from 1 : 1 to 2 :1. Typical advantageous thicknesses for the top film may be from 20 to 100 micrometer, more preferred from 25 to 80 micrometer, most preferred from 30 to 60 micrometer.

Cleaning composition

[0035] The cleaning composition may be any type of cleaning composition for which it is desirable to provide a dose thereof in a water soluble sachet. For example the detergent composition may be in the form of tablets or briquettes. Preferably each cleaning composition is a particulate composition, a semi-solid or a liquid composition.

[0036] The multi-compartment packages of the invention comprise at least two different cleaning compositions. It will be appreciated that each of these cleaning compositions may be independantly selected from the above mentioned product forms e.g. each of the compositions may be particulate, semi-solid or liquid or the multi-compartment product according to the invention may comprise a combination of solid, semi-solid and liquid compositions.

[0037] For example, the detergent compositions may be a laundry (fabric cleaning, softening and/or treatment) compositions or machine dishwashing detergent compositions.

[0038] Each of the compositions is a cleaning composition, with this is meant that each composition has at least one functionality which is usually present in a cleaning composition. Examples of such functionalities are building, bleaching, perfuming, softening, cleaning, enzymes etc.

[0039] The multi-compartment packages of the invention comprise at least two different cleaning compositions, with that is meant that the formulation of the cleaning compositions is different either in its physical form, its composition or its colour. Sometimes it will be sufficient to only have minor differences between the cleaning compositions e.g. colour, perfume etc. Often however it will be advantageous to have clear differences for example a clearly different physical form of the cleaning composition. In this context suitably one of the cleaning composition may for example be a solid (e.g. a particulate or powdered formulation) while the other cleaning composition may be a liquid or a semi-solid.

[0040] Other advantageous combinations of cleaning compostions may involve the pre-dominant presence of at least one of the functionalities in one of the compositions. For example one of the cleaning compositions may comprises more than 75 % of the builder or bleach ingredients , while the other may for example comprise more than 75% of the surfactants or bleach activator ingredients. It will be within the ability of the skilled person to determine a suitable division of ingredients of the different cleaning compositions.

[0041] In an especially preferred embodiment of the invention the bleach component is predominantly (i.e. for more than 70%, most preferred more than 90%, most preferred more than 99 wt% based on the total weight of the bleach) present in one compartment of the multi-compartment pouch. Preferably the bleach component is present as (part of) a solid composition.

[0042] Also advantageously a liquid cleaning composition will be present in another compartment of the multi-compartment pouch, whereby the bleach containing and the liquid containing compartment are separated by the flat seal area as descibed above. Especially preferably such a liquid composition has a low water content of less than 10 wt%. Advantageous effects of the invention are especially apparent when one of the compartment comprise a liquid composition with from 0.5 to 9 wt% water, more preferred from 2 to 8 wt%. Such a liquid composition in one compartment can very advantageously be combined with a solid composition in one of the other compartments, such a solid composition is preferably a particulate composition, especially preferably comprising a bleach ingredient at a level of 5 to 100 wt%, more preferred from 5 to 60 wt%, most preferred from 20 to 50 wt% based on the total weight of the composition

in the second compartment.

[0043] The multi-compartment packages according to the invention may be suitable for use in (fabric) washing machines and in dishwashing machines amongst other applications. They can also be used in the manual laundry and dishwashing operations.

[0044] The detergent composition may contain particles which have been prepared by spray-drying or granulation and which contain a mixture of ingredients. Such particles may contain organic detergent surfactant and some, or all, of any water-softening agent (detergency builder) present in the composition.

Suitable granulation and spray drying methods are well known in the art. The spray dried or granulated particles may be optionally mixed with other materials to form the particulate detergent composition.

[0045] Preferably the particulate detergent composition may have a bulk density of at least 400 g/litre, preferably at least 500 g/litre, and most preferably at least 600 g/litre.

a) Surfactant Compounds

[0046] The detergent compositions typically comprise one or more organic surfactants. Many suitable detergent-active compounds are available and are fully described in the literature, for example, in "Surface-Active Agents and Detergents", Volumes I and II, by Schwartz, Perry and Berch.

[0047] The surfactant may be anionic (soap or non-soap), cationic, zwitterionic, amphoteric, nonionic or a combination of these. The preferred detergent-active compounds that can be used are soaps and synthetic non-soap anionic and nonionic compounds.

[0048] Anionic surfactant may be present in an amount from 0.5 to 50% by weight, preferably from 2% or 4% up to 30% or 40% by weight of the composition. Suitable examples include alkyl benzene sulphonates, particularly sodium linear alkyl benzene sulphonates having an alkyl chain length of C_8-C_{15}; olefin sulphonates; alkane sulphonates; dialkyl sulphosuccinates; and fatty acid ester sulphonates.

[0049] Suitable nonionic surfactant compounds include in particular the reaction products of compounds having a hydrophobic group and a reactive hydrogen atom, for example, aliphatic alcohols, acids, amides or alkyl phenols with alkylene oxides, especially ethylene oxide.

[0050] Specific nonionic surfactant compounds are alkyl (C_{8-22}) phenol-ethylene oxide condensates, the condensation products of linear or branched aliphatic C_{8-20} primary or secondary alcohols with ethylene oxide, and products made by condensation of ethylene oxide with the reaction products of propylene oxide and ethylene-diamine.

[0051] In a fabric washing composition, these organic surfactants preferably provide from 5 to 50% by weight of the overall composition. In a machine dishwashing composition, organic surfactant is likely to constitute from 0.5 to 8% by weight of the overall composition and is likely to consist of nonionic surfactant, either alone or in a mixture with anionic surfactant.

b) Water-softening agent

[0052] The detergent compositions may contain a so-called water-softening agent, which serves to remove or sequester calcium and/or magnesium ions in the water. In the context of a detergent composition containing organic surfactant, a water-softening agent is more usually referred to as a detergency builder.

[0053] When a water-softening agent (detergency builder) is present, the amount of it is likely to lie in a broad range from 5%, preferably 15 wt% up to 98% by weight of the composition. The amount is likely to be from 15 to 80% by weight, more usually 15 to 60% of the composition.

[0054] Water-softening agents may be provided wholly by water soluble materials, or may be provided in large part or even entirely by water-insoluble material with water-softening properties.

[0055] Alkali metal aluminosilicates are strongly favoured as environmentally acceptable detergency builders for fabric washing. Suitable crystalline sodium aluminosilicate ionexchange materials are described, for example, in GB 1 429 143 (Procter & Gamble). The preferred sodium aluminosilicates of this type are the well known commercially available zeolites A and X, the newer zeolite P described and claimed in EP 384 070 (Unilever) and mixtures thereof. This form of zeolite P is also referred to as "zeolite MAP". One commercial form of it is denoted "zeolite A24" (ex Ineos Silicas, UK).

[0056] The builder may also be a water-soluble phosphorus-containing inorganic softener for example alkali-metal orthophosphates, metaphosphates, pyrophosphates and polyphosphates. Specific examples of inorganic phosphate detergency builders include sodium and potassium tripolyphosphates, orthophosphates and hexametaphosphates.

[0057] Non-phosphorus water-soluble detergency builders may be organic or inorganic. Inorganics that may be present include alkali metal (generally sodium) carbonate; while organics include polycarboxylate polymers, such as polyacrylates, acrylic/maleic copolymers, and acrylic phosphonates, monomeric polycarboxylates such as citrates, gluconates, oxydisuccinates, glycerol mono- di- and trisuccinates,

carboxymethyloxysuccinates, carboxymethyloxymalonates, dipicolinates and hydroxyethyliminodiacetates.

c) Bleach System

[0058] The detergent compositions according to the invention may contain a bleach system. This preferably comprises one or more peroxy bleach compounds, for example, inorganic persalts or organic peroxyacids, which may be employed in conjunction with activators to improve bleaching action at low wash temperatures. If any peroxygen compound is present, the amount is likely to lie in a range from 10 to 85% by weight of the composition. If the composition contains surfactant and detergency builder, the amount of peroxygen compound bleach is unlikely to exceed 25%wt of the composition.

[0059] Preferred inorganic persalts are sodium perborate monohydrate and tetrahydrate, and sodium percarbonate, advantageously employed together with an activator. Bleach activators, also referred to as bleach precursors, have been widely disclosed in the art.

d) Further optional ingredients

[0060] Detergency enzymes may be employed in the compositions and are commonly employed in the form of granules or marumes, optionally with a protective coating, in amount of from about 0.1% to about 3.0% by weight of the composition.

[0061] The compositions may also contain a fluorescer (optical brightener), for example, Tinopal (Trade Mark) DMS or Tinopal CBS available from Ciba-Geigy AG, Basel, Switzerland. Tinopal DMS is disodium 4,4'bis-(2-morpholino-4-anilino-s-triazin-6-ylamino) stilbene disulphonate; and Tinopal CBS is disodium 2,2'-bis-(phenyl-styryl) disulphonate.

[0062] An antifoam material is advantageously included if organic surfactant is present; especially if the detergent composition is primarily intended for use in front-loading drum-type automatic washing machines.

[0063] It may also be desirable that the composition comprises an amount of an alkali metal silicate. A composition for machine dishwashing will frequently contain at least 20 wt% silicate.

[0064] Further ingredients which can optionally be employed in laundry detergent compositions of the invention include antiredeposition agents such as sodium carboxymethylcellulose, straight-chain polyvinyl pyrrolidone and the cellulose ethers such as methyl cellulose and ethyl hydroxyethyl cellulose, fabric-softening agents; heavy metal sequestrants such as EDTA; perfumes; and colorants or coloured speckles.

Sachet material

[0065] The sachet may is produced from a water-soluble film material, i.e. a substantially uniform material. Such film materials can for example be produced by a process of blowing or casting.

[0066] Water soluble materials which may be used to form the water soluble films are widely disclosed in the literature and include, for example, polyester amides, polyvinyl alcohol, copolymers of vinyl alcohol and methacrylate, polyethylene oxide, alginates, cellulose ethers such as carboxymethyl cellulose and methylcellulose, starches and starch derivatives, gelatin and any combination of these. Especially preferred is the use of polyvinyl alcohol

[0067] The desired degree of solubilisation and sachet strength can be achieved by matching the type of packaging material and its thickness such that the desired solubilisation time is achieved while still maintaining the desired strength.

[0068] The water soluble sachet is preferably mainly composed of poly vinyl alcohol (PVA) or of a co-polymer of poly vinyl alcohol and poly methyl acrylate (PVA-PMA). The term poly vinyl alcohol as used herein also includes partially hydrolysed poly vinyl acetates. The water soluble film can also contain minor quantities of plasticizers, antifoams, antioxidants, surfactants, perfumes and the like.

[0069] In use the sachets according to the invention are preferably, and conveniently, placed directly into the liquid which will form the wash liquor or into the area where this liquid will be introduced. The sachet dissolves on contact with the liquid, thereby releasing the particulate detergent composition.

EXAMPLE

[0070] The invention will be further described by reference to the following example. Further examples within the scope of the invention will be apparent to the skilled Person.

[0071] Figure 1A shows a first embodiment of the invention showing a rectangular two compartment package of water-soluble film produced by thermoforming two recesses followed by filling and sealing the top with a second sheet of film. The first compartment is a rectangular compartment having a length of about 33mm and a breadth of about 29 mm and maximum depth of about 15 mm. The angle between the top and the sides is approximately 90 degrees. The

stretch factor is about 2.9 and the internal radius of curvature in the corners between the sides and the bottom is about 2 mm. The second compartment is a smaller rectangular comparment having a length of about 29 mm, a breadth of about 16 mm and a maximum depth of about 7 mm. The angle between top and sides and the radius of curvature are substantially the same as for the first compartment. The stretch factor is about 2.3. The flat seal between the two compartments has a width of 3 mm.

[0072] A suitable thermoforming process for preparing a package according to Figure 1A is as follows. In this process a number of recesses are formed in a single sheet using a forming die having a plurality of cavities with dimensions corresponding generally to the dimensions of the packages to be produced. Each package will be produced from a set of two substantially rectangular recesses as shown in figure 1A. Further, a single heating plate is used for moulding the film for all the cavities, and in the same way a single sealing plate is described.

[0073] A first sheet of polyvinyl alcohol film (85 micrometer thickness) is drawn over a forming die so that the film is placed over the plurality of forming cavities in the die. Each cavity is generally rectangular shape.

[0074] Each group of 2 cavities further includes a surrounding flange. In order to maximise package strength, the film is delivered to the forming die in a crease free form and with minimum tension. In the forming step, the film is heated to 100 to 120 degrees C, preferably approximately 110 degrees C, for up to 5 seconds preferably approximately 700 micro seconds. A heating plate is used to heat the film, which plate is positioned to superpose the forming die. The plate includes a plurality depressions which correspond to the recesses on the forming die. During this preheating step, a vacuum is pulled through the pre-heating plate to ensure intimate contact between the film and the pre-heating plate, this intimate contact ensuring that the film is heated evenly and uniformly (the extent of the vacuum is dependant of the thermoforming conditions and the type of film used, however in the present context a vacuum of less than 0.6 bar was found to be suitable). Non-uniform heating results in a formed package having weak spots. In addition to the vacuum, it is possible to blow air against the film to force it into intimate contact with the preheating plate.

[0075] The thermoformed film is thus moulded into the cavities forming a plurality of recesses which, once formed, are retained in their thermoformed orientation by the application of a vacuum through the walls of the cavities. This vacuum is maintained at least until the packages are sealed. Further, the cavities are cooled to 8 degrees C by the circulation of liquid coolant through the forming die. Once the recesses are formed and held in position by the vacuum, the compositions, in this case a liquid and a powdered detergent, are added to each of the recesses, where in each group of 2 recesses results in one recess filled with liquid detergent and one with powdered detergent. The fact that formed recesses are retained in their formed orientation by the vacuum substantially prevents the formed film shrinking, which if not prevented could result in some of the compositon in the recesses spilling or splashing out of the recess and onto that portion of film which overlies the sealing flange resulting in poor sealing. A second sheet of polyvinyl alcohol film (65 micrometer thickness) is then superposed on the first sheet covering the filled recesses and heatsealed thereto using a heating plate. In this case the heat sealing plate, which is flat, operates at a temperature of about 140 to 160 degrees centigrade, and contacts the films for 1 to 2 seconds and with a force of 8 to 30 kg/cm^2 , preferably 10 to 20 kg/cm^2 .

[0076] The flanges surrounding each cavity ensures that the films are sealed together along the flange to form a continuous closed flat seal.

[0077] Once sealed, the packages formed are separated from the web of sheet film using cutting means, whereby the cutting is done such that the two compartments of one single package remain connected to each other by a flat seal area. At this stage it is possible to release the vacuum on the die, and eject the formed packages from the forming die. In this way the packages are formed, filled and sealed while nesting in the forming die. In addition they may be cut while in the forming die as well.

[0078] During the forming, filling and sealing steps of the process, the relative humidity of the atmosphere is controlled at ca. 50%. This is done to maintain the heat sealing characteristics of the film. When handling thinner films, it may be necessary to reduce the relative humidity to ensure that the films have a relatively low degree of plasticisation and as such tend to be stiffer resulting in easier handling.

[0079] A liquid cleaning composition for use in accordance to the invention is:

Ingredient	Parts by weight
Alcohol Ethoxylate Nonionic (7EO)	20
LAS (alkylbenzene sulphonic acid, as acid)	23
Coco fatty acid	17
Monoethanolamine	11
Enzymes (Protease, cellulase)	1

(continued)

Ingredient	Parts by weight
Monopropylene Glycol	20
Polymers (Acrylic/styrene copolymer, polyvinylpyrrolidone)	1
Minors (perfume, colourant)	<1
Water	5.5
*NB water originating from the raw materials and/or added during processing.	

[0080] A detergent powder was made of the following composition by pregranulating the granule ingredients, followed by post-dosing the rest of the ingredients :

Ingredient	Parts by weight
Granules	
Na-las	1.1
Nonionic 7EO	0.5
Soap (C16-C18)	0.1
Zeolite A24	2.4
NaAc3aq	0.3
Light soda ash	0.4
SCMC (68%)	0.1
Moisture/minors	0.4
Post-dose	
Antifoam granule (17 % active)	3.2
Fluorescer granule (15 % active)	2.5
TAED (83% active)	8.8
Coated Percarbonate	40.6
Blue speckles	1.4
Granular sodiumdisilicate (80% active)	6.5
Trisodiumcitrate 2aq.	32.5
Enzymes, sequestrants, perfume	4.5

[0081] The above product formulations were dosed into the packages of figure 1A as follows: the larger compartment contained 40 grammes of solid formulation 1, the smaller compartment 15 grammes of liquid formulation.

Example II

[0082] The side by side package of figure 1A was filled with 18.0 grammes of a liquid formulation as indicated below (larger compartment) and 8.5 grammes of a solid formulation as indicated below (smaller compartment).

Liquid formulation	**[wt%]**
Alcohol Ethoxylate (7EO)	20.2
LAS acid	20.0
Coco fatty acid	15.0
Monopropyleneglycol	25.0
Monoethanolamine	9.5

(continued)

Liquid formulation	[wt%]
Minors (enzymes, perfume, polymers, etc)	7.5
Blue dye	0.0012
Water	3.0

Powder formulation	[g]
Sodium Percarbonate granules	7.0
TAED (83%) granules	1.5

[0083] As a comparison the same formulation in the same amounts were filed in a so-called back to back sachet whereby the two compartments are in superposed position in accordance to the example of WO02/42408.

[0084] The two compartments sachets were stored at 37°C.

[0085] The stability of the blue dye in the liquid formulation was measured by measuring the blue colour intensity over time. The side by side package of figure I resulted in a significant better colour stability than the use of the comparative package in accordance to WO02/42408.

[0086] The stability of the TAED in the solid formulation was measured after 4 weeks and after 11 weeks storage at 37 °C.

The side-by side package had a TAED stability (measured as percentual residual TAED activity) of 62.4 (4 weeks) and 44.4 (11 weeks). This is markedly better than the TAED stability in the comparative package which was 54.5 (4 weeks) and 22.7 (11 weeks).

Claims

1. A multi-compartment package comprising from 2 to 5 compartments of water-soluble material, said package containing at least two different cleaning compositions and wherein said compartments are connected to each other and seperated by at least one flat seal area having a width of from 1 to 10 mm.

2. A package according to claim 1 manufactured by a process of thermoforming.

3. A package according to claim 1, wherein the compartments are separated by a seal with a width of from 2 to 9 mm, most preferred 3 to 7 mm.

4. A package according to claim 1, wherein each compartment has a top surface area adjacent to the seal area of from 0.5 to 50 cm^2.

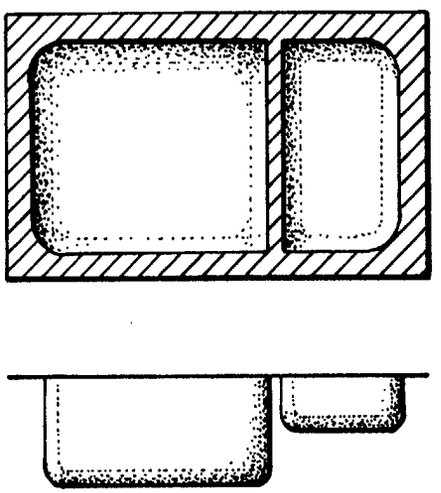
5. A package according to claim 1, wherein at least one of the cleaning compositions is a solid and least on of the other cleaning compositions is a liquid or a semi-solid.

6. A package according to claim 1, wherein the bleach component is predominantly present in one compartment of the multi-compartment package.

7. A package according to claim 1, wherein at least one of the cleaning compositions is a liquid cleaning composition having a water content of less than 10 wt%.

8. A package according to claim 1, wherein a first compartment comprises a liquid composition comprising from 0.5 to 9 wt% water based on the total weight of the composition in the first compartment, and a second compartment comprises a particulate solid composition comprising a bleach ingredient at a level of 5 to 100 wt based on the total weight of the composition in the second compartment.

Fig.1A.



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Application Number
EP 03 07 6743

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Place of search	Date of completion of the search	Examiner
MUNICH	3 September 2003	Bevilacqua, V

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