DUAL COMPARTMENT POUCH HAVING PRESSURE-OPENABLE NON-SEALING LINE AND HEAT SEALING MOULD THEREFOR

Inventor: Han-Wook PARK, Seoul (KR)
Assignee: C&TECH CORPORATION, Hwaseong-si (KR)

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ABSTRACT
The present invention provides a duplex pouch and a heat-sealing mould for manufacturing the same. The duplex pouch has a pressure-openable non-sealing line of which a specific portion can be opened by a dynamic load that is generated when an external force is applied thereto, and includes a first chamber and a second chamber that are sealed by an external sealing line at their edges and a middle portion of the two chambers is heat-sealed by an inside sealing line to contain different types of liquid contents, respectively, a pressure-openable portion formed at the middle portion of the inside sealing line, a non-sealing unit formed in a rounded triangular or semicircular shape at the center of the pressure-openable portion by first and second branch sealing lines divided by the inside sealing line and then extended, a long non-sealing line provided in a middle of the first branch sealing line and communicating the first chamber and the non-sealing unit, and a short non-sealing line provided in the middle of the second branch sealing line and communicating the non-sealing unit and the second chamber. The heat-sealing mould forms the pouch by heat-sealing two sheets of films, and long and short notches may be formed in the first and second branch sealing lines that correspond to the first and second branch sealing lines, or long and short heat sinks may be formed between the first and second branch sealing lines.
FIG. 4
FIG. 6
FIG. 7

10a

[Primary heat-sealing]

10b

[Inject liquid component]

10a

[Secondary heat-sealing]
FIG. 8
DUAL COMPARTMENT POUCH HAVING PRESSURE-OPENABLE NON-SEALING LINE AND HEAT SEALING MOLD THEREFOR

CROSS-REFERENCE TO RELATED APPLICATION


BACKGROUND OF THE INVENTION

[0002] (a) Field of the Invention
[0003] The present invention relates to a dual compartment pouch having two chambers for separately receiving two types of liquid components. More particularly, it relates to a dual compartment pouch separately storing two types of liquid components that are mixed prior to use and having a pressure-openable non-sealing line, and a heat sealing mould for manufacturing the same.
[0004] (b) Description of the Related Art
[0005] A pouch having an externally isolated chamber formed by heat-compressing two films has excellent water resistance and air-tightness, and can be easily processed into a certain shape so that it can be used as a package for detergent, skin lotion, a medical material, or a beverage.
[0006] Unlike a typical pouch containing a single component liquid, the duplex storage pouch disclosed in the U.S. Patent Layd Open Publication No. 2004/0079763 separately stores different types of liquid or stores a liquid and a powder in one pouch, and pressure is applied to a portion that separates the two different materials in order to mix them prior to use.
[0007] The disclosed duplex storage pouch has a chamber divided by a chevron-shaped seal. When external pressure is applied to one of the divided chambers, the pressure is concentrated to the apex of the chevron shape the chambers, and because the apex portion is fragile, the chevron seal that divides the two chambers is opened. Good examples include a package including a viscous liquid (e.g., hair dye or oxygenated water) that should be kept separate from the other material prior to use.
[0008] The duplex storage pouch is illustrated to be opened at the boundary between the two chambers when a user presses the pouch with their hand, but it needs much stronger power to open the apex area. In other words, when the user presses the chamber, the pressure is uniformly distributed to the entire inner area of the chamber rather than being concentrated at one point so that partial pressure applied to the apex of the saw-shaped sealing line is not sufficient even though a user presses strongly so that the pouch cannot be easily opened.
[0009] The inventor of the present invention disclosed a duplex pouch in Korean Utility No. 20-2009-000590. The duplex pouch has a structure in which at least one of triangular spaces having an apex is included in a sealing line that functions as a boundary between the two chambers so that a specific portion of the sealing line has weak adhesive strength compared to another portion.
[0010] The duplex pouch suggested by the inventor of the present invention has a structure in which a sealing area is significantly narrowed at a specific area so that a portion at which the adhesive is weaker than the other portion is formed. However, the weak portion cannot be easily opened unless strong power is applied.
[0011] The above information disclosed in this Background section is only for enhancement of understanding of the background of the invention and therefore it may contain information that does not form the prior art that is already known in this country to a person of ordinary skill in the art.

SUMMARY OF THE INVENTION

[0012] The present invention has been made in an effort to provide a duplex compartment pouch that can store different types of components in a chamber divided into two and has a sealing line that becomes the boundary of the chamber and a pressure-openable non-sealing line. Here, a specific portion of the sealing line is not opened by a static load applied while being transported or being stacked, and the pressure-openable non-sealing line is opened by a dynamic load that is applied by user's pressure.
[0013] In addition, the present invention provides a heat-sealing mould for manufacturing a duplex pouch having a pressure-openable non-sealing line to form a portion of a sealing line that functions as a boundary of the separated chambers with the aforementioned non-sealing line.
[0014] The duplex pouch according to the present invention includes a first chamber and a second chamber that are sealed by an external sealing line at their edges and a middle portion of the two chambers is heat-sealed by an inside sealing line to contain different types of liquid contents, respectively, a pressure-openable portion formed at a middle portion of the inside sealing line, a non-sealing unit formed in a round triangle or semicircle shape at the center of the pressure-openable portion by first and second branch sealing lines divided by the inside sealing line and then extended, a long non-sealing line provided in a middle of the first branch sealing line and communicating the first chamber and the non-sealing unit, and a short non-sealing line provided in a middle of the second branch sealing line and communicating the non-sealing unit and the second chamber.
[0015] The pressure-openable may further include a pair of enhanced sealing lines forming an acute angle by being extended from the inside sealing line, and the first and second branch sealing lines are respectively divided into two from the enhanced sealing line and then extended.
[0016] It is preferable that the width of each of the first and second branch sealing lines is set to correspond to less than 1/3 of the width of the inside sealing line.
[0017] In addition, it is preferable that the length of the long non-sealing line is 5 to 10 mm, and that the length of the short non-sealing line is 0.4 to 0.9 times that of the non-sealing portion.
[0018] A heat-sealing mould for manufacturing a duplex pouch having a pressure-openable non-sealing line includes a heat compression pad at one part thereof and a linear heater at another part to form two separate chambers by heat-sealing external and internal sealing lines to two sheets of films. The heat compression pad includes an inner sealing pad corresponding to an inner sealing line, an enhanced pad forming an enhanced sealing line, and first and second branch sealing pads respectively corresponding to first and second branch sealing lines, and a long notch and a short notch are provided for forming the long non-sealing line and the short non-sealing line in the first and second branch sealing pads.
In addition, instead of the long and short notch in the heat-compression pad, a long heat sink and a short heat sink may be respectively provided to form a long non-sealing line and a short non-sealing line in the linear heater.

The duplex pouch according to the present invention may separately store liquid components that should be separate prior to use, such as hair dye or oxygenated water, in the first and second chamber, respectively.

The pressure-openable portion disposed between the first and second chambers has a structure in which the non-sealing portion disposed between the first and second chambers is double-blocked with the long non-sealing line and the short non-sealing line so that the liquid components respectively stored in the first and second chambers cannot be mixed by a static load.

Since the long non-sealing line and the short non-sealing line are substantially not sealed, they may be opened by a dynamic load generated when a user presses the first chamber with a sufficient amount of power so that the two different components respectively stored in the first and second chambers can be mixed.

**BRIEF DESCRIPTION OF THE DRAWINGS**

- FIG. 1 is a front view of a duplex pouch according to a first exemplary embodiment of the present invention.
- FIG. 2 is an enlarged view of “A” in FIG. 1.
- FIG. 3 is an enlarged cross-sectional view of FIG. 2, taken along the line III-III.
- FIG. 4 is a front view of a duplex pouch according to a second exemplary embodiment of the present invention.
- FIG. 5 is an enlarged view of “B” in FIG. 4.
- FIG. 6 is a partial perspective view of an example of a heat-sealing mould for manufacturing a duplex pouch according to the present invention.
- FIG. 7 is a schematic diagram of a manufacturing process of the duplex pouch according to the present invention.
- FIG. 8 is a partial perspective view of another example of a heat-sealing mould for manufacturing the duplex pouch.

**DETAILED DESCRIPTION OF THE EMBODIMENTS**

The present disclosure will be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of this disclosure are shown.

As shown in FIG. 1, a duplex pouch according to the present invention is formed of a first chamber 6 and a second chamber 8. The first and second chambers 6 and 8 are sealed by an outside sealing line 2 that is formed by heat-sealing the outside perimeter thereof and are simultaneously separately divided by an inside sealing line 4 that substantially crosses the center between the first and second chambers 6 and 8 and is formed by heat-sealing.

The first and second chambers 6 and 8 respectively store different types of liquid components that have viscosity and should be kept separate prior to use. The liquid components exemplarily include hair dye and oxygenated water.

In addition, a pressure-openable portion 10 is provided at the longitudinal center of the inside sealing line 4 that forms the boundary the two chambers 6 and 8.

As shown in FIG. 2, the pressure-openable portion 10 includes a rounded triangular or semi-circular non-sealing portion 16 formed by a first branch sealing line 12 and a second branch sealing line 14 that are divided into two and extended from the inside sealing line, and a long non-sealing line 18 and a short non-sealing line 20 are respectively provided in the middle of each of the first and second branch sealing lines 12 and 14.

Here, it is preferred that the width of each of the first and second branch sealing lines 12 and 14 has weaker bonding force than other portions by setting the width to be ½ the width of the inside sealing line 4.

As in a typical pouch, in the duplex pouch according to the present invention, the outside sealing line 2 and the inside sealing line 4 are sealed with a width of 6 mm or 7 mm, and accordingly, the width of each of the first and second branch sealing lines 12 and 14 is set to 2 mm.

As shown in FIG. 3, the first branch sealing lines 12 that are adjacent to each other at lateral sides are integrally sealed, and the non-sealing line 18 has a structure in which two films are simply overlapped.

That is, the surface of the non-sealing line 18 is melted due to a peripheral temperature that is maintained at a range of 200°C. to 275°C. during the heat-sealing process, the portion of the non-sealing line 18 is not pressed by a heater so that the inside thereof is overlapped rather than being internally sealed, and after the non-sealing line 18 is heat-sealed and then cooled, it is difficult to distinguish the integrally sealed first branch sealing line 12. However, the non-sealing line 18 is not internally sealed but the two parts thereof internally contact each other so that the non-sealing line 18 is opened when a dynamic load is applied thereto, and the non-sealing line 20 of the second branch sealing line 14 has the same structure as of the non-sealing line 18 but is shorter than the non-sealing line 18.

With the above-described structure, the long non-sealing line 18 and the short non-sealing line 20 are always opened respectively in the first and second branch sealing lines 12 and 14, but liquid contents in the first and second chambers 6 and 8 cannot be mixed with each other because they cannot pass therethrough by themselves.

In further detail, the long non-sealing line 18 and the short non-sealing line 20 are sealed in an air-tight manner due to an electrostatic force according to the characteristic of the material at the early forming stage so that they are maintained in the closed state unless a user externally presses the pouch.

In the duplex pouch of the present invention, the external force applied to the first and second chambers 6 and 8 includes a dynamic load applied by user’s manipulation and a static load applied to a lower-side pouch when it is stacked for transportation or storage.

Since the static load is externally applied to both the first and second chambers 6 and 8, pressure distribution occurs inside the pouch and pressure between the first and second chambers 8 and 8 is balanced so that the static load is weaker than the electrostatic force that maintains the long non-sealing line 18 and the short non-sealing line 20 in the closed state, and accordingly the pouch is not opened.

However, the long non-sealing line 18 has a relatively long length and thus the static load may cause leakage therein so that the liquid component of the first chamber 6 may flow into the non-sealing portion 16. However, the flow of the liquid component is blocked by the short non-sealing line 20 in the non-sealing portion 16, and the non-sealing portion 16 is expanded in a water blister shape as the leaked liquid component fills the non-sealing portion 16 so that
tension therebetween is increased. For this reason, the first and second chambers 6 and 8 are not opened by the static load.

[0045] Thus, the first and second chambers 6 and 8 are not opened so that the liquid components are not mixed even though the pouch is stacked for transportation or storage.

[0046] When the long non-sealing line 18 of the first branch sealing line 12 that communicates between the first chamber 6 and the non sealing portion 16 is set too long, the close contact state cannot be maintained so that the length of the non-sealing line 18 may be limited to an appropriate length, and the open length of the first chamber 6 caused by pressure with a user's palm is preferably set to 4 to 10 mm according to experiments of the inventor.

[0047] When the length is set to be longer than 11 mm, liquid components of the first chamber 6 of the lowest one of the pouch stack may leak to the non-sealing portion 16 by static load due to the weight of the upper pouches. On the contrary, when the length is set to be shorter than 10 mm, the user needs to increase the pressure force to open the pouch.

[0048] In addition, the length of the short non-sealing line 20 is set to be relatively short to block flow of the liquid component and is opened only when the dynamic load is applied thereto, and is optimized to be in a range of 0.4 to 0.9 times the length of the long non-sealing line 18 formed in the first branch sealing line 12.

[0049] When the length of the short non-sealing line 20 is shorter than 0.4 times the length of the long non-sealing line 18, the user needs to increase pressure force to open the pouch, and when the length of the short non-sealing line 20 is longer than 1.0 times the length of the long non-sealing line 18, a liquid component may leak when the static load is applied together with external impact.

[0050] In the duplex pouch of the present invention, the long non-sealing line 18 is set to 6 mm and the short non-sealing line 20 is set to 3.5 mm for optimizing desired operation.

[0051] In the duplex pouch with the above-described configuration, components of the duplex pouch are set to be mixed when the user externally presses the first chamber 6 with a finger or palm.

[0052] When the user presses the first chamber 6, the liquid components in the first chamber 6 brings about pressure and the pressure is applied to the long non-sealing line 18 of the pressure-openable portion 10 as the static load such that it is opened.

[0053] In other words, the long non-sealing line 18 passes the liquid component to the non-sealing line 16 when the user presses the first chamber 6, and the liquid component that has leaked into the non-sealing portion 16 is pushed into the second chamber 8 while opening the short non-sealing line 20 and thus the two liquid components are mixed through repeatedly pressing the first chamber 6.

[0054] In the duplex pouch of the present invention, the pouch is opened by the dynamic load generated from the user's external force so that the first and second chambers 6 and 8 communicate with each other, but the static load applied to the lowest pouch when it is stacked for transportation or storage cannot open the pouch.

[0055] That is, since the applied static load is evenly distributed in the entire areas of the first and second chambers 6 and 8, the static load is not strong enough to open the long non-sealing line 18 so that the liquid component of the first chamber 6 is not mixed with the component in the second chamber 8.

[0056] A strong static load may be instantly applied to the pouch due to external impact during transportation of the pouch. In this case, only the long non-sealing line 18 is opened and the non-sealing portion 16 and the second chamber 8 are double-blocked by the short non-sealing line 20. That is, the instant variation due to static load may open the long non-sealing line 18 but cannot open the short non-sealing line 20.

[0057] Accordingly, the liquid components in the first and second chambers 6 and 8 cannot be mixed with each other even if an external impact is applied to the pouch during transportation.

[0058] The duplex pouch of the present invention is not limited thereto, and may be realized with a configuration shown in FIG. 4.

[0059] In this exemplary embodiment, a pressure-openable portion 10 further includes a pair of enhanced sealing lines 22 extending from an inside sealing line 4 with a constant width and rising upward, forming an acute angle.

[0060] At the vertex of the enhanced sealing lines 22, a first branch sealing line 12 and a second branch sealing line 14 are extended to form a rounded triangular or semicircular non-sealing portion 16 as in the previous exemplary embodiment, and a long non-sealing line 18 and a short non-sealing line 20 are respectively formed in the longitudinal middle of the first and second branch sealing lines 12 and 14.

[0061] With such a configuration, a portion where the enhanced sealing line 22 is stronger than its periphery area so that the lateral sides of the first branch sealing line 12 receive a pre-stress force at the enhanced sealing line 22 is formed, and a space between the enhanced sealing lines 22 become concave in the first chamber 6 such that the concave portion maintains a vacuum condition without being filled with the liquid component. Accordingly, the long non-sealing line 18 that is pre-stressed at the enhanced sealing line 22 has stronger adhesiveness compared to the structure of the aforementioned exemplary embodiment so that it cannot be easily opened even if a heavy static load is applied thereto.

[0062] Therefore, the duplex pouch of the present exemplary embodiment more efficiently separates liquid contents than the duplex pouch of the previous exemplary embodiment.

[0063] In addition, the pair of enhanced sealing lines 22 function as a path for guiding the liquid contents generating pressure to the long non-sealing line 18 when the user presses the first chamber 6 so that the first chamber 6 and the second chamber 8 can be easily opened even though the enhanced sealing lines 22 have strong adhesive force.

[0064] That is, the user presses the duplex pouch of the exemplary embodiment with his thumb or palm such that the pressure can be concentrated to the inside of the enhanced sealing line 22 of the pressure-openable portion 10, and accordingly the dynamic load generated by the liquid contents can be effectively applied to the long non-sealing line 18.

[0065] The duplex pouch of the present invention can be realized through a heat-sealing mould shown in FIG. 6.

[0066] The duplex pouch of the exemplary embodiment related to FIG. 4 and FIG. 5 can be manufactured through a heat-sealing mould, and FIG. 6 shows an enlarged view of one part of the mould 10a corresponding to the pressure-openable portion 10 and another part of the mould 10b opposite thereto.

[0067] The one part of the mould 10a has a pad for heat compression and the other part of the mould 10b has a linear
heater for heat sealing, and the pad and the linear heater have
the same shape. The pad of the one part of the mould 10a
includes an internal pad 40a corresponding to the inside sealing
line 4, an enhanced line pad 220a forming the enhanced sealing line 22, and first and second branch pads 120a and
140a that respectively correspond to the first and second branch sealing lines 12 and 14. The first branch pad 120a and
the second branch pad 140a are provided with a long notch
180a and a short notch 200a to form the long non-sealing line
18 and the short non-sealing line 20. The linear heater
includes an internal line 40b forming the inside sealing line 4,
an enhanced line 220b forming the enhanced sealing line 22,
and first and second branch lines 120b and 140b that respecti
vely form the first and second branch sealing lines 12 and 14.

With such a configuration, the heat sealing mould is
mounted on the heat sealing device through the same method
of the typical pouch manufacturing method to manufacture
the duplex pouch of the present invention.

FIG. 7 shows a process for manufacturing the
duplex pouch of the present invention. Two piled films form-
ing a pouch are provided between the two heat sealing moulds
10a and 10b, and the sealing area is heated at a temperature in
a range of 200-275°C. Such that the films are primarily
heat-sealed.

The first and second chambers 6 and 8 are formed
through the primary heat-sealing, but one side of the two
chambers 6 and 8 is not sealed.

A nozzle N is inserted through the non-sealed por-
tion to inject a liquid content to be stored, and the non-sealed
portion is secondarily heat-sealed while filling nitrogen gas at
the end of the injection of the liquid contents to prevent
degeneration of the liquid content as necessary.

For convenience of description, the liquid content
injection and the secondary heat-sealing processes are sepa-
 rated in FIG. 7, but when the liquid content injection is
finished and the nozzle N is ejected, the two moulds 10b and 10b
are closed and simultaneously the secondary heat-sealing
process is started.

The heat-sealing mould for manufacturing the
duplex pouch of the present invention is not limited to the
structure of FIG. 6. That is, as shown in FIG. 8, in the heat-
sealing mould 10b, a long heat sink 180b and a short heat sink
200b may be provided at portions extended to the first branch
line 120b and the second branch line 140b respectively
extended from the internal sealing line 40b and the enhanced
line 220b to thereby prevent the corresponding portions from
being melted during the heat-sealing process.

In addition, the non-sealing portion 16 provided in
the pressure-openable portion 10 of the duplex pouch of the
present invention may be provided in plural, and the plurality
of non-sealing portions can more completely block the first
and second chambers 6 and 8 from each other.

While this invention has been described in connec-
tion with what is presently considered to be practical exam-
plary embodiments, it is to be understood that the invention is
not limited to the disclosed embodiments, but, on the con-
trary, is intended to cover various modifications and equiva-
 lent arrangements included within the spirit and scope of the
 appended claims.

What is claimed is:
1. A duplex pouch having a pressure-openable non-sealing
line, comprising:
a first chamber and a second chamber that are sealed by an
external sealing line at their edges and a middle portion