

Wiper Packaging Incorporating Magnetic Seal

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of, and priority from United States provisional application 61/514,582 filed August 3, 2011 the contents of which are hereby incorporated by reference in their entirety as if fully set forth herein.

TECHNICAL FIELD

[0002] The present disclosure is directed generally to a packaging arrangement for presaturated cleaning wipes and more specifically to a cleaning wipe package incorporating a liquid impermeable containment structure having a resealable opening incorporating one or more magnetic strips disposed adjacent to the perimeter of the opening for use in selectively sealing the opening thereby guarding against evaporation of solvent or other agents used to presaturate the cleaning wipes.

BACKGROUND OF THE INVENTION

[0003] Cleaning wipes of textile constructions are known. Such wipes may be presaturated with a solvent or other cleaning agent and stored within an appropriate package. Such packages may be in the form of a flexible envelope container which may be opened to gain access to the enclosed wipes. Wipe packages also may be in the form of a relatively shallow tray with a removable surface covering or lid.

[0004] During use, the interior of wipe packages may be accessed multiple times by a user through a mouth opening as individual wipes are retrieved. By closing the container between uses, evaporation of solvent or other cleaning agents can be reduced. By way of example only, one such prior resealable package is illustrated and described in United States Patent 6,978,889 the contents of which are incorporated by reference in their entirety. While such systems may work well, the adhesion force of the releasable adhesive may diminish

after multiple uses. Thus, there is a continuing need for an improved sealing system for a pliable storage container.

SUMMARY OF THE INVENTION

[0005] The present disclosure provides advantages and alternatives over past wiper sheet packaging systems by providing a containment package for wipes presaturated with a solution subject to evaporation. The containment package incorporates an access opening with at least one pair of opposing magnetically attracted strips adapted to selectively seal the access opening to reduce or prevent evaporation of the solution in the sealed condition.

[0006] In accordance with one exemplary practice, the present disclosure provides a containment package for presaturated wiper sheets including a liquid and vapor impermeable body having an interior adapted to receive and store a plurality of wiper sheets presaturated with a solution subject to evaporation. The body includes an access opening adapted for insertion and withdrawal of the wiper sheets through the access opening. At least a first sealing element defining a magnet is supported on a first support structure at a position outside of the interior. At least a second sealing element of magnetized or non-magnetized character having a complementary magnetic attraction to the first sealing element is disposed on a second support structure at a position outside of the interior. The second support structure is selectively moveable relative to the first support structure to open and close the access opening such that when the first support structure disposed in contacting, opposing relation to the second support structure, the first sealing element and the second sealing element will act through the first support structure and the second support structure to cooperatively form a magnetic seal so as to reversibly seal the access opening in a closed condition. A method of packaging presaturated wiper sheets is also provided.

[0007] Other features and advantages of the disclosure will become apparent to those of skill in the art upon review of the following detailed description, claims and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is schematic perspective view of a pliable containment envelope construction adapted to hold presaturated wiper sheets showing the envelope in an open condition;

[0009] FIG. 2 is a schematic cross-section taken generally along line 2-2 in FIG. 1 with the envelope in a closed condition;

[0010] FIG.3 is a schematic plan view of an exemplary material blank which may be used to form an exemplary packaging envelope as shown in FIGS. 1 and 2;

[0011] FIG. 4 is a schematic perspective view of a packaging tray adapted to hold presaturated wiper sheets showing the packaging container in a closed condition; and

[0012] FIG. 5 is a schematic cross-section taken generally along line 5-5 in FIG. 4.

[0013] While the invention has been illustrated and will hereafter be described in connection with certain exemplary and potentially preferred embodiments, practices and procedures, it is to be understood that the invention is in no way limited to any such illustrated and described embodiments practices and procedures. Rather, it is to be understood that it is the intention of the applicant to cover all alternatives and modifications as may fall broadly within the spirit and scope of the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0014] Reference will now be made to the drawings wherein to the extent possible like reference numbers are utilized to designate like elements throughout the various views. Looking jointly to FIGS. 1 and 3, there is illustrated an exemplary package for a multiplicity of wiper sheets 10 which may be of either a single ply or multi-ply construction. By way of example only, it is contemplated that the wiper sheets 10 may be formed from a woven, knit or non-woven absorbent textile material which has been pre-saturated with a solvent or other cleaning agent. The wiper sheets have sufficient pliability to permit folding.

[0015] In the embodiment of FIGS. 1 and 2, the wiper sheets 10 are stored within a pliable containment envelope 12 of foil laminate or other material as will be known to those of skill in the art defining an envelope body which is substantially impermeable to liquid and gas transmission. The containment envelope 12 includes a resealable mouth opening 14 (also referred to as a pouch opening or access opening) with a first boundary edge 16 and a second boundary edge 18 at the top of deformable walls oriented in opposing relation substantially along the length of the mouth opening 14. As best seen in FIG. 2, the first boundary edge 16 and the second boundary edge 18 each may be formed by folding the containment envelope material forming the deformable walls over upon itself to establish a double layer cuff construction with a pocket between the layers outboard from the mouth opening.

[0016] Referring now to FIG. 2, in the illustrated exemplary arrangement, a first sealing element 20 in the form of a magnetic strip may be disposed in substantially covered, contained relation within the pocket below the first boundary edge 16. A second sealing element 22 in the form of a magnetic strip or non-magnetized metal or other material which is magnetically attracted to the first sealing element 20 may be disposed in substantially covered, contained relation within the pocket below the second boundary edge 18. The sealing elements 20, 22 thus cooperatively form an operative magnetic seal which preferably extends substantially continuously along the entire length of the mouth opening 14. While the complementary sealing elements 20, 22 are illustrated as extending to an elevation corresponding substantially to the interior of the boundary edges 16, 18 it will be understood that in practice the magnetic strips may occupy any opposing elevation positions as may be desired within the pockets below the boundary edges.

[0017] As shown, the pockets containing the first sealing element 20 and second sealing element 22 may be closed if desired. By way of example only, the folded over portion of the envelope material may be adhesively bonded or heat sealed to a portion of the envelope body at an elevation below the sealing elements 20, 22 to form a surface seal 24. If desired, such a surface seal 24 may extend continuously or intermittently about the perimeter of the containment envelope 12. Regardless of whether or not a surface seal is formed, the sealing elements 20, 22 preferably will be substantially covered on the exterior by the folded over portions of the envelope material such that the sealing elements 20, 22 are not visible and do not form an outer contact surface for the containment envelope 12. Thus, the sealing elements 20, 22 will be substantially isolated from other surfaces in the environment of use.

This isolation of the sealing elements may be beneficial in maintaining their integrity as well as in avoiding any potential contamination to outside surfaces from the material forming the sealing elements. In the illustrated exemplary construction, each of the sealing elements 20, 22 is also isolated from the interior of the containment envelope 12. Thus, in practice, the wiper sheets 10 are never in physical contact with the material forming the sealing elements 20, 22. Accordingly, any potential for contamination by the sealing elements is avoided.

[0018] By way of example only, and not limitation, at least the first sealing element 20 may be formed from a suitable, magnetized material of pliable character and defined polarity such as polymeric ferrous oxide or the like. In one exemplary practice, the second sealing element 22 may be formed from a suitable magnetized material such as polymeric ferrous oxide or the like of reverse polarity to the first sealing element 20. In another exemplary practice, the second sealing element 22 may be a non-magnetized metal strip or other material having a magnetic attraction to the first sealing element 22. The complementary sealing elements 20, 22 each may be secured in place to a surface of a deformable wall of the containment envelope 12 by any suitable technique including adhesives or the like as may be desired. Thus, the opposing deformable walls of the containment envelope may define support surfaces for the sealing elements 20, 22. As will be appreciated, placement of the complimentary sealing elements 20, 22 at the exterior of the containment envelope 12 with the opposing deformable walls of the containment envelope forming a barrier between the wiper sheets 10 and the sealing elements ensures that the wiper sheets 10 are contacted only by the material forming the containment envelope.

[0019] Regardless of the placement of the sealing elements 20, 22 they will be characterized by complimentary magnetic attraction such that pressing the first boundary edge 16 together with the second boundary edge 18 results in establishing an effective magnetic seal which holds the containment envelope 12 closed (FIG. 2). In the sealed condition, evaporation of fluid saturating the wiper sheets may be substantially eliminated. In this regard, the combined effective thickness of the envelope material between the sealing elements 20, 22 is such that a magnetic sealing force may nonetheless be established and maintained when the opposing surfaces of envelope material are in contacting relation. Of course, this effective thickness may vary depending upon the strength of the magnetic force generated by the opposing sealing elements. In use, the sealing condition may be overcome

by a user manually pulling the first boundary edge 16 and a second boundary edge 18 away from one another thereby applying a shear force to open the containment envelope 12 (FIG. 1). When the sealing system of the present disclosure is used with the same film laminates used in prior known pliable containment envelopes, it has been found that evaporation is substantially eliminated in the sealed condition such that even with periodic opening and closing during use, evaporation losses are typically less than about 10% of the starting weight and will more preferably be less than about 5% and will most preferably be less than about 2%.

[0020] In the illustrated exemplary construction, the body of the containment envelope 12 is preferably formed to include end gussets 30 (only one shown) on either end with a non-gusseted end seam 32 (only one shown) extending away from each gusset to the mouth opening 14. Such a construction facilitates the packaging of a relatively large volume of wiper sheets 10 by expansion of the gussets 30 while avoiding excess material at the mouth opening. By way of example only, and not limitation, such a construction may be formed by folding a symmetrical panel 40 of foil laminate material as shown in FIG. 3 along a bisecting fold line 42 and then heat sealing or otherwise connecting the overlying perimeter edges to form a three-dimensional structure. A gusseted envelope as shown in FIGS. 1 and 2 is thereby provided. Of course, any number of other construction arrangements may be used as desired.

[0021] The use of complimentary sealing elements to form a magnetic seal for the containment envelope 12 provides a number of performance benefits. By way of example only, since the seal is magnetic, there is no degradation in sealing strength following multiple uses. This may be contrasted with adhesive seals or physical seals which may degrade after multiple uses. Another benefit is that the seal may be easily activated by a user wearing gloves. Still another benefit is the reduced propensity for particle generation due to the absence of sliding contact between dissimilar surfaces. In this regard, the reduction in particle generation may be particularly great when the sealing elements 20, 22 are at the exterior of the containment envelope. Still another benefit is the ability to maintain chemical compatibility with the solvent or other saturating liquid. In this regard, the benefit of maintaining chemical compatibility may be particularly great with the sealing elements 20, 22 at the exterior of the containment envelope 12 since only the foil or other base material of

the containment envelope 12 will contact the solvent or other saturating liquid. Moreover, in such an arrangement the seal is formed by the face to face contact of the foil or other base material forming the containment envelope 12. Since such materials may be impermeable to the solvent, there is increased containment of any volatile emissions.

[0022] FIGS. 4 and 5 illustrate another exemplary embodiment consistent with the present disclosure. In this exemplary embodiment, the wipe container 130 includes a tray body 132 of concave construction with an integral flange 134 disposed about the upper perimeter edge of the tray body 132. A selectively displaceable lid 136 is provided to rest in covering relation to the tray body 132. Both the tray body 132 and the lid 136 may be formed from materials such as PET, Mylar, high density polypropylene or the like which are substantially impermeable to any solvent saturating the wiper sheets (not shown) stored at the interior of the tray body 132. If desired, the tray body 132 may be operatively connected to the lid 136 along a living hinge 140 or other hinging connection. However, the tray body 132 and the lid 136 also may be separate, independent structures.

[0023] As shown, in the exemplary construction, a first arrangement of sealing elements 150 such as magnetic strips or the like as described previously is positioned along the perimeter of the lid 136 in a generally horseshoe shaped pattern following the free edges of the lid 136. The first arrangement of sealing elements 150 may be formed from a suitable, magnetized material such as polymeric ferrous oxide or the like to define a magnet and may be secured in place to the surface of the lid 136 defining a support structure by any suitable technique including adhesives or the like as may be desired.

[0024] As best seen in FIG. 5, the first arrangement of sealing elements 150 may be covered by an upper cap structure 152. The upper cap structure 152 may be formed from the same material as the lid 136 and may be held in place by any suitable technique including adhesive bonding, melt bonding or the like. However, other materials of construction and attachment techniques also may be used. In the final construction, the upper cap structure 152 may substantially encapsulate the first arrangement of sealing elements 150. Thus, the first arrangement of sealing elements 150 may be substantially isolated from other surfaces in the environment of use. This isolation may be beneficial in maintaining the integrity of the sealing elements as well as in avoiding any potential contamination from the material

forming the first arrangement of sealing elements 150. Of course, it is also contemplated that the upper cap structures may be eliminated if desired.

[0025] As shown, the first arrangement of sealing elements 150 is positioned to be generally aligned with the surface of the flange 134 when the lid 136 is in a closed condition. A second arrangement of sealing elements 160 may be positioned at the underside of the flange 134. In this regard, the second arrangement of sealing elements 160 may have a substantially mirror image pattern relative to the first arrangement of sealing elements 150. Thus, in the illustrated exemplary construction, the second arrangement of sealing elements 160 has a generally horseshoe shaped pattern. However, other patterns also may be used.

[0026] In one exemplary practice, the second arrangement of sealing elements 160 may be formed from a suitable magnetized material such as polymeric ferrous oxide or the like of reverse polarity to the first arrangement of sealing elements 150. In another exemplary practice, the second arrangement of sealing elements 160 may be in the form of non-magnetized metal strips or other materials having a magnetic attraction to the first arrangement of sealing elements 150. It is also contemplated that combinations of magnetized and non-magnetized materials may be used in the first arrangement of sealing elements 150 and/or in the second arrangement of sealing elements 160. The second arrangement of sealing elements 160 may be secured in place to the underside of the flange 134 defining a support structure by any suitable technique including adhesives or the like as may be desired.

[0027] As best seen in FIG. 5, the second arrangement of sealing elements 160 may be covered by a lower cap structure 162. The lower cap structure 162 may be formed from the same material as the tray body 132 and may be held in place by any suitable technique including adhesive bonding, melt bonding or the like. However, other materials of construction and attachment techniques also may be used. In the final construction, the lower cap structure 162 may substantially encapsulate the second arrangement of sealing elements 160. Thus, the second arrangement of sealing elements 160 may be substantially isolated from other surfaces in the environment of use. This isolation may be beneficial in maintaining the integrity of the sealing elements as well as in avoiding any potential contamination from the material forming the second arrangement of sealing elements 160.

Of course, it is also contemplated that the lower cap structure 162 may be eliminated if desired.

[0028] The first arrangement of sealing elements 150 and the second arrangement of sealing elements 160 are characterized by magnetic attraction such that pressing the lid 136 against the flange 134 results in establishing a magnetic seal which holds the container 130 closed. In this regard, the combined effective thickness of the flange 134 and lid 136 between opposing magnetic strips 150, 160 is such that a magnetic sealing force may be established and maintained when the underside of the lid 136 contacts the upper surface of the flange 134. Of course, this effective thickness may vary depending upon the strength of the magnetic force generated by the opposing sealing elements. During use, the sealing relation may be overcome to provide access to the interior by a user pulling the lid 136 away from the flange 134 thereby applying a shear force to open the container 130. In this regard, the zones outboard from the sealing elements may define finger tabs to be grasped by a user during the opening procedure.

[0029] As noted previously, in the illustrated exemplary arrangement, the complementary sealing elements 150, 160 are arranged in a generally horseshoe pattern extending along a forward edge and lateral sides of the container. In this arrangement, the lid 136 may remain attached along the living hinge 140. Thus, the lid 136 may be lifted away from the tray body 132 to expose the access opening and then replaced with assured alignment of the opposing sealing elements. Of course, any number of other patterns for the magnetic strips may likewise be used if desired.

[0030] The disclosure may be further understood through reference to the following non-limiting comparative examples.

Comparative Examples

[0031] Three samples of the magnetic closure pouch packaging were prepared by placing a multitude of wipes in the pouch, saturated with a blend of 50% isopropanol and 50% acetone. For baseline control and comparison, a similar set of sample wipes was prepared, but placed in a pouch of the same material construction as the magnetic closure pouch, and

thermally sealed closed. Once per day for thirty consecutive days, each magnetic closure pouch was opened briefly, then closed, to simulate removal of wipes, although no wipes were removed in order to maintain consistent weight and isolate the weight change due to solvent loss via evaporation. The control set of sealed-pouch wipes were not opened in order to establish the maximum solvent containment with the same materials of pouch construction. The weight of each pouch, from both sample sets, was then taken and recorded. Analysis consisted of averaging the weights of the three pouches in each sample set, and calculating the change in average pouch weight compared to the average weight at the start of the test (Day 0) for each day measurements were taken. The results are tabulated in Table 1 below. As can be seen, the magnetic seal pouches lost less than 1.5% of their total initial weight compared to completely sealed and undisturbed pouches of the same conditions.

Table 1

Day No. *	Sample Weight, (Kg)	Weight Loss, (%)
0	0.8420	0.00%
1	0.8416	-0.05%
2	0.8411	-0.11%
3	0.8407	-0.16%
4	0.8403	-0.21%
7	0.8396	-0.29%
8	0.8392	-0.33%
9	0.8386	-0.40%
10	0.8385	-0.42%
11	0.8380	-0.48%
14	0.8371	-0.58%
15	0.8369	-0.61%
16	0.8366	-0.64%
17	0.8361	-0.70%
18	0.8355	-0.77%
21	0.8354	-0.78%
22	0.8345	-0.89%
23	0.8341	-0.94%
24	0.8301	-1.42%
25	0.8329	-1.08%
28	0.8325	-1.12%
29	0.8323	-1.16%
30	0.8318	-1.21%
31	0.8313	-1.27%
* - Break in number sequence due to weekends, when data was not collected.		

[0032] Of course, variations and modifications of the foregoing are within the scope of the present invention. Thus, it is to be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features

mentioned or evident from the text and/or drawings. All of these different combinations constitute various alternative aspects of the present invention. The embodiments described herein explain the best modes known for practicing the invention and will enable others skilled in the art to utilize the invention. The claims are to be construed to include alternative embodiments and equivalents to the extent permitted by the prior art.

CLAIMS:

1. A containment package for presaturated wiper sheets, the containment package comprising:

a substantially liquid and vapor impermeable body having an interior adapted to receive and store a plurality of wiper sheets presaturated with a solution subject to evaporation, the body including an access opening adapted for insertion and withdrawal of the wiper sheets through the access opening;

at least a first sealing element defining a magnet supported on a first support structure at a position outside of the interior; and

at least a second sealing element having a complimentary magnetic attraction to the first sealing element, the second sealing element being disposed on a second support structure at a position outside of the interior, the second support structure being selectively moveable relative to the first support structure to open and close the access opening such that with the first support structure disposed in contacting, opposing relation to the second support structure, the first sealing element and the second sealing element will act through the first support structure and the second support structure to cooperatively form a magnetic seal to reversibly seal the access opening in a closed condition, characterized in that the body is a pliable expansible envelope with the access opening disposed between a first deformable wall of the envelope and a second deformable wall of the envelope, wherein the first deformable wall defines the first support structure supporting the first sealing element and the second deformable wall defines the second support structure supporting the second sealing element, wherein the a pliable envelope is formed from a foil laminate material, wherein the first sealing element is a magnetized strip disposed in substantially adjacent, parallel relation to a first boundary edge of the access opening across a surface of the first deformable wall facing away from the interior and wherein the second sealing element is a magnetized strip disposed in substantially adjacent, parallel relation to a second boundary edge of the access opening across a surface of the second deformable wall facing away from the interior, and wherein the first boundary edge is a folded edge with a portion of the first deformable wall folded in covering relation over the first sealing element.

2. The containment package as recited in Claim 1, wherein the portion of the first deformable wall folded in covering relation over the first sealing element is secured to the body at a position below the first sealing element.

3. The containment package as recited in Claim 2, wherein the second boundary edge is a folded edge with a portion of the second deformable wall folded in covering relation over the second sealing element.

4. The containment package as recited in Claim 3, wherein the portion of the second deformable wall folded in covering relation over the second sealing element is secured to the body at a position below the second sealing element.

5. The containment package as recited in Claim 1, wherein the first sealing element and the second sealing element each comprise a magnetized pliable ferromagnetic material and wherein the first boundary edge is a folded edge with a portion of the first deformable wall folded in covering relation over the first sealing element, the portion of the first deformable wall folded in covering relation over the first sealing element being secured to the body at a position below the first sealing element and wherein the second boundary edge is a folded edge with a portion of the second deformable wall folded in covering relation over the second sealing element, the portion of the second deformable wall folded in covering relation over the second sealing element being secured to the body at a position below the second sealing element.

6. A containment package for presaturated wiper sheets, the containment package comprising:

a substantially liquid and vapor impermeable body having an interior adapted to receive and store a plurality of wiper sheets presaturated with a solution subject to evaporation, the body including an access opening adapted for insertion and withdrawal of the wiper sheets through the access opening;

at least a first sealing element defining a magnet supported on a first support structure at a position outside of the interior; and

at least a second sealing element having a complimentary magnetic attraction to the first sealing element, the second sealing element being disposed on a second support structure at a position outside of the interior, the second support structure being selectively moveable relative to the first support structure to open and close the access opening such that with the first support structure disposed in contacting, opposing relation to the second support structure, the first sealing element and the second sealing element will act through the first support structure and the second support structure to cooperatively form a magnetic seal to reversibly seal the access opening in a closed condition, characterized in that wherein the body is a tray with the access opening surrounded by perimeter walls, wherein a flange extending radially away from a perimeter wall defines the first support structure supporting the

first sealing element disposed across the underside of the flange and a removable lid adapted to cover the access opening defines the second support structure supporting the second sealing element disposed across the upper surface of the lid.

7. The containment package as recited in Claim 6, wherein the removable lid is operatively connected to the tray along a living hinge.

8. The containment package as recited in Claim 7, wherein the first sealing element comprises a plurality of magnetized strips extending in a first pattern substantially around the perimeter of the tray not including the living hinge and wherein the second sealing element comprises a plurality of magnetized strips extends in a mirror image pattern around the perimeter of the lid not including the living hinge.

9. The containment package as recited in Claim 6, wherein the first sealing element is covered by polymeric cap structure.

10. The containment package as recited in Claim 6, wherein the first sealing element is covered by polymeric cap structure.

11. The containment package as recited in Claim 6, wherein the first sealing element and the second sealing element each are covered by polymeric cap structures.