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SYSTEM FOR MAKING AVAILABLE IMPREGNATED MOIST CLOTHS, AND A
MOIST CLOTH FOR SKIN DISINFECTION OR SURFACE DISINFECTION

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TECHNICAL FIELD

The invention relates to a system for providing impregnated wet wipes and also
to a wet wipe for disinfecting skin or areas that is impregnated with a disinfecting
15 solution.

BACKGROUND OF THE INVENTION

The use of disinfecting wipes impregnated with an active ingredient solution is
20 known for rapid disinfection, for medical products, wipeable areas of all kinds with
elevated infection risk and with the requirement for short exposure times, and for use
on the skin. These wipes are often ready-impregnated and housed in a storage
receptacle which allows fluidtight storage and individual withdrawal of wipes. The
provision of ready-to-use wipes is convenient, as it removes the need for active
25 ingredient solutions and wipes to be stored separately and to be brought into
conjunction shortly before or during the treatment of the area in question.

Ready-impregnated wet wipes are often equipped with a zig-zag fold (also
called an interfold), stacked in layers, and stored in a tubular film pack (also known as
a soft pack or flow pack). With the folding of the wet wipes, successive wipes may
30 exhibit regional overlap, and so, when a wet wipe is withdrawn from the storage
receptacle, a part of the following wet wipe in the stack projects through the
withdrawal opening and can be subsequently grasped. Pack sizes with 20, 50, 80, 100
or more wet wipes in a single storage receptacle are known to be available.

For the user, larger pack sizes are advantageous and of economic interest. With

the impregnation of wet wipes, especially for disinfection, it is important to deliver a sufficient quantity of active ingredient with each wipe. In the case of area disinfection, for example, it is necessary to ensure sufficient activity in conjunction with low cross-contamination; hitherto demonstrating its efficacy is, in particular, the test known as

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the four-field test, which is specified in European Standard EN 16615:2015. In this standard protocol, a wipe composed of a defined material and of a mandated size is specified as a standard wipe for wiping tests. The wiping tests are carried out over four fields of an area, with only the first field being contaminated with test organisms. The efficacy is verified in accordance with this standard with respect to the test

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microorganisms *Staphylococcus aureus*, *Enterococcus hirae*, *Pseudomonas aeruginosa* and/or *Candida albicans*, and with a mandated exposure time. During the wiping operation, fields 1-4 are overwiped within one second with a unit weight charged with the standard wipe or with the cleaning substrate under test. At the end of the distance, i.e. directly after test field 4, the unit weight is turned and the four fields are overwiped

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in the reverse order within the next second. Colony-forming units (CFUs) from each of test fields 1-4 are detected by a cotton swab method in accordance with EN 16615:2015.

SUMMARY OF THE INVENTION

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In tests, however, it has emerged that in the case of larger pack sizes of wet wipes, the provision of a desired minimum concentration requires high impregnation quantities for each wipe, since after a prolonged storage time the concentration of the disinfectant in upper plies of the stack of wet wipes may decrease over time, with an accompanying increase in the concentration in the lower plies over time; in relatively

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large stacks, therefore, the active ingredient solution may sink over time within the storage receptacle. In order to ensure the efficacy of such wipes for skin or area disinfection, therefore, it is necessary to overimpregnate wipes.

It is an object of the invention, consequently, to propose wet wipes, or a corresponding apparatus for delivery of wet wipes, especially for wet wipes for disinfecting areas and/or skin, which allow largely constant impregnation of wet wipes in a storage receptacle, independently of their position in the stack or their storage time, reliably, so removing any further need for overimpregnation.

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The object is achieved by a system for providing impregnated wet wipes, having the features of independent claim 1. Advantageous embodiments and developments are evident from the dependent claims and from the description hereinafter.

5 A system for providing impregnated wet wipes is proposed. The system comprises a plurality of impregnated wet wipes, a storage receptacle for storing the wet wipes, and one or more sheetlike, liquid-impervious separating plies for separating two wet wipes lying one upon the other. The storage receptacle is designed to provide a closed envelope for the wet wipes. The storage receptacle has a base and also a
10 closable withdrawal opening, from which the wet wipes can be withdrawn individually from the storage receptacle. The wet wipes in the storage receptacle are stacked from the base in the direction of the closable opening. A separating ply is disposed at least between two successive wet wipes.

 The wet wipes are produced from a sheetlike, pliant and impregnatable
15 material, such as from a nonwoven, for example. The composition of the nonwoven may be dependent on the nature of the impregnated solution, and may be implemented on the basis of cellulose or viscose, for instance, and may optionally also comprise polymeric fibres. Blend fibres as well are widespread. The nature and dimensions of the wet wipes may be selected such that the wet wipes can be utilized easily and
20 efficiency, especially in order to disinfect areas. Reference may be made again, merely by way of example, to the standard EN 16615:2015, in which the standard wipes for wiping tests have a size of 17.5 cm x 28 cm and a specific material composition. It will be appreciated that the wet wipes may also have different dimensions.

 The separating ply is preferably configured in such a way that, in order to
25 increase convenience of use, it too can be easily removed through the withdrawal opening, like a wet wipe. It is appropriate, accordingly, to produce the separating ply as well from a sheetlike, pliant material – for example, from the same material as the wet wipes. The liquid-impervious function should be understood to mean that a liquid present on the separating ply is unable autonomously to diffuse or flow through the
30 separating ply. The separating ply is preferably designed to be able to withstand a hydrostatic water pressure of up to 100 mm. The separating ply may have a single-layer or multilayer embodiment.

 With the stacked arrangement of wet wipes in the storage receptacle, the

dimensions of the interior of the storage receptacle and the dimensions of the stack of the wet wipes ought substantially to be adapted to one another. As well as the use of pliant, pouch-like or tubular storage receptacles, such as soft packs or flow packs, for example, it is also possible to envisage storage receptacles having firm walls, or else,
5 as an alternative, a hybrid form. The function of the storage receptacle is to provide a fluidtight envelope which, while allowing easy withdrawal of the wet wipes from the withdrawal opening, allows secure storage of the wet wipes, without the impregnating solution being able to run off or dry out.

A core aspect of the invention lies in the use of separating plies to segregate successive wet wipes in the stack. By disposing a liquid-impervious separating ply
10 between two successive wet wipes, the sinking of the impregnating solution can be largely prevented if the storage receptacle is properly stored – that is, with the base on a largely horizontal surface. The separating ply between a lower wet wipe and an upper wet wipe located thereon avoids the slow, gravity-assisted flow of the impregnating
15 solution down from the upper wet wipe into the lower. In tests it has been demonstrated that the use of a separating ply for clear and distinct reduction in the sinking of impregnating solution within a stack of wet wipes can be achieved.

In this context it should be noted that it is not necessary to separate every pair of successive wet wipes by a separating ply. Instead, it may also be enough to
20 subdivide the stack of wet wipes into a number of component packs of wet wipes, and to separate each of these by a separating ply from the adjacent component stacks or packs. The degree of impregnation of the wet wipes of a component stack which is closed off on its underside in a liquid-impervious manner is improved distinctly in comparison to an individual, larger stack.

25 With the subdivision of the entirety of the wet wipes into component stacks, however, the withdrawal of individual wet wipes from the storage receptacle means that in succession always only a certain number – dependent on the subdivision – of wet wipes can be withdrawn until the user encounters a separating ply. After the withdrawal of the separating ply, the user is then able to withdraw the uppermost wet
30 wipe of the next component stack.

As usual in the prior art, the impregnated wet wipes may be disposed in the storage receptacle in such a way that when one wet wipe is extracted from the withdrawal opening, the next wet wipe is already partly projecting from the withdrawal

opening, allowing it to be easily grasped. It is particularly advantageous, however, to design the separating ply in such a way that on withdrawal of a lowermost or last wet wipe of the component stack in question, the separating ply in question remains in the storage receptacle. It would then be necessary for this separating ply to be removed
5 manually from the storage receptacle and disposed of or used in order to release the next component stack. Depending on the implementation of the separating ply, it may simply be used like a wet wipe. However, the user ought to be made aware that the separating ply cannot be utilized for cleaning/disinfection if it is not suitable for that purpose. This might be the case, for instance, if the separating ply has a double-sided,
10 liquid-impervious coating or other properties preventing sufficient impregnation and/or subsequent delivery of the impregnating solution. Further possibilities in this regard are specified later on below.

All in all, an efficient system is proposed for the provision of impregnated wet wipes, not only leading to improved shelf life but also, in the case of wet wipes for skin
15 or area disinfection, obviating any overimpregnation, for virtually any desired pack sizes, and so enabling efficient processing. As well as a requisite degree of impregnation being maintained, moreover, the stability of the wet wipes with respect to drying out is also improved.

In one advantageous embodiment, the wet wipes in the stacked state each span
20 a first area and the separating ply within the stacked arrangement of wet wipes each spans a second area which corresponds at least to the first area. It is advantageous for the separating ply to cover a component stack completely, so that its covering area ought to correspond at least to that of a stacked wet wipe. However, especially when a pliable separating ply is used, the area spanned by the separating ply may be greater
25 than that of stacked wet wipe. The separating ply is disposed, ideally, centrally on a stacked wet wipe, to produce a slight overhang by the separating ply. In this way, especially at the edges of the stack of wet wipes, it is possible to prevent the impregnating solution trickling past the component stacks at the sides.

As is usual the prior art, the wet wipes may be folded in a zig-zag fold or
30 singularly. As a result, it becomes much easier to withdraw the wet wipes from the storage receptacle, since the folded wet wipes are able to engage partially into one another, so that the next wet wipe can project from the withdrawal opening as soon as one wet wipe is extracted from the withdrawal opening.

The separating ply may comprise a cloth provided at least on one side with a liquid-impervious coating. The material from which the cloth is produced may in particular be the same as or similar to that of the wet wipes, thereby allowing it to be processed on the same manufacturing line as the wet wipe. In that case the separating
5 plies might be produced from a defined, coated web, which is able to run through the same manufacturing line together with other webs for the production of wet wipes.

There are various ways in which the coating of the cloth of the separating ply may be realized. For example, single-sided coating with a polyethylene or another plastic, to produce a liquid barrier, is advantageous. The plastic – that is, for instance,
10 the polyethylene – may be applied or attached directly onto one side of the cloth, for example. An alternative to this is via an intermediate layer in the form of an adhesive, and other joining means, or the like.

If the separated ply used comprises a single-sidedly coated cloth, it may be appropriate to roughen at least regions of the coating material, so that the component
15 stack and/or the separating ply cannot slip because of a coating which is too smooth. The above-stated, ideally central arrangement of a separating ply on a stacked wet wipe or on a component stack can therefore be maintained. It is also possible to use an inherently liquid-impervious, rough coating material.

The separating ply in the stacked arrangement may have at least one fold, by
20 which an uncoated side of the cloth is fully concealed to the outside. If, for instance, the same material or a similar material is used for the separating ply as for the wet wipes, it would be sufficient to produce a single-sided coating. Edges are folded over, leading to the complete enclosure of the uncoated side of the cloth, and this provides a liquid-impervious coating on the separating ply, both on the base-facing side and on
25 the side facing the withdrawal opening. If the folded-over sections of the separating ply are directed toward the withdrawal opening, they ought to abut one another in a flush way as possible, so that the separating layer is as impervious as possible on both sides.

In one preferred embodiment, the separating ply has a window fold, forming two side wings folded with respect to one another on the cloth. An abutment point of
30 the two folded side wings may be directed to the withdrawal opening. As an alternative to this, the stated abutment point may also point to the base of the storage receptacle. This may come about, for instance, for production-related reasons.

The separating ply may have optical marking with which the separating ply is

clearly distinguishable from the wet wipes. As mentioned above, it is reasonable to draw the attention of a user to the fact that the last wet wipe of a component stack has been withdrawn from the storage receptacle and a possibly non-utilizable separating ply is located in front of the withdrawal opening. If it not utilizable, this ply ought to be withdrawn from the storage receptacle and disposed of directly, without being used for cleaning or disinfecting. By way of example, in addition to the other fold, which prevents one separating ply being automatically “carried along” when the lowermost wet wipe of a component stack is withdrawn, there may be an optical marking used, which may comprise, for instance, an obvious coloration, an obvious inscription directly in front of the withdrawal opening, a printed symbol, or the like.

The wet wipes are preferably assembled into component stacks, which each comprise a plurality of wet wipes and are separated from adjacent component stacks by a separating ply. The component stacks comprise wet wipes in a number from a range from 2 to 50. The component stacks may comprise wet wipes in a number from 5 to 25. It may be appropriate to process the separating plies together with the wet wipes on the same manufacturing line, this processing in particular being folding and stacking. This enables, for example, the simultaneous processing of 5, 10 or more webs of material, with one web or a minority of the total number of webs being possibly used in each case to produce one separating ply.

A number of 5 to 25 wet wipes for each component stack is advantageous, since there is no likelihood of substantial sinking within these significantly limited component stacks. Component stacks with an amount of 7 to 12 and especially 10 wet wipes per component stack may be advantageous in particular.

The storage receptacle is with particular preference a flow pack or soft pack in tubular or pouch form. This configuration is cost-effective, easy to produce, and can be employed in particular for any desired sizes of pack.

In one advantageous embodiment, the wet wipes are impregnated with a disinfecting solution and so form disinfecting wet wipes especially for skin or area disinfection.

The invention further relates to a wet wipe for area disinfection, impregnated with a disinfecting solution, for use in a system having the above-described features for the disinfection of surfaces in conjunction with preventing the spread of microorganisms. The arrangement with separating plies in a stack allows an extended

shelf life in conjunction with larger consistent degree of impregnation, in order to fulfil the provisions of the stated EN 16615:2015 with efficient impregnation of the wipes.

BRIEF DESCRIPTION OF THE FIGURES

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Further features, advantages and possible applications of the present invention will be apparent from the following description of the embodiment examples and the figures. All the features described and/or depicted, on their own and in any combination, form the subject-matter of the invention, irrespective of their combination in the individual claims or their dependency references. In the figures, furthermore, the same reference signs are used for objects which are the same or similar.

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Fig. 1 shows a system for providing impregnated wet wipes in a partial sectional representation in three dimensions.

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Fig. 2a shows a detailed representation of a component stack, whereas Fig. 2b shows a detailed representation of a separating ply.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

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Fig. 1 shows a system 2 for providing impregnated wet wipes, in a three-dimensional partial section. Depicted here is a storage receptacle 4, which has a base 6 or a base area 6, a withdrawal opening 10 closed by a lid 8, and closure seams 12, of which a single one is indicated as an example, these seams providing the storage receptacle 4 with all-round fluidtight closure. Materials of which the storage receptacle 4 may consist include a polymeric film, and this receptacle may be implemented as a flow pack or soft pack in tubular or pouch form. In the depiction, the storage receptacle 4 is cut open on one side, in order to provide a view into its interior.

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In the storage receptacle 4, wet wipes 14 are aligned parallel to the base 6 and stacked on top of one another. The resulting stack therefore extends from the base 6 in the direction of the withdrawal opening 10, and is subdivided into a plurality of component stacks 16, each stacked one upon the other and separated by a separating ply 18. Merely as an example, the component stacks 16 are composed of ten wet wipes 14. This is an advantage in production terms, since all of the wet wipes 14 and a

separated ply 18 can be produced and layered one upon another in parallel in a single manufacturing line.

5 The separating plies 18 are liquid-impervious and prevent an impregnating solution with which the wet wipes 14 are impregnated from sinking within the stack in the direction of the base 6. Accordingly, the degree of impregnation of the individual wet wipes 14 can be maintained over a significantly longer time than without such separating plies 18. The realization of more separating plies 18 and smaller component stacks 16, or of fewer separating plies 18 and larger component stacks 16, is also conceivable. This ought to be determined, especially by experimentation, according to 10 the material used for the wet wipes 14, the impregnating solution, the pack size, and the usual conditions of utilization, such as the usual storage duration or usage duration, for example.

In this depiction it is apparent – merely as an example – that the liquid-impervious separating plies 18 have a greater extent in width than the wet wipes 14. In 15 fact, the separating plies 18 span a greater area than the wet wipes 14 in the stack. This allows the sealing inside the storage receptacle 4 to be improved, since the separating plies 18 preferably extend virtually over the entire available cross section inside the storage receptacle 4, flush to its inside faces, for example. It will be appreciated that the invention is not confined to the use of such oversizing.

20 The lid 8 shown by way of example need not necessarily be present or be configured in the form shown. Instead, especially with relatively large pack sizes, a swing-mounted and engageable lid 8 may be advantageous, since a self-adhesive closure tab could exhibit reduced bonding force as a result of multiple wetting of the impregnating solution in the course of the usage duration.

25 Fig. 2a shows, as an example, part of a component stack 16, in a somewhat enlarged depiction. It can be seen that the individual wet wipes 14 are arranged, for example, in a zig-zag folding, producing three sections 14a, 14b and 14c lying one upon another. A section 14a of a lower wet wipe 14 may lie on a lower section 14c of an upper wet wipe 14, so that when the upper wet wipe 14 is extracted there is already 30 a part of the lower wet wipe 14 projecting out of the withdrawal opening 10. It is preferable not to configure the separating plies 18 such that they do not project automatically out of the withdrawal opening 10, in order to avoid errors in use.

Fig. 2b shows a separating ply 18 which, as an example, has what is called a

window fold. For this, on an unfolded cloth, two side wings 18a and 18b are formed that are folded inward, onto a lower section 18c, so as to form two outer edges 20 of a folded separating ply 18. In this case, depending on the cloth size, outer edges 22 of the cloth may abut one another in the folded state along a centre line of the folded

5 separating ply 18. In that case, as indicated in Fig. 1, the area spanned by the separated ply 18 is greater than the area spanned by a wet wipe 14.

The separating ply 18 may be made of a nonwoven cloth 26, just like the wet wipes 14. In order to produce the required liquid-imperviousity, the separating ply 18 has a liquid-impervious polymer coating 24, which in Fig. 2b in the folded state is

10 directed outward in each case.

In addition, it should be noted that "having" does not exclude other elements or steps, and "a" or "an" does not exclude a multiplicity. It should furthermore be noted that features which have been described with reference to one of the above embodiment examples can also be used in combination with other features of other
15 embodiment examples described above. Reference signs in the claims should not be regarded as restrictive.

C L A I M S

1. System (2) for providing wet wipes (14) impregnated with an
5 impregnating solution, comprising:
 - a plurality of impregnated wet wipes (14),
 - a storage receptacle (4) for storing the wet wipes (14), and
 - one or more sheetlike, liquid-impervious separating plies (18) for
10 separating two wet wipes (14) lying one upon the other,wherein the storage receptacle (4) is designed to provide a closed envelope for
the wet wipes (14),
wherein the storage receptacle (4) has a base (6) and also a closable withdrawal
opening (10), from which the wet wipes (14) can be withdrawn individually from the
storage receptacle (4),
15 wherein the wet wipes (14) in the storage receptacle (4) are stacked from the
base in the direction of the withdrawal opening (14), and
wherein one separating ply (18) each is disposed at least between two
successive wet wipes (14).
- 20 2. System (2) according to Claim 1,
wherein the wet wipes (14) in the stacked state each span a first area and the
separating ply (18) within the stacked arrangement of wet wipes (14) in each case
spans a second area which corresponds at least to the first area.
- 25 3. System (2) according to Claim 1 or 2,
wherein the wet wipes (14) are folded singularly or in a zig-zag fold.
4. System (2) according to any of the preceding claims,
wherein the separating ply (18) comprises a cloth (26) provided at least on one
30 side with a liquid-impervious coating (24).
5. System (2) according to Claim 4,

wherein the liquid-impervious coating (24) has a plastic applied at least indirectly to the cloth (26).

6. System (2) according to Claim 4 or 5,
5 wherein the separating ply (18) in the stacked arrangement has at least one fold which completely conceals one uncoated side of the cloth (26).

7. System (2) according to Claim 6,
10 wherein the separating ply (18) has a window fold with which two side wings (18a, 18b) are formed on the cloth (26) and are folded relative to one another, an abutment point of the two folded side wings (18a, 18b) being directed to the withdrawal opening (10).

8. System (2) according to any of the preceding claims,
15 wherein the separating ply (18) has optical marking with which the separating ply (18) is clearly distinguishable from the wet wipes (14).

9. System (2) according to any of the preceding claims,
20 wherein the wet wipes (14) are assembled into component stacks (16), which each comprise a plurality of wet wipes (14) and are separated by a separating ply (18) from adjacent component stacks (16), and
wherein the component stacks (16) comprise wet wipes (14) in a number from a range from 2 to 50.

25 10. System (2) according to Claim 9,
wherein the component stacks (16) comprise wet wipes (14) in a number from 5 to 25.

11. System (2) according to any of the preceding claims,
30 wherein the storage receptacle (4) is in a tubular or pouch form.

12. System (2) according to any of the preceding claims,
wherein the wet wipes (14) are impregnated with a disinfecting solution.