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(54) **Detergent tablets having more than four side surfaces**

Waschmitteltabletten mit mehr als vier Seitenflächen

Pastilles de détergent dotées de plus de quatre surfaces latérales

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- **Mol, René**
7913 TL Hollandscheveld (NL)
- **Ruiter, Marco**
8032 BJ Zwolle (NL)
- **Van Ommen, Janco**
8031 EZ Zwolle (NL)

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(74) Representative: **f & e patent**
Braunsberger Feld 29
51429 Bergisch Gladbach (DE)

(73) Proprietor: **Dalli-Werke GmbH & Co. KG**
52224 Stolberg (DE)

- (72) Inventors:
- **Beenen, Henk**
8017 LN Zwolle (NL)
 - **De Boer, Robbert**
8167 PH Oene (NL)

(56) References cited:

WO-A1-92/20775	WO-A1-99/27063
WO-A1-2006/021284	DE-A1- 10 064 635
DE-A1-102004 040 330	US-A- 4 587 031

EP 2 388 309 B2

Description

[0001] The present invention refers to detergent tablets in form of pressed bodies having an upper and a lower surface and more than four side surfaces, wherein the tablet has 8 or 10 edges of equal angles and 8 or 10 side surfaces of the same length, wherein the side surfaces have equal length and the edges have equal angles, accordingly, the tablet is in the form of a symmetrical polygon.

[0002] Detergent tablets like e.g. automatic dishwashing detergent tablets or laundry detergent tablets in Europe commonly are provided in form of bars or pressed bodies having an upper and a lower surface, four 90° angles and two longer and two shorter sides. Accordingly, considered in an onview they have a rectangular form wherein dimensions of about 34 mm length and about 25 mm width are usual. Said form fits perfectly in the applied dosing chambers of automatic dishwashing machines or laundry machines in the European market.

[0003] Modern raw materials show that it becomes possible to reduce the dose per wash for automatic dishwashing detergents (ADD's) without losing on performance aspects. Until recent year it was market standard that dosing weights of about 20 grams (up to 24 grams) were necessary to obtain a desired performance. New raw materials, like better builders, enzymes and polymers, created the option to reduce the dose of the ADD's.

[0004] Decreasing tablet weights and maintaining the upper and lower surface of about 34 by 25 mm, results in thinner tablets. This has the disadvantage that the tablets become more fragile, resulting in potential breaking / damage during production, packaging or transport. So it is desirable to find a way to reduce the weight of the tablets, without significantly reducing the thickness of the tablets or to find other ways to overcome the problem of the increased vulnerability.

[0005] The object of the present invention was to provide stable detergent tablets providing a unit dose of a modern detergent which are easy to handle during preparation, transport and packaging process.

[0006] This object is met by a detergent tablet having an upper and a lower surface and 8 to 10 edges of equal angles and 8 or 10 side surfaces of the same length, wherein the side surfaces have equal length and the edges have equal angles, accordingly, the tablet is in the form of a symmetrical polygon.

[0007] With "edges" according to the present application the contact points or contact areas are meant connecting the side surfaces of the tablets to each other. Thus, the upper and the lower surface of the tablet are parallel to each other wherein the angels connecting them to the side surfaces are essentially 90° (upper or lower surface to the side surfaces), whereas the side surfaces are connected to each other by equal angels, wherein the side surfaces all have the same length. Accordingly, the tablet is in the form of a symmetrical polygon. The tablet has 8 or 10 edges of equal angels and 8 or 10 side surfaces of the same length. Most preferred the tablet has 8 edges and 8 side surfaces of the same length resulting in an octagon (onview).

[0008] Due to the modern raw materials for detergent compositions a unit dose of a detergent composition decreases in weight. Accordingly smaller detergent tablets have to be provided. During development of the present invention several embodiments of tablet forms have been prepared and tested.

[0009] Rectangular tablets having less width than commonly used up to now result in a lower stability, are difficult to steer or arrange during the processing, e.g. on a transport belt and during a wrapping process. Accordingly the speed of preparation, transport, optionally wrapping and packaging has significantly decreased to obtain not too much degraded material. Besides these aspects also the flow wrappers need significant modifications if the width of the tablets is decreased noticeable.

[0010] Tablets having a decreased length without modifying the width (up to a tablet having 4 equal side surfaces and 90° angles) show the tendency to turn during the transport to the wrapping angles or packaging station. Accordingly blockages occur and the edges of the tablets can break. This results in a high dust charge. Furthermore it becomes difficult to steer or arrange the tablets for further processing e.g. for the wrapping or packaging process.

[0011] Round tablets having a diameter of about 25 mm (corresponding to the width of the presently commonly used tablets) have shown to eliminate the problems of breaking edges of the tablets and of steering / arranging the tablets during the transport on the conveyor belts for further processing. However, the round tablets showed the tendency to spin on the conveyor belt, activated by the steering rails on the side of said belts. The spinning causes significant abrasion of the tablets, resulting in an undesired dust formation. This might be overcome e.g. by a protecting coating on the tablets, however, this decreases the production speed and increases the preparation costs.

[0012] Surprisingly it has been found that if tablets are prepared having more than four edges, such as according to the invention 8 or 10, more preferably 8 edges and side surfaces of similar length the tablets obtain the tendency to position themselves in a correct position during the belt transport to the next processing station like a flow wrapper or a package station, without the tendency to block the transport due to turning and breaking of the tablet edges. Furthermore, no spinning occurs and accordingly the dust charge is low. The best results were obtained with octangular tablets (octagon in onview).

[0013] The detergent tablets of the present invention can be prepared from any known detergent compositions providing e.g. automatic dishwashing compositions, laundry detergent compositions, beaching compositions, water softening compositions or stain remover compositions.

[0014] The composition serving as a basis for the detergent tablets of the present invention is not limiting the invention, since it is not essential which type of detergent composition is representing the tablet. Any detergent composition which can be provided in form of a tablet can be used according to the invention.

[0015] Tablets of the present invention representing automatic dishwashing tablets preferably have a width of about 18 to 34 mm, preferably of about 20 to 32 mm, more preferably of about 22 to 30 mm and most preferred of about 24 to 28 mm. Since all side surfaces have the same length the tablet has a "diameter" (width between two parallel side surfaces) as mentioned before.

[0016] Such automatic dishwashing tablets have a decreased weight compared to the up to now commonly used dishwashing tablets, preferably a weight between 8 and 20 g, more preferred between 9 and 18 g and most preferred between 10 and 16 g.

[0017] Tablets of the present invention representing laundry detergent tablets preferably have a width of about 30 to 70 mm, preferably of about 35 to 55 mm and most preferred of about 40 to 50 mm. In the preferred case where all side surfaces have the same length the tablet has a "diameter" (width between two parallel sides) as mentioned before.

[0018] Laundry detergent tablets preferably have a weight of 15 to 70 g, preferably 20 to 50 g and most preferred of about 25 to 45 g.

[0019] The present form of the tablets results in stable tablets which are easy to process and to handle. In particular the present tablets have less tendency to break and can be placed in the dosing chambers of any common dishwashing and laundry machine.

[0020] The tablets, particularly automatic dishwashing tablets, of the present invention can be wrapped by any film, foil or paper, as presently known in the art. Due to their essentially unchanged width and thickness compared to up to now commonly produced tablets the wrapping equipment and wrapping machines don't have to be changed significantly.

[0021] Furthermore the tablets of the present invention can be coated with any of the known coating compositions for detergent tablets. Such coating compositions are extensively described in the state of the art. Which type of such coatings is used is not limiting the invention.

[0022] Preparation of the tablets can be carried out by pressing a particulate detergent composition e.g. in a mould, by sintering a detergent composition, by melting and solidifying a detergent composition or by a mixture of said methods or by any other process known for preparing detergent tablets. The preparation process is not limiting the invention as long as a tablet is obtained having the properties as described above and claimed.

[0023] The tablets can represent a unit dose for automatic dishwashing, for laundry washing or for any other desired use, wherein the tablet can consist of one continuous phase or of several phases like different tablet parts, preferably different layers, an inlay, an additional part attached on at least one of the surfaces or a filled cavity. If the tablet comprises different phases it is preferred that these phases differ in their composition, e.g. providing different detergent ingredients at different time periods during the wash cycles of an automatic dishwashing machine. The tablet can comprise one, two, three, four, five or more different phases, preferably one, two or three. Examples for such tablets are multilayer tablets, tablets providing a cavity which is filled with a liquid, particulate or solid additive, tablets with a non-compressed portion on at least one of their upper or lower surfaces and tablets including an inlay.

[0024] The present invention provides a detergent tablet which can be prepared from any known detergent composition using any of the commonly used preparation equipment and machines, which due to the modern raw materials has less weight and accordingly different dimensions compared to rectangular tablets used up to now, showing high stability during preparation process. Accordingly a smaller tablet can be prepared without significant changes in any equipment or machines which due to its form is stable, easy to handle, to process, optionally to wrap and to package.

[0025] The tablets of the present invention are particularly suitable in a process for wrapping, packaging or coating said tablets. In particular they are suitable for wrapping on a flow wrapping machine, automatic packaging and/ or automatic coating by suitable machines, since they are easily to process automatically without breakage and without significant abrasion during said automatic processing. Due to their behavior to essentially arrange themselves on a conveyor belt they are particularly suitable in any process including transport on such a belt.

Figures:

[0026] The figures show one particularly preferred embodiment of the present invention, a tablet having 8 edges of the same angle and 8 sides of the same length. In this figure the tablet is shown as a two-layered tablet, however, this should not limit the octagonal embodiment in any way.

Figure 1 shows a halfside view of the preferred octagonal detergent tablet

Figure 2 shows an onview of the preferred octagonal tablet. The integer d describes the width of the tablet.

EP 2 388 309 B2

Examples:

[0027] Detergent tablets were prepared by pressing 15 g of an automatic dishwashing detergent composition commonly used for tablets in an according mould. The detergent powder was dosed in the according mould, the according punch provided a pressure on the powder of $50 \cdot 10^3$ Newton during maximal 1 second.

[0028] Automatic dishwashing detergent composition;

	Tri sodium citrate	38,0
	Acrylic copolymer	2,0
10	Sodium carbonate / sodium disilicate co-granulate	30,0
	Hydroxyethylidene-1,1-diphosphonic acid tetra sodium salt	0,2
	Sodium percarbonate, coated	20,0
	Tetraacetylenethylenediamine	4,5
15	Protease	0,7
	Amylase	0,5
	Fatty alcohol ethoxylate	0,9
	Polyethylene glycol, molecular weigh around 4000	3,0
	Polyethylene glycol, molecular weigh around 200	0,2
20	Total	100,0

Reference A: tablet having 4 edges, 90° angels, rectangular, width about 25 mm, length about 34 mm, thickness about 10 mm

Reference B: tablet having 4 edges, 90° angels, rectangular, width about 18 mm, length about 34 mm, thickness about 14 mm

Reference C: tablet having 4 edges, 90° angels, square, width/length about 26 mm, thickness about 13 mm

Reference D: round tablets diameter about 26 mm, thickness about 16 mm

Example E (not part of the invention as claimed): tablet having 6 edges, hexagonal, maximum width or length about 26 mm, thickness about 19 mm

Inventive example F: tablet having 8 edges, octagonal, maximum width or length about 26 mm, thickness about 17 mm

Inventive example G: tablet having 10 edges, decagonal, maximum width or length about 26 mm, thickness about 16 mm

[0029] After pressing the tablets were processed according to commonly used tablets, i.e. transported on a conveyor belt to a flow wrapper and/or to a packaging station.

[0030] The behavior and properties of the tablets can be seen in tables 1 and 2.

Table 1

Example	compressability	behavior on conveyor belt	breakage	abrasion/dust charge	
A	good	arranged in line	high	middle	
B	good	arranged in line	high	middle	
50	C	good	turns up to 45°	at the edges	high
	D	good	spins	low	high
	E	good	arranged correctly	low	low
	F	good	arranged correctly	low	low
55	G	good	arranged correctly	low	low

Table 2

Example	wrapping	packaging
A	difficult due to high breakage	difficult due to high breakage
B	difficult due to high breakage	difficult due to high breakage
C	difficult due to turns	difficult due to turns
D	good	good
E	good	good
F	good	good
G	good	good

Claims

1. Detergent tablet having an upper and a lower surface and more than 4 side surfaces with more than four edges, wherein the tablet has 8 or 10 edges of equal angles and 8 or 10 side surfaces of the same length, wherein the side surfaces have equal length and the edges have equal angles, accordingly, the tablet is in the form of a symmetrical polygon.
2. Detergent tablet according to claim 1 having 8 edges and 8 side surfaces of the same length resulting in an octagon.
3. Detergent tablet according to any of claims 1 to 2, wherein the detergent tablet is wrapped.
4. Detergent tablet according to any of claims 1 to 3, wherein the detergent composition provides an automatic dish-washing composition, a laundry composition, a bleaching composition, a water softening composition or a stain removal composition.
5. Detergent tablet according to any of claims 1 to 4, wherein the tablet comprises different tablet parts, preferably different layers, an inlay, an additional part attached on at least one of the surfaces or a filled cavity.
6. Process for preparing a detergent tablet according to any of claims 1 to 4 by pressing a particulate detergent composition in a mould, by sintering a detergent composition, by melting and solidifying a detergent composition or by a mixture of said methods.
7. Use of a detergent tablet according to any of claims 1 to 4 for automatic dishwashing, for laundry washing or for cleaning hard surfaces.
8. Use of a detergent tablet according to any of claims 1 to 4 in a wrapping, packaging or coating process.

Patentansprüche

1. Reinigungsmitteltablette mit einer oberen und einer unteren Oberfläche und mehr als 4 Seitenflächen mit mehr als vier Ecken, wobei die Tablette 8 oder 10 Ecken mit gleichen Winkeln und 8 oder 10 Seitenflächen der gleichen Länge aufweist, wobei die Seitenflächen gleiche Längen und die Ecken gleiche Winkel aufweisen, so dass die Tablette dementsprechend die Form eines symmetrischen Polygons aufweist.
2. Reinigungsmitteltablette nach Anspruch 1 mit 8 Ecken und 8 Seitenflächen gleicher Länge, so dass die Tablette ein Oktagon darstellt.
3. Reinigungsmitteltablette nach einem der Ansprüche 1 bis 2, wobei die Reinigungsmitteltablette umhüllt ist.
4. Reinigungsmitteltablette nach einem der Ansprüche 1 bis 3 wobei die Reinigungsmittelzusammensetzung eine Maschinengeschirrspülmittelzusammensetzung, eine Waschmittelzusammensetzung, eine Bleichzusammensetzung

zung, eine Wasserenthärterzusammensetzung oder eine Fleckenentfernerzusammensetzung bereitstellt.

- 5
5. Reinigungsmitteltablette nach einem der Ansprüche 1 bis 4, wobei die Tablette unterschiedliche Tablettenteile umfasst, vorzugsweise verschiedene Schichten, eine Füllung, einen zusätzlichen Teil, der auf mindestens einer der Oberflächen angebracht ist, oder eine befüllte Kavität.
- 10
6. Verfahren zur Herstellung einer Reinigungsmitteltablette nach einem der Ansprüche 1 bis 4, durch Verpressen einer partikulären Reinigungsmittelzusammensetzung in einer Form, durch Sintern einer Reinigungsmittelzusammensetzung, durch Schmelzen und Aushärten einer Reinigungsmittelzusammensetzung oder durch eine Kombination der vorgenannten Verfahren.
- 15
7. Verwendung einer Reinigungsmitteltablette nach einem der Ansprüche 1 bis 4 zum Geschirrspülen, zum Wäschewaschen oder zum Reinigen harter Oberflächen.
8. Verwendung einer Reinigungsmitteltablette nach einem der Ansprüche 1 bis 4 in einem Umhüllungs-, Verpackungs- oder Beschichtungsverfahren.

Revendications

- 20
1. Pastille de détergent présentant une surface supérieure, une surface inférieure et plus de 4 surfaces latérales sur plus de 4 côtés, laquelle pastille présente 8 ou 10 côtés formant des angles égaux et 8 ou 10 surfaces latérales, dans laquelle les surfaces latérales sont de même longueur et les côtés forment des angles égaux, moyennant quoi cette pastille se présente de préférence sous la forme d'un polygone régulier.
- 25
2. Pastille de détergent selon revendication 1, qui présente 8 côtés et 8 surfaces latérales de même longueur, formant ainsi un octogone.
- 30
3. Pastille de détergent selon l'une quelconque des revendications 1 à 2, qui est ensachée.
4. Pastille de détergent selon l'une quelconque des revendications 1 à 3, dans laquelle la composition détergente fournit une composition de lavage automatique de la vaisselle, une composition de lessive pour le linge, une composition de blanchiment, une composition d'adoucissement de l'eau ou une composition de détachage.
- 35
5. Pastille de détergent selon l'une quelconque des revendications 1 à 4, dans laquelle la pastille est constituée par des parties différentes, de préférence des couches différentes, une incrustation, une partie supplémentaire attachée à au moins une des surfaces ou une cavité occupée.
- 40
6. Procédé de préparation d'une pastille de détergent selon l'une quelconque des revendications 1 à 4 par compression d'une composition détergente particulière dans un moule, par frittage d'une composition détergente, par fusion et solidification d'une composition détergente ou au moyen d'une combinaison desdites procédures.
- 45
7. Utilisation d'une pastille de détergent selon l'une quelconque des revendications 1 à 4 pour le lavage automatique de la vaisselle, pour le lavage du linge ou pour le nettoyage de surfaces dures.
- 50
8. Utilisation d'une pastille de détergent selon l'une quelconque des revendications 1 à 4 dans un procédé d'ensachage, d'emballage ou d'enrobage.
- 55

Figure 1

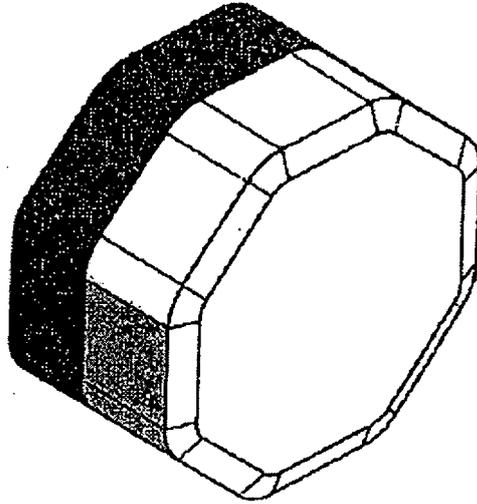


Figure 2

