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(54) **Lavatory blocks**

(57) The invention provides a lavatory cleansing and freshening block comprising a solid phase and a gel phase, in which:
the gel phase contains from 2% to 90% by weight per-

fume (based on the total weight of the gel phase) and is positioned on the surface of the solid phase.

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DescriptionField of the Invention

[0001] The present invention relates to lavatory blocks.

Background and Prior Art

[0002] Lavatory blocks are known in the art and are typically configured to provide an automatic and sustained release of active ingredients to the lavatory environment. For example, they may be suspended in a container under the rim of a lavatory bowl or urinal such that, during a flushing cycle, water from the cistern flows over the block thereby dissolving a portion of the block and releasing active ingredients of the block into the lavatory bowl.

[0003] In recent years it has become desirable that lavatory blocks contain a number of active ingredients in order to provide multiple lavatory care benefits such as cleansing, disinfection and fragrancing.

[0004] Formulating and processing blocks with multiple active ingredients can lead to problems due to the physical and/or chemical incompatibility of such ingredients. For example, it has become commonplace for lavatory blocks to contain a halogen release agent or other bleaching agent. Such materials are powerful chemically reactive species, which are difficult to combine with other oxidation sensitive components (such as perfumes), particularly since blocks are commonly made by extrusion which subjects the ingredients to elevated temperatures and pressures.

[0005] WO00/23558 describes how it is possible to provide a viable two-part lavatory cleansing block containing bleach and bleach-incompatible substances by extruding two compositions, only one of the compositions containing the bleach, and the other composition containing a component which is incompatible with the bleach, and ensuring that the two compositions do not have a common hydrophobe component. This is said to prevent the migration of the bleach sensitive component. Preferably the block parts are co-extruded side-by-side. A problem with such co-extrusion is that it places constraints on the formulation and the physical properties of the constituent block parts. For example, it is difficult to co-extrude parts of significantly different rheologies.

[0006] Furthermore, it is desirable that lavatory blocks continue to produce lavatory care benefits (such as fragrancing) throughout the useful life of the block, which is typically around 3 to 4 weeks under normal domestic use conditions. A problem with the incorporation of high levels of perfume into blocks formed by an extrusion process is that such incorporation may produce an overplasticised or sticky formulation consistency that is difficult to extrude. Also, perfume materials are normally hydrophobic and high levels may tend to ooze out from the block during manufacture and/or storage.

[0007] US 5,759,974 describes a WC stick with a relatively high fragrance content in a cast core. This is said to have the advantage of the possibility of incorporating very large quantities of perfume in the core. The stick is manufactured by extruding a hollow shell, cutting the shell to its final length, and placing on a support in such a way that the moulding is closed underneath. The shells are then filled with the molten core material containing the perfume by means of a casting trolley. A problem with this manufacturing method is that it is difficult to scale up and/or operate as a continuous process.

[0008] WO03/0426 describes how the fragrance life of an in-the-bowl (ITB) toilet article may be extended by placing the perfume in the second chamber of a dual chamber housing so that the perfume is not in the path of the flushing toilet water. The first chamber has an inlet and an outlet opening for water flow and typically contains a cleaning, disinfectant or anti-limescale composition in solid block form which fits into the chamber. A problem with this proposal is that the dual chamber housing is an expensive configuration to manufacture. Also, since the perfume is placed within a gel system which is deposited in the second chamber of the housing, this means that the entire housing will need replacing by the consumer once the perfume is exhausted.

[0009] The underlying objective of the present invention is to resolve one or more of the problems outlined above.

Summary of the Invention

[0010] The present invention provides a lavatory cleansing and freshening block, comprising a solid phase and a gel phase, in which the gel phase contains from 2% to 90% by weight perfume (based on the total weight of the gel phase) and is positioned on the surface of the solid phase.

[0011] The gel phase releases perfume during as well as between the flushes

Detailed Description of the InventionProduct Form and Process

5 **[0012]** Preferably the solid phase of the block according to the invention has a recess moulded on an outer surface in which the gel phase is positioned.

[0013] The solid phase of the block according to the invention is preferably formed by a process which includes extrusion.

10 **[0014]** A preferred process used to form the solid phase of the block is an extrusion process in which a mixture of the constituent ingredients of the solid phase is extruded into a continuous bar of solid phase which is subsequently cut into pieces of the desired size.

[0015] The solid phase may be in the form of a single, homogeneous composition, or alternatively may be in the form of one or more layers. Such a multi-layered solid phase may suitably be produced by extrusion of the layers as complementary shapes which are brought together, or preferably by co-extrusion of the two layers side-by-side into a continuous bar as above. The provision of a multi-layered solid phase is advantageous because it enables incompatible components such as bleach and dye, or bleach and bleach activator, to be segregated by placing them in different layers, thereby enhancing stability and performance of the block.

15 **[0016]** The solid phase of the block preferably has a recess moulded on an outer surface thereof, more preferably a longitudinal surface. Preferably the recess extends along the entire length or width of the longitudinal surface of the solid phase of the block as a strip or groove.

20 **[0017]** The recess may be moulded on an outer longitudinal surface of the solid phase of the block by stamping, or preferably by extruding the constituent ingredients of the solid phase through a specially shaped extruder head so that the recess is formed in an outer longitudinal surface of the solid phase as it is extruded. This latter process is advantageous since it avoids the need for a separate recess-moulding step and so enables the overall manufacturing process of the block to be operated continuously.

25 **[0018]** The gel phase is positioned in the recess of the solid phase. Preferably it is put into position by injection into the recess. In a more preferred process, the constituent ingredients of the gel phase are heated, mixed and dosed through a nozzle into the recess of the solid phase.

30 **[0019]** In a most preferred process, the constituent ingredients of the solid phase are extruded through a specially shaped extruder head to form a recess as described above, and the extrudate so formed is mounted to travel upon a belt conveyor which is arranged so that the gel phase may be injected continuously into the recess of the solid phase as it travels along the belt conveyor, for example by dosing the gel phase into the recess through a nozzle as described above. Cooling and cutting of the gel-filled extrudate so formed may then take place to produce the final lavatory block according to the invention. Again this enables continuous operation of the block manufacturing process.

35 **[0020]** Fig 1 depicts an extruded block having a recess moulded along the entire length of a longitudinal surface of the solid phase 1, which is filled with the gel phase 2. Fig. 2 depicts an extruded block having a recess moulded along the entire width of a longitudinal surface of the solid phase 1, which is filled with the gel phase 2.

[0021] The weight ratio of solid phase to gel phase in the block according to the invention suitably ranges from 40:1 to 5:1, preferably from 30:1 to 5:1, more preferably from 25:1 to 10:1, more preferably from 25:1 to 12.5:1.

Solid Phase

40 **[0022]** Suitable substances used to form the solid phase include surfactants, hygiene agents, fillers, whiteners and complexing agents.

Surfactants

45 **[0023]** Surfactants serve to provide a cleansing and foaming effect. The total amount of surfactant, when present, will generally range from 10 to 70wt%, more preferably from 20 to 50wt% (by weight based on the total weight of the solid phase).

[0024] Anionic surfactants are preferably used. Suitable anionic surfactants include alkali metal or ammonium alkylaryl sulphonates (especially alkyl benzene sulphonates), alkane sulphonates, alkyl sulphates and sarcosinates.

[0025] Improved foaming properties are obtained by the use of a surfactant system which comprises primary alkyl sulphate (PAS) together with other anionic surfactants.

55 **[0026]** Preferably the solid phase comprises from 1 to 20wt%, more preferably from 5 to 15wt% of a primary alkyl sulphate (by weight based on the total weight of the solid phase), and from 5 to 40wt%, more preferably from 10 to 35wt%, even more preferably from 15-35% of other anionic surfactants (by weight based on the total weight of the solid phase). Preferred other anionic surfactants are sulphonate anionic surfactants, such as alkyl benzene sulphonates

(ABS).

Hygiene agents

[0027] Hygiene agents may be used in the solid phase to inhibit germs and keep the lavatory clean. The total amount of such materials, when present, will generally range from 5 to 50wt%, more preferably from 5 to 30wt% (by total weight of hygiene agent based on the total weight of the solid phase).

[0028] Preferred hygiene agents for use in the block according to the invention are bleaching agents, optionally in combination with one or more bleach activators.

[0029] Suitable classes of bleaching agent include materials which release active halogen and materials which release active oxygen. Examples from these classes include chlorinated cyanuric acid derivatives such as sodium dichloroisocyanurate; halogenated hydantoins such as 1,3-dichloro-5,5-dimethyl hydantoin, bromochloro-5,5-dimethyl hydantoin and 1,3-dichloro-5-ethyl-5-methyl hydantoin; alkali metal percarbonates such as sodium percarbonate, and alkali metal perborates such as sodium perborate (monohydrate and tetrahydrate). Preferred examples are sodium percarbonate and sodium perborate monohydrate.

[0030] Preferably the solid phase comprises from 5 to 15wt%, more preferably around 10wt% of an oxygen bleach such as alkali metal perborate (by weight based on the total weight of the solid phase), and from 1 to 10wt%, more preferably around 6wt% of a bleach activator such as tetraacetylene-diamine (TAED). Most preferably the perborate and TAED are segregated into different layers of the solid phase.

Fillers

[0031] Typically, the solid phase of the block according to the present invention comprises up to 60% by weight of a filler. Preferred levels of filler range from 30 to 50wt% (by total weight filler based on the total weight of the solid phase).

[0032] Suitable fillers include urea, sodium, magnesium and calcium carbonates, sodium chloride, borax, talc and sodium, magnesium and calcium sulphates.

[0033] Preferably the solid phase comprises from 10 to 25wt% of a sulphate filler, most preferably sodium sulphate (by weight based on the total weight of the solid phase), and from 15 to 35wt% of a carbonate filler, most preferably calcium carbonate (by weight based on the total weight of the solid phase).

Whiteners and colouring agents

[0034] Whiteners and/or colouring agents may be present in the solid phase of the block according to the present invention, particularly when the solid phase has a multi-layered structure. If present, these materials should be chosen such that they are compatible with any bleaching agent present. Suitable colouring agents include Pigment Blue 15 (CI 74160) and Pyramid S Green TM, ex Minchem. Titanium dioxide is an acceptable whitener. Levels of whiteners and/or colouring agents are typically below 5wt% by total weight based on the total weight of the solid phase.

Complexing Agents

[0035] The solid phase may usefully contain complexing agents for water hardness and also for the heavy metal ions often encountered in water such as iron and manganese.

Furthermore, the complexing agent may also improve the stability of any bleaching agent in the solid phase.

[0036] Examples of suitable classes of complexing agents are aminopolycarboxylic acids, polyphosphonic acids and their salts, polymeric polycarboxylic acids and their salts, and hydroxypolycarboxylic acids and their salts. Preferred are polyphosphonic acids and salts such as EDTMP (ethylene diamine tetra(methylene phosphonate)), Ca/Na salt.

[0037] Preferably the solid phase comprises from 0.1 to 0.5wt% complexing agent (by weight based on the total weight of the solid phase).

Optional ingredients

[0038] The solid phase of the block according to the invention may comprise a processing aid to assist in extrusion. Suitable processing aids include oils (including both mineral and silicone oils), esters, alcohol ethoxylates, polybutene and most preferably glycol ethers. The preferred level of glycol ether is up to 4.5wt% (by weight based on the total weight of the solid phase). Furthermore the solid phase may comprise a perfume which may also partly or totally perform the function of processing aid.

Gel Phase

[0039] The gel phase contains from 2 to 90% by weight of perfume (based on the total weight of the gel phase) and is positioned in the recess of the solid phase, preferably by injection.

[0040] Preferably the gel phase contains 25-90%, more preferably 40% to 70%, even more preferably 40-60% by weight perfume (based on the total weight of the gel phase).

[0041] Suitable methods of forming the gel phase include heating, melting and mixing the perfume and gel together in a vessel, or alternatively, heating and melting the gel in a vessel, followed by adding the perfume to the melted gel and then mixing.

[0042] The perfume may be a single discrete ingredient, but more typically will be a complex blend of volatile liquid (and some solid) ingredients of natural and/or synthetic origin.

[0043] Suitable gelling agents may be selected by those skilled in the art, and include absorbents, starch based systems, modified celluloses, natural gums and other materials which can form a gel when mixed with the perfume.

[0044] Preferred gelling agents are those which do not dissolve in water.

[0045] Further preferred gelling agents used to form the gel phase in the block according to the invention are polyamide resins. Particularly preferred are ester-terminated polyamide (ETPA) resins, such as are described in US 5,783,657, and tertiary amide-terminated polyamide (ATPA) resins, such as are described in US 6,268,466. These materials create clear gels in a wide variety of solvents.

[0046] Suitable resins are available commercially from Arizona Chemicals as UNICLEAR[™] and SYLVACLEAR[™] gellants. Particularly preferred are UNICLEAR[™] 100 and SYLVACLEAR[™] A200.

[0047] A preferred gel phase for use in the block according to the invention may be prepared by warming the gelling agent, preferably a polyamide resin as described above, and the perfume with gentle mixing. At an elevated temperature, typically around 65 to 70 degrees C, the gelling agent and the perfume form a solution or dispersion. The warm liquid mixture may be injected into the recess of the solid phase of the block as described above.

[0048] The gel phase may include other optional additives as commonly used in the art, including solvents or carriers, inert additives such as pigmented or pearlescent particles for aesthetic purposes, or soluble additives such as colourants. Solvents are not required to form the gel, but may be used to dilute perfume ingredients to a suitable concentration. Hydrophobic solvents are generally preferred for this purpose and well known examples are C1-C4 esters of C8-C20 fatty acids.

[0049] The gel phase of the blocks according to the invention is preferably insoluble in water and thereby substantially retains its shape and size during the entire lifetime of the block.

Product Usage

[0050] Blocks according to the invention are preferably arranged in suitable holders such as cage or basket-like containers which can be suspended over the lavatory rim in such a position that they can be reached by the flush water which flows past whenever the lavatory is flushed. They are normally suspended from the inner rim of the lavatory bowl, for example by a hook.

[0051] The invention will now be illustrated by the following nonlimiting Example, in which all percentages are by weight based on total weight, unless otherwise indicated.

EXAMPLE

[0052] Lavatory blocks were prepared having a two-layer solid phase with ingredients as shown in the following Tables:

<u>Layer A</u>	
INGREDIENT	LEVEL (wt% of total layer)
Sodium ABS ⁽¹⁾	21.000
Sodium PAS ⁽²⁾	7.000
Sodium Perborate Monohydrate	20.000
EDTMP Ca/Na salt ⁽³⁾	0.204
Calcium Carbonate	19.850
Sodium Sulphate	19.772

(continued)

Layer A	
INGREDIENT	LEVEL (wt% of total layer)
Titanium Dioxide	1.000
Colourant ⁽⁴⁾	1.000
Glycol Ether ⁽⁵⁾	3.750
Minors	to 100%

Layer B	
INGREDIENT	LEVEL (wt% of total layer)
Sodium ABS ⁽¹⁾	21.000
Sodium PAS ⁽²⁾	7.000
TAED granules (83% a.i.)	12.450
EDTMP Ca/Na salt ⁽³⁾	0.204
Calcium Carbonate	23.000
Sodium Sulphate	23.122
Titanium Dioxide	0.500
Glycol Ether ⁽⁵⁾	3.750
Minors	to 100%

⁽¹⁾Nansa™ HS 80/L, (80% a.i.), ex Huntsman

⁽²⁾Empicol™ LZ-V, (90% a.i.), ex Huntsman

⁽³⁾Dequest™ 2047, (34% a.i.), ex Solutia

⁽⁴⁾Pyramid S Green, ex Minchem

⁽⁵⁾Dowanol™ DPNB, ex Dow

[0053] The solid phase was formed by an extrusion process in which the ingredients of each layer were mixed and co-extruded as a plasticised mass through an extruder head so as to form a continuous bar of the two layers A and B side-by-side. The extruder head was shaped so as to produce a groove of 10 mm width extending along the entire length of one of the outer longitudinal surfaces of the bar, and spanning the two layers A and B.

[0054] A gel phase was prepared by mixing 50wt% UNICLEAR™ 100, ex Arizona Chemical, 49.988wt% perfume (EMPTYSKY 375, ex IFF) and 0.012wt% dye (Sudan Blue, ex BASF) in a mixer heated by a heating jacket to 65 to 70 degrees C and equipped with a pump and nozzle. The hot gel phase was dosed by pumping it through the nozzle so as to inject it into the recess of the solid phase which was mounted to run upon a belt conveyor into the path of the nozzle.

[0055] After cooling, the gel-filled bar of solid phase so produced was then cut into 48mm lengths to form the final lavatory blocks.

[0056] The blocks were tested by placing in a cage suspended over the rim of a lavatory which was contained in a booth measuring 4.35 cubic meters and which was flushed 15 times a day. The perfume intensity of the blocks was evaluated on a scale of 1 to 10 by a panel of 20 subjects.

[0057] The blocks of the invention gave improved perfume performance over 160 flushes compared to control blocks of equivalent dimensions and solid phase composition, but in which the perfume was distributed throughout the block rather than incorporated into a separate gel phase. The improved perfume performance of the blocks of the invention was observed even with lower overall levels of perfume than in the control blocks (1g vs 1.6g), and was consistent over the life of the block and also in between flushes.

Claims

1. A lavatory cleansing and freshening block comprising a solid phase and a gel phase, in which the gel phase

contains from 2% to 90% by weight perfume (based on the total weight of the gel phase) and is positioned on the surface of the solid phase.

2. A block according to claim 1, in which the solid phase is in the form of one or more layers.
3. A block according to claim 1 or claim 2, in which the solid phase comprises from 10 to 70wt% of surfactant (by weight based on the total weight of the solid phase).
4. A block according to any one of claims 1 to 3, in which the solid phase comprises from 5 to 15wt% of an alkali metal perborate (by weight based on the total weight of the solid phase), and from 1 to 10wt% a bleach activator (by weight based on the total weight of the solid phase).
5. A block according to any one of claims 1 to 4, in which the solid phase comprises from 0.1 to 0.5wt% of a complexing agent (by weight based on the total weight of the solid phase).
6. A block according to any one of claims 1 to 5, in which the gel phase is formed from a polyamide resin.
7. A block according to claim 6, in which the polyamide resin is an ester-terminated polyamide (ETPA) resin or a tertiary amide-terminated polyamide (ATPA) resin.
8. A block according to any one of claims 1 to 7, in which the gel phase contains from 40 to 60% by weight perfume (by weight based on the total weight of the gel phase).
9. A block according to any one of claims 1 to 8, in which the recess extends along the entire length of the outer longitudinal surface of the solid phase as a strip or groove.
10. A process for producing a block according to any one of claims 1 to 9, comprising the steps of:
 - i) forming a solid phase by extruding a mixture of the constituent ingredients
 - ii) moulding a recess in an outer longitudinal surface of the solid phase
 - iii) injecting a gel phase into the recess.
11. A process according to claim 10 comprising the steps of:
 - i) extruding the mixture of ingredients for the solid phase through a shaped extruder head which forms the recess in an outer longitudinal surface of the solid phase
 - ii) mounting the extrudate so formed upon a belt conveyor which is arranged so that the gel phase may be injected continuously into the recess of the solid phase as it travels along the belt conveyor, and
 - iii) cutting the gel-filled extrudate so formed into pieces of the desired size.
12. A process according to claims 10 or 11, in which the constituent ingredients of the gel phase are heated, mixed and dosed through a nozzle into the recess in the solid phase.

Fig.1.

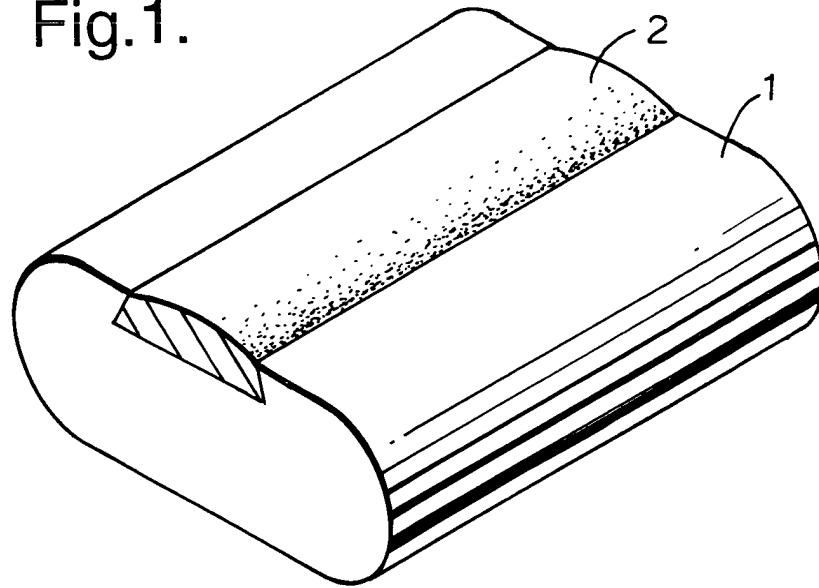
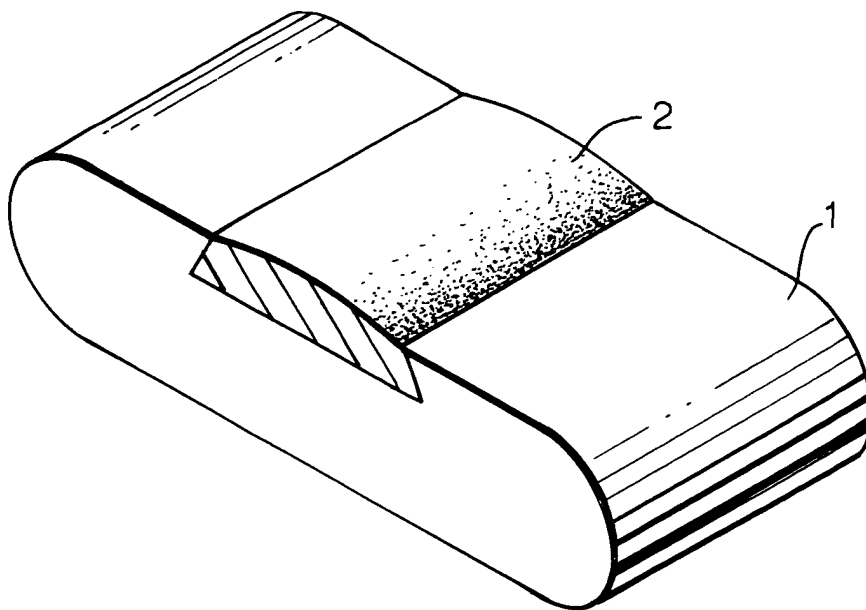


Fig.2.





European Patent
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Place of search The Hague		Date of completion of the search 13 April 2005	Examiner Neys, P
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