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The present invention relates to packaging which has easily controllable opening behaviour, made of a container based on a film made of at least one thermoplastic polymer, the opening of the container having been sealed by a cover made of a transparent multilayer film that comprises a sealable layer (a) based on at least one heat-sealable thermoplastic polymer with a layer thickness of at most 12 µm and, adjoining the sealable layer (a), a layer (b) based on at least one thermoplastic polymer, and optionally other layers, where the adhesion between the sealable layer (a) and the layer (b) is lower by at least 30% than the strength of the seal between the container and the cover, and the bond between the sealable layer (a) and the layer (b) in the multilayer film is therefore peelable in such a way that during the first opening of the packaging in the seal seam region a section of the sealable layer (a) remains on the container.

Packaged products such as food or drink in the food industry are frequently supplied in plastics packaging made of a container and of a cover; these provide clarity and visibility to allow the purchaser to check the characteristics of the packaged product through the package, in particular through the cover. It is also desirable here that the packaging can be opened in a controllable manner by exerting a small and homogeneous force.

The prior art discloses packaging with cover composed of a multilayer film that comprises a sealable-layer material, said cover being applied to the container by heat-sealing. That type of packaging is usually opened by opening of the resultant heat-sealed seam. In order to facilitate opening, the composition of the sealable-layer material of a cover film can be such that the bond between the cover and the container can be peelable. However, a disadvantage here is that the peelable sealable-layer material often leads to undesired haze in the cover, and moreover the peelability reduces bond strength between the two packaging elements.

According to EP 1 749 655 B1 attempts were made to solve this problem by providing a multilayer film in which the sealable-layer material is not peelable, but instead the cohesion of the layer adjoining the sealable layer is weakened.

This is achieved in that the said layer is composed of a polymer blend made of two incompatible polymer components. When a multilayer film thus constructed as packaging cover is sealed in relation to a second packaging element, during opening of the packaging in the region of the seal seam the sealable layer and a portion of the adjacent layer of the cover remain on the second packaging element, since the adjoining layer fractures within the plane of the layer (cohesion peel). This not only leads to a lack of clean separation between cover and container but can also lead to undesired further tear of, or tear-away of, the cover in the, or behind the, seal-seam region. Although improved bond strength between the two packaging elements is achieved in comparison with covers made of multilayer films that comprise a peelable sealable-layer material, no improvement of haze in the cover is achieved, because the polymer components of the polymer blend are incompatible.

There is therefore a need for packaging which features homogenously easy, and easily controllable, opening and which at the same time permits very easy checking of the product packaged therein by the potential purchaser, in particular through the cover.

It was therefore an object of the present invention to provide packaging which is superior to known packaging in featuring easily controllable homogeneous opening, substantially without any destructive effect, and at the same time featuring very good optical properties such as transparency in order to avoid undesired haze, at least in the cover.

This object is achieved according to the invention by providing packaging which has easily controllable opening behaviour, made of a container based on a single-layer or multilayer film made of at least one thermoplastic polymer, the opening of the container having been sealed by a cover made of a transparent multilayer film that

comprises a sealable layer (a) based on at least one heat-sealable thermoplastic olefin homo- and/or copolymer with a layer thickness of at most 12 µm and,

adjoining the sealable layer (a), a layer (b) made of at least one thermoplastic copolymer of ethylene and/or propylene and of at least one α-olefin having at least four carbon atoms, where the layer (b) is based on a thermoplastic polymer different from the thermoplastic polymers of the sealable layer (a),

and optionally other layers, where the optionally present sealable layer (s) is based on the same polymer(s) as the sealable layer (a) and the thermoplastic olefin homo- and/or copolymers from which the single-layer film of the container has been produced are the same as those from which the sealable layer (a) has been produced,

or alternatively

the opening of the container has been sealed by a cover made of a transparent multilayer film which comprises

a sealable layer (a) based on at least one heat-sealable thermoplastic amorphous homo- or copolyester with a layer thickness of at most 12 µm and, adjoining the sealable layer (a), a layer (b) made of at least one ethylene copolymer selected from the group comprising ethylene-vinyl acetate copolymers, ethylene-$C_{1-4}$-alkyl (meth)acrylate copolymers and ethylene-(meth)acrylic acid copolymers, where the layer (b) is based on a thermoplastic polymer different from the thermoplastic polymers of the sealable layer (a),

and optionally other layers,

where the optionally present sealable layer (s) is based on the same polymer(s) as the sealable layer (a) and the single-layer film of the container has been produced from a thermoplastic homo- and/or copolyester,

where the adhesion between the sealable layer (a) and the layer (b) is in each case lower by at least 30% than the strength of the seal between the container and the cover, and the bond between the sealable layer (a) and the layer (b) in

the multilayer film is therefore peelable in such a way that during the first opening of the packaging in the seal seam region only a section of the sealable layer (a) having the width of the seal seam remains on the container, and no further delamination takes place between the layers (a) and (b).

Because the adhesion between the sealable layer (a) and the adjoining layer (b) is lower by at least 30% than the strength of the seal between the container and the cover, during the first opening of the packaging in the seal seam region a section of the sealable layer (a) having the width of the seal seam remains, by virtue of fracture and delamination from the layer (b) on the container, and the packaging can therefore be opened in easily controllable manner and practically without any further destructive effect, in particular relating to the cover. Furthermore, during the first opening of the packaging no further delamination takes place between the layer (b) and (a) other than in the seal seam region, and therefore the packaging does not remain sealed by a sealable layer (a) delaminated from the layer (b) and remaining on the container. According to the invention, by virtue of the much lower adhesion between the sealable layer (a) and the layer (b), during the first opening of the packaging in the seal seam region only a section of the sealable layer (a) having the width of the seal seam remains on the container as a result of fracture of the sealable layer (a) and delamination from the layer (b).

For the purposes of the present invention, the meaning of the terms "peelable" and "peelability" is that the sealable layer (a) and the layer (b) of the packaging of the invention have been bonded delaminably to one another and can be separated from one another without any destructive effect. The adhesion between the said two layers is a measure of delaminability and therefore of peelability. The adhesion is determined in accordance with the method described hereinafter.

This method is also used to check the selection of the polymer materials for the structure of the layer (b) and, respectively, the sealable layer (a) associated therewith, for adequate delaminability at the mutual interface, i.e. peelability of

the sealable layer (a) from the adjoining layer (b). It is self-evident that the adhesion between all of the other optionally present layers of the multilayer film used as cover film must also be higher than the adhesion between the sealable layer (a) and the layer (b).

In a preferred embodiment of the packaging of the invention, the adhesion between the sealable layer (a) and the layer (b) of the multilayer film used according to the invention is at least 2.5 N/15 mm, preferably at least 3.5 N/15 mm, particularly preferably at least 4.5 N/15 mm. A point that must be considered here is that this adhesion is never permitted to exceed the maximal values stated hereinafter for the strength of the seal; the said adhesion value must always be lower by at least 30%.

The strength of the seal between the two packaging elements, container and cover, is preferably at most 35 N/15 mm, particularly preferably ≤ 30 N/15 mm.

The strength of the seal is determined in accordance with the method described hereinafter. This method can also be used to check the selection of the polymer materials for the structure of the sealable layer (a) and of the film of the container for adequate strength of the seal.

The multilayer film used according to the invention is transparent, i.e. the sealable layer (a) and the layer (b) and all other layers optionally present are transparent. The transparency of each individual layer of the multilayer film used according to the invention is determined in accordance with the method described hereinafter. However, the multilayer film can if necessary have been printed, for example for information purposes.

According to one of the alternative embodiments of the multilayer film used according to the invention,

the sealable layer (a) is based on at least one olefin homo- and/or copolymer, preferably on at least one propylene homo- and/or copolymer, particularly preferably on at least one propylene copolymer, and

the layer (b) is based on at least one copolymer of ethylene and/or propylene, preferably ethylene, and at least one α-olefin having at least 4 carbon atoms, as described hereinafter.

A suitable material for the production of the transparent layer (a) of the multilayer film used according to the invention is at least one thermoplastic olefin homo- or copolymer.

For the production of the transparent sealable layer (a) of the multilayer film used according to the invention it is preferably possible to use olefin homo- and copolymers of the same type as those disclosed hereinafter – originally as suitable – for the production of the layer (b). However, if olefin copolymers are used for the production of the sealable layer (a), the α-olefin content in these olefin copolymers is preferably at most 15% by weight, particularly preferably at most 10% by weight, based in each case on the total weight of the olefin copolymer.

Suitable olefin homo- and copolymers for the production of the layer (b) and, respectively, the layer (a) of the multilayer film used according to the invention are preferably thermoplastic olefin homo- or copolymers of α,β-unsaturated olefins having from 2-10, i.e. 2, 3, 4, 5, 6, 7, 8, 9 or 10, carbon atoms. Suitable olefin homopolymers are preferably selected from the group comprising ethylene homopolymers (polyethylenes, PE), preferably LDPE and HDPE, propylene homopolymers (polypropylenes, PP), butylene homopolymers (polybutylenes, PB) and isobutylene homopolymers (polyisobutylenes, PI) or a mixture of at least two of the polymers mentioned. "LDPE" means low-density polyethylenes with density in the range from 0.86 to 0.93 g/cm$^3$, featuring a high degree of branching of the molecules. "HDPE" means high-density polyethylenes which have only a small extent of branching of the molecular chain; density here can be in the range from 0.94 to 0.97 g/cm$^3$.

Suitable olefin copolymers for the layer (a) and, respectively, according to the invention for the layer (b) are only copolymers of ethylene and/or propylene and of at least one α-olefin having at least 4, preferably from 4 to 10, particularly preferably from 4 to 8, carbon atoms, very particularly preferably copolymers of ethylene and/or propylene with at least one α-olefin selected from the group comprising butene, hexene and octene. For the layer (b), the α-olefin content in the olefin copolymer is preferably at most 25% by weight, particularly preferably at most 15% by weight, based in each case on the total weight of the olefin copolymer. Particularly suitable copolymers of ethylene and of at least one α-olefin having at least 4 carbon atoms are LLDPE and/or mPE. "LLDPE" means linear low-density ethylene copolymers which are characterized by the presence of a linear main chain with pendent chains located thereon and having a density in the range from 0.86 to 0.94 g/cm$^3$. "mPE" means ethylene copolymers polymerized by means of metallocene catalysts and preferably having a density in the range from 0.88 to 0.93 g/cm$^3$.

For the production of the layer (b), respectively, the layer (a), it is also possible to use mixtures of olefin copolymers; for the layer (a) it is also possible to use mixtures of olefin homopolymers or a mixture of olefin homopolymers with olefin copolymers, however, transparency of the layer (b) must be ensured here. The content of the olefin copolymer in the mixture here is preferably higher than the content of the olefin homopolymer. Particular preference is given to a mixture of mPE, LLDPE and/or LDPE. It is very particularly preferable that the layer (b) is based on a mPE, a LLDPE, based in each case on the total weight of the layer (b) and, respectively, (a), where the sum of the % by weight values must always be 100% by weight.

The olefin content in the olefin copolymer of the transparent layer (b) of the multilayer film used according to the invention is preferably at least 75%, preferably at least 80%, particularly preferably at least 85%, based in each case on the total weight of the olefin copolymer.

According to the second alternative embodiment of the multilayer film used according to the invention,

the sealable layer (a) is based on at least one amorphous homo- or copolyester and

the layer (b) is based on at least one ethylene copolymer selected from the group comprising ethylene-vinyl acetate copolymers, ethylene-$C_{1-4}$-alkyl (meth)acrylate copolymers and ethylene-(meth)acrylic acid copolymers.

Suitable materials for the production of the transparent sealable layer (a) of this multilayer film used according to the invention in the second alternative embodiment are thermoplastic homo- and copolyesters.

These suitable homo- and/or copolyesters for the production of this transparent sealable layer (a) of the multilayer film used according to the invention are amorphous, thermoplastic aliphatic, semi-aromatic and aromatic homo- and copolyesters. These homo- and copolyesters derive from polyols, preferably from diols, e.g. ethylene glycol or 1,4-butanediol, and dicarboxylic acids or dicarboxylic acid derivatives such as adipic acid, isophthalic acid and/or terephthalic acid. According to the invention, it is also possible to use polycarbonates (PC) as homo- and/or copolyesters for the production of the sealable layer (a), as long as transparency of the sealable layer (a) is ensured. Polyesters preferred as homopolyesters are those that derive from a polyol component and from a dicarboxylic acid component. Suitable homopolyesters are preferably selected from the group comprising PET, PBA and PBT. "PET" means polyethylene terephthalate, which can be produced from ethylene glycol and terephthalic acid. "PBA" means polybutylene adipate, which can be produced from butane-1,4-diol and adipic acid. "PBT" means polybutylene terephthalate, which can be produced from butane-1,4-diol and terephthalic acid. The preferably amorphous condition here is characterized by the prefix "A". A particularly preferred amorphous homopolyester is APET (amorphous PET). Polyesters which also comprise, alongside a

polyol component and a dicarboxylic acid component, at least one other comonomer, preferably another polyol component, are termed copolyesters. Suitable preferably amorphous copolyesters are copolyesters made of an aromatic dicarboxylic acid such as terephthalic acid, an aliphatic glycol such as ethylene glycol and at least one other monomer, preferably at least one other monomer selected from the group comprising preferably branched aliphatic polyols, aromatic polyols and cycloaliphatic polyols. A particularly preferred amorphous copolyester derives from ethylene glycol, terephthalic acid and 1,4-cyclohexanedimethanol.

It is preferably that the sealable layer (a) of this multilayer film used according to the invention is based on at least one amorphous homopolyester made of an aromatic dicarboxylic acid and of an aliphatic polyol, or on at least one amorphous copolyester made of at least one aromatic dicarboxylic acid, at least one aliphatic polyol and at least one cycloaliphatic polyol.

It is very particularly preferably that the sealable layer (a) of the multilayer film used according to the invention is based on at least one amorphous homopolyester made of an aromatic dicarboxylic acid and of an aliphatic diol, or on at least one amorphous copolyester made of at least one aromatic dicarboxylic acid, at least one aliphatic diol and at least one cycloaliphatic diol.

Copolymers suitable for the production of the transparent layer (b) of the multilayer film used according to the invention in the second alternative embodiment are copolymers of at least one olefin such as ethylene and of at least one compound from the group comprising vinyl acetate, alkyl (meth)acrylates, preferably $C_{1-4}$-alkyl (meth)acrylates, particularly preferably methyl (meth)acrylate, ethyl (meth)acrylate, n- and isopropyl (meth)acrylate, n- and isobutyl (meth)acrylate, tert-butyl (meth)acrylate, 2-ethylhexyl (meth)acrylate, cyclohexyl (meth)acrylate and isobornyl (meth)acrylate, and (meth)acrylic acid. Particular preference is given, as comonomer, to at least one α,β-unsaturated non-olefinic monomer selected from the group comprising vinyl acetate, (meth)acrylate and (meth)acrylic acid.

For the purposes of the present invention, the terms "(meth)acrylate" and "(meth)acrylic acid" comprise not only alkyl methacrylates and methacrylic acids but also alkyl acrylates and acrylic acid.

It is preferable that the layer (b) of the multilayer film used according to the invention is based on a thermoplastic polymer different from the thermoplastic polymer of the sealable layer (a).

The layer (b) of the multilayer film used according to the invention preferably has a layer thickness of at least 3 µm, particularly ≥ 6 µm, very particularly from 7 to 14 µm.

In a preferred embodiment, antifogging properties have been provided to the transparent sealable layer (a) of the multilayer films used according to the invention. It is preferable here that the sealable layer (a) comprises at least one antifogging additive or that the sealable layer (a) has, at least on one side, a coating based on at least one antifogging additive. It is preferable to use, as antifogging additive, at least one additive selected from the group comprising alkoxylated amines, alkoxylated amides and polyol fatty acid esters, preferably glycerol fatty acid esters, and also appropriate salts of these. If the sealable layer (a) is coated at least on one side with at least one antifogging additive, the sealable layer (a) of the multilayer foil used according to the invention can optionally be corona-(pre)treated in advance of the said coating. If the sealable layer (a) is based on at least one olefin homo- and/or copolymer, it is preferably corona-(pre)treated in advance of coating with one at least antifogging additive at least on one side. If the sealable layer (a) is based on at least one homo- and/or copolyester, it is not always necessary to carry out corona-(pre)treatment in advance of coating with at least one antifogging additive at least on one side. The sealable layer (a) can preferably have a coating based on at least one antifogging additive at least on one side when the sealable layer (a) is based on at least one homo- and/or copolyester. If the sealable layer (a) is based on at least one olefin homo- and/or copolymer, the sealable layer (a) can preferably comprise at least one antifogging additive that provides antifogging properties.

The sealable layer (a) of the multilayer film used according to the invention preferably has a layer thickness of at most 12 µm, particularly from 2 to 10 µm, very particularly from 3 to 8 µm.

The layer thickness of the sealable layer (a) and of the transparent layer (b) can optionally be identical. However, the sealable layer (a) preferably has a layer thickness that is smaller by at least 30% than the layer thickness of the layer (b).

The container of the packaging of the invention is preferably a tray moulded from a single- or multilayer, preferably single-layer, film made of a thermoplastic polymer; the said film optionally has a sealable layer (s) based on a heat-sealable thermoplastic polymer. The single- or multilayer film, and also the sealable layer (s) can optionally be transparent, but need not necessarily be transparent.

Heat-sealable thermoplastic polymers that are suitable for the production of the optionally present sealable layer (s) of the container used according to the invention are the same as the heat-sealable thermoplastic polymers that can be used respectively for the production of the sealable layer (a) of the multilayer film used according to the invention as cover. It is preferable that the sealable layer (s) of the container used according to the invention is based on the same polymer(s) as the sealable layer (a) of the multilayer film used as cover. In a particularly preferred embodiment, the transparent sealable layer (a) and also the sealable layer (s) are based on at least one amorphous homo- and/or copolyester. In the alternative embodiment, the transparent sealable layer (a) and also the sealable layer (s) are based on at least one olefin homo- and/or copolymer.

The sealable layer (s) of the container used according to the invention preferably has a layer thickness of ≤ 20 µm, particularly from 1 to 12 µm, very particularly from 2 to 11 µm.

The container of the packaging of the invention has preferably been moulded from a film by thermoforming, particularly by a deep-draw process. It is preferable that the container used according to the invention has a peripheral edge that defines the size of the container opening sealed by the cover.

A suitable material for the production of the preferably single-layer film of the container used according to the invention is a thermoplastic polymer, preferably a thermoplastic polymer selected from the group comprising homo- and copolyesters or olefin homo- and copolymers.

For the production of the preferably single-layer film of the container used according to the invention here, it is possible to use thermoplastic homo- and/or copolyesters and olefin homo- and/or copolymers that are the same as those also respectively suitable for the production of the sealable layer (a). If the preferably single-layer film is based on a homo- or copolyester, however, it is not essential that these homo- and/or copolyesters are amorphous; they can also be crystalline or semi-crystalline. Particularly preferred homo- or copolyesters for the production of the preferably single-layer film are selected from the group comprising CPET (crystalline PET) and APET.

The preferably single-layer film of the container used according to the invention preferably has a layer thickness of from 200 to 1200 µm, particularly from 300 to 900 µm.

In an alternative embodiment of the packaging of the invention, the cover is composed of a transparent multilayer film comprising

a sealable layer (a) based on at least one olefin homo- and/or copolymer, preferably based on at least one propylene homo- and/or copolymer, particularly preferably based on at least one propylene copolymer, and

a layer (b) based on at least one copolymer of ethylene and/or propylene, preferably ethylene, and at least one α-olefin having at least 4 carbon atoms, where

the container is composed of a preferably single-layer film made of an olefin homo- or copolymer, preferably of an olefin homopolymer, particularly preferably of a propylene homopolymer, where the film can optionally comprise a sealable layer (s) based on a heat-sealable thermoplastic olefin homo- and/or copolymer.

In the other alternative embodiment of the packaging of the invention, the cover is composed of a transparent multilayer film comprising

a sealable layer (a) based on at least one amorphous homo- or copolyester and

a layer (b) based on at least one ethylene copolymer selected from the group comprising ethylene-vinyl acetate copolymers, ethylene-$C_{1-4}$-alkyl (meth)acrylate copolymers and ethylene (meth)acrylic acid copolymers, where

the container is composed of a preferably single-layer film made of a thermoplastic polymer selected from the group consisting of homo- and copolyesters and polyvinyl chlorides, where the film can optionally comprise a sealable layer (s) based on a heat-sealable thermoplastic homo- and/or copolyester.

In a preferred embodiment, the multilayer film used according to the invention as cover film has as barrier layer, preferably as a gas-barrier layer, a transparent layer (c) which optionally has been bonded by way of a transparent adhesion-promoter layer (d) in each case to the adjoining layer. The layer (c) is particularly preferably an oxygen-barrier layer and/or a water-vapour-barrier layer.

The layer (c) of the multilayer film used according to the invention is preferably based on at least one thermoplastic polymer selected from the group comprising ethylene-vinyl alcohol copolymers (EVOH), at least partially hydrolysed polyvinyl acetates, polyvinylidene chloride (PVDC), vinylidene chloride copolymers, preferably with at least 80% vinylidene chloride content, based on the total weight of the vinylidene chloride copolymer, or a mixture of at least two of the polymers

mentioned, particularly preferably on at least one ethylene-vinyl alcohol copolymer.

The ethylene-vinyl alcohol copolymers (EVOH) used for the production of the layer (c) are obtained through complete or incomplete hydrolysis of corresponding ethylene-vinyl acetate copolymers (EVAc). It is preferable to use fully hydrolysed ethylene-vinyl acetate copolymers with a degree of hydrolysis ≥ 98% and with from 0.01 to 80 mol% ethylene content, preferably from 1 to 50 mol%, based in each case on the total weight of the ethylene-vinyl alcohol copolymer.

The at least partially hydrolysed polyvinyl acetates used for the production of the layer (c) of the multilayer film used according to the invention are obtained through complete or incomplete hydrolysis of corresponding polyvinyl acetates. At least partially hydrolysed polyvinyl acetates that are particularly preferably used for the production of the layer (c) are selected from the group comprising fully hydrolysed polyvinyl acetates (polyvinyl alcohols, PVOH) with a degree of hydrolysis > 98% and partially hydrolysed polyvinyl acetates with a degree of hydrolysis of from 75 to, and including, 98%.

The layer (c) of the multilayer film used according to the invention preferably has a layer thickness from 1 µm to 30 µm, particularly preferably from 1 µm to 20 µm, very particularly preferably from 1 µm to 10 µm, in particular from 1.5 to 7 µm. In a preferred embodiment, there is a transparent adhesion-promoter layer (d) bonding the layer (c) to the respective layer adjoining the same, preferably the layer (b).

Materials suitable for the production of the adhesion-promoter layer (d) of the multilayer film used according to the invention are thermoplastic polymers modified by polar groups, preferably by organic acid groups and/or organic anhydride groups, particularly preferably by cyclic organic anhydride groups, very particularly preferably with maleic anhydride groups. The person skilled in the art is aware of methods for the modification of the thermoplastic polymers that are

suitable for the production of the adhesion-promoter layer (d). The modification has preferably proceeded via grafting onto the thermoplastic polymer.

The adhesion-promoter layer (d) is preferably based on at least one modified thermoplastic olefin homo- and/or copolymer. The type of thermoplastic olefin homo- and copolymer used here can be the same as that also used for the production of the sealable layer (a) or of the layer (b). It is particularly preferable that the adhesion-promoter layer (d) is based on at least one ethylene or propylene homo- or copolymer modified by cyclic organic anhydride groups, particularly preferably on an ethylene or propylene homo- or copolymer modified by maleic anhydride groups.

The adhesion-promoter layer (d) of the multilayer film used according to the invention preferably has a layer thickness of at most 10 µm, particularly at most 5 µm, very particularly at most 3 µm.

In a preferred embodiment, the multilayer film used according to the invention comprises at least one transparent layer (h) which is based on at least one homo and/or copolyamide and which preferably serves as protective layer in relation to moisture for the layer (c), and preferably respectively adjoins the latter layer.

Homo- and/or copolyamides suitable for the production of transparent layers (h) of the multilayer film used according to the invention are preferably selected from the group comprising thermoplastic aliphatic, semi-aromatic and aromatic homo- and copolyamides. These homo- and copolyamides can be composed of aliphatic and/or cycloaliphatic diamines having from 2 to 10 carbon atoms, for example hexamethylenediamine, and/or of aromatic diamines having from 6 to 10 carbon atoms, for example p-phenylenediamine, or of aliphatic and/or aromatic dicarboxylic acids having from 6 to 14 carbon atoms, e.g. adipic acid, terephthalic acid or isoterephthalic acid. These homo- or copolyamides can moreover be produced from lactams having from 4 to 10 carbon atoms, e.g. from ε-caprolactam. Homo- and/or copolyamides used according to the invention are preferably selected from the group comprising PA 6, PA 12, PA 66, PA 6I, PA 6T,

corresponding copolymers and mixtures of at least two of the polymers mentioned.

The layer (h) of the multilayer film used according to the invention preferably has a layer thickness of at most 10 µm, particularly at most 5 µm, very particularly at most 3 µm, and there is preferably in each case an adhesion-promoter layer (d) bonding the said layer (b) and, respectively, (e).

In a preferred embodiment, the multilayer film used according to the invention also comprises, for reasons related to production technology, at least one transparent layer (e) based on at least one thermoplastic olefin homo- or copolymer.

A material suitable for the production of the layer (e) of the multilayer film used according to the invention is of the same type as thermoplastic olefin homo- and copolymers which can also be used for the production of the sealable layer (a) or of the layer (b). Preference is given to at least one thermoplastic olefin homopolymer, preferably at least one ethylene homopolymer.

In a preferred embodiment of the multilayer film used according to the invention, there is a transparent adhesion-promoter layer (d) and, respectively, (f) bonding the layer (e) to the respectively adjoining layer, preferably the layer (c) and, respectively, (h).

The layer (e) of the multilayer film used according to the invention preferably has a layer thickness of from 5 µm to 50 µm, particularly from 7 µm to 40 µm, very particularly from 10 µm to 30 µm.

A material suitable for the production of the adhesion-promoter layer (f) of the multilayer film used according to the invention is of the same type as modified thermoplastic olefin homo- and copolymers that can also be used for the production of the adhesion-promoter layer (d).

The adhesion-promoter layer (f) of the multilayer film used according to the invention preferably has a layer thickness of at most 10 µm, particularly at most 5 µm, very particularly at most 3 µm.

The multilayer film used according to the invention can moreover have a transparent supportive layer (g), optionally at least to some extent printed.

A suitable material for the production of the supportive layer (g) of the multilayer film used according to the invention is preferably at least one thermoplastic polymer.

The supportive layer (g) of the multilayer film used according to the invention is preferably at least one thermoplastic polymer selected from the group comprising olefin homo- and copolymers, homo- and copolyamides and homo- and copolyesters. The supportive layer (g) is particularly preferably based on at least one homo- and/or copolyester.

A material that can be used for the production of the supportive layer (g) is of the same type as olefin homo- or copolymers, homo- and copolyamides and homo- and copolyesters that can also be used for the production of the layer (b) and, respectively, of the sealable layer (a) and, respectively, of the layer(s) (h).

The supportive layer (g) of the multilayer film used according to the invention can have been embossed and/or oriented, preferably monoaxially or biaxially oriented, particularly preferably biaxially oriented.

The supportive layer (g) of the multilayer film used according to the invention preferably has a layer thickness of from 10 µm to 100 µm, particularly from 11 µm to 80 µm, particularly preferably from 12 µm to 50 µm.

There can preferably be, bonding the supportive layer (g) to the remaining layer composite of the multilayer film used according to the invention, preferably to a

layer (e) of this multilayer film, an adhesive layer (i) based on at least one lamination adhesive, preferably a lamination adhesive based on a polyurethane, particularly preferably a two-component polyurethane adhesive.

The adhesive layer (i) of the multilayer film used according to the invention preferably has a layer thickness of at most 10 µm, particularly at most 5 µm, very particularly at most 3 µm.

The total layer thickness of the multilayer film used according to the invention is preferably from 20 µm to 200 µm, particularly preferably from 25 µm to 150 µm, very particularly preferably from 30 µm to 120 µm, in particular from 35 µm to 100 µm, with particular preference from 40 µm to 80 µm.

Each of the layers of the multilayer film used according to the invention, preferably the sealable layer (a), and also optionally the sealable layer (s) of the container used according to the invention can, if necessary, respectively mutually independently comprise at least one conventional additive known to the person skilled in the art, preferably at least one additive selected from the group comprising antiblocking agents, lubricants, dyes, inorganic fillers, antioxidants, plasticizers and antistatic agents. Each of the abovementioned layers here can respectively mutually independently comprise at least from 0.01 to 20% by weight, preferably at least from 0.1 to 10% by weight, based in each case on the total weight of an individual layer, of at least one of the abovementioned additives.

The layers (a) and (b) and optionally (c) to (h) of the multilayer film used according to the invention can to some extent or entirely be produced and processed in the form of a tubular film or cast film.

Accordingly, the individual layers (a) and (b) and optionally (c) to (h) of the multilayer film used according to the invention can be produced by (co)extrusion.

The multilayer film used according to the invention, made of the layers (a) and (b) and optionally (c) to (h), is preferably obtainable by (co)extrusion, particularly preferably by blown-film (co)extrusion or by cast (co)extrusion.

The supportive layer (g) of the multilayer film used according to the invention is preferably obtainable by extrusion, and can be bonded by way of an adhesive layer (i) to the layer composite of the multilayer film.

After (co)extrusion, individual layers or layer composites, or the entire multilayer film can optionally be stretched, i.e. oriented. An antifogging additive can optionally be provided to the sealable layer (a) after (co)extrusion.

The multilayer film used according to the invention can optionally be thermoformed, preferably by a deep-draw process.

In a particularly preferred embodiment, the packaging of the invention is composed of a container based on a single-layer film made of a thermoplastic polymer and of a transparent multilayer film used according to the invention as cover film, comprising

a sealable layer (a),
adjoining the sealable layer (a), a layer (b),

optionally a layer (h),

a layer (c) as barrier layer,

optionally a layer (h),

a supportive layer (g)

and optionally other layers, for example adhesion-promoter layers (f).

The packaging of the invention is produced by sealing the multilayer film used according to the invention along a seal seam across the opening of the container used according to the invention, preferably onto the peripheral edge of this container.

The person skilled in the art is well aware of the respective production processes and corresponding conventional process parameters.

The sealing time for the multilayer film used according to the invention across the opening of the container used according to the invention is preferably at most 2 seconds, particularly preferably at most ≤ 1.5 seconds, at a temperature that is preferably in the range from 150 to 200°C, particularly preferably in the range from 160 to 190°C, and at a pressure that is preferably from ≥ 1.5 bar to ≤ 6 bar, particularly preferably from ≥ 2 bar to ≤ 5.5 bar.

A feature of the packaging of the invention is that it can be opened controllably and with no destructive effect, i.e. without any destructive effect on the layer (b) during the first opening, while permitting homogeneous opening in a single movement without increase of the force exerted. The packaging of the invention can be opened without any essential requirement to attach an opening aid to the packaging. If the cover nevertheless comprises an opening aid, preferably in the form of a lug, this preferably adjoins the seal seam region of the packaging of the invention. The first opening of the packaging of the invention up to the seal seam region is preferably achieved by separating the cover from the container as far as the seal seam region or, if an opening aid is present, by using this opening aid. Because the adhesion between the sealable layer (a) and the layer (b) of the cover film is smaller by at least 30% than the strength of the seal between the container and the cover, break-out of a section of the sealable layer (a) with delamination, which has no destructive effect, from the layer (b) takes place over the width of the seal seam during the opening procedure in the region of the seal seam, where by virtue of this substantially precise break-out and delamination this sealable-layer section (a) in the seal seam region corresponding to the width of the seal seam remains on the container. After opening in the

region of the seal seam, the cover can then be removed without difficulty from the container.

The packaging of the invention, preferably the cover film of the packaging, particularly preferably the supportive layer (g) of the multilayer film used according to the invention, can have at least some extent of printing and/or of colouring that retains transparency.

The packaging of the invention is preferably suitable as packaging for foodstuffs, preferably for food or drink. Food or drink is therefore preferably present as packaged product in the packaging of the invention, and can be viewed without difficulty through the multilayer film used according to the invention as cover film.

The present invention therefore further provides the use of packaging of the invention as packaging for food or drink.

With the aid of the packaging of the invention it is possible to heat a product packaged therein, preferably food or drink, for example a ready meal, by exposure to microwaves in a microwave oven. It has been ensured here that the packaging of the invention will not suffer uncontrolled opening or bursting, but instead will allow escape of gas during heating. As soon as the force exerted on the cover by the vapour pressure, which increases within the packaging during heating, is greater than the adhesion between the sealable layer (a) and the layer (b), delamination of these layers occurs in the seal seam region at at least one location of the packaging, thus producing a "channel" through which the vapour can escape to the environment.

The packaging of the invention is therefore preferably self-degassing packaging intended for microwave heating of food or drink packaged therein.

The container and also the cover of the packaging of the invention are suitable for use in a microwave oven, i.e. are permeable to microwaves and are not deformed or degraded by the action of the microwaves.

The present invention further provides the use of the packaging of the invention for the heating of a product packaged therein, preferably food or drink in a microwave oven.

Determination of the strength of the seal

The strength of the seal is stated via the separation force in [N/15 mm] required to separate the container and the cover of the packaging of the invention from one another.

The strength of the seal between the container and the cover of the packaging of the invention is based on the strength of the seal between the sealable layer (a) of the multilayer film and the container, i.e. the film of the container. It is therefore sufficient to determine the strength of the seal between the container and a film which comprises at least one sealable layer (a). The methods for determining the strength of the seal can also be used to check the selection of the polymer materials for the structure of the sealable layer (a) and of the film of the container for adequate strength of the seal.

The strength of the seal is determined by mutually superposing, in such a way that they are parallel, a test strip of a first film comprising respectively a sealable layer (a) and a test strip made of a second film, the width of these being respectively 15 mm and the length of these being respectively about 150 mm, where the test strip of the first film is placed with its sealable side, i.e. the sealable layer (a), onto a side of the second film. A sealing device is used to seal the two strips to one another along the entire width of 15 mm. The two longer unsealed ends of the test strips provided with a seal seam are secured in a tensile testing machine in such a way that the angle formed by the strips to be separated from one another is about 180°C, and the strips are separated from one another. The other unsealed ends are not secured here at any defined angle. The measurement distance and, respectively, measurement time extends until the 15 mm seal seam fails. The maximal and average separation force is determined across

the measurement distance of the region of the seal. A computer-controlled tensile-testing machine is used for the test. The force measured in N corresponds to the force required to separate the two test strips along the 15 mm seal seam.

Determination of adhesion

The adhesion is stated via the separation force in [N/15 mm] required to separate the sealable layer (a) from the layer (b) of the multilayer film used according to the invention.

The adhesion between the sealable layer (a) and the layer (b) is determined by mutually superposing, in such a way that they are parallel to one another, a test strip of a multilayer film used according to the invention and a test strip with a second single-layer film made of a thermoplastic polymer, the width of each of these being 15 mm and the length of each of these being about 150 mm, where the test strip of the multilayer film used according to the invention is placed with its sealable side, i.e. the sealable layer (a), onto one of the sides of the two films. A sealing device is then used to seal the two strips to one another along the entire width of 15 mm. The test strips are then secured in a tensile-testing machine in a manner such that the angle formed by the layers (sealable layer (a) and layer (b)) to be separated from one another is about 180°C, and are then separated from one another. The maximal and average separation force is determined across the measurement distance. A computer-controlled tensile-testing machine is used for the test. The adhesion is determined here by plotting force against tensile strain. The force measured in N corresponds to the force required to achieve complete separation of the layers (sealable layer (a) and layer (b)) to be separated from one another in the test strip.

This method is also used to check the selection of the polymer materials for the structure of the layer (b) and, respectively, the sealable layer (a) bonded thereto for adequate delaminability from one another at the interface, i.e. peelability of

the sealable layer (a) from the layer (b) adjoining the same. The adhesion between these two layers can therefore also be determined by prior sealing in relation to a single- or multilayer film.

Determination of transparency

The transparency of the multilayer film used according to the invention as cover film is determined by way of its haze in accordance with ASTM D1003-61. Haze is the term used for the amount of light that leaves a sample of the multilayer film used according to the invention at a solid angle of from > 8° to at most 160° after a light beam has been passed centrally through the material. Haze is stated in [%], and is based on the total amount of light that has passed through the sample (= 100%).

The Inventive Examples and Comparative Examples below serve to explain the invention, but are not to be interpreted as restrictive.

**I.** Chemical characterization of the raw materials used:

Propylene copolymer: Propylene copolymer comprising ethylene and/or butene as further comonomer (propylene content: at least 90%) (melting point: 145°C, density: 0.905 g/cm$^3$)

LDPE: Ethylene homopolymer (melting point: 111°C, density: 0.924 g/cm$^3$)

PB Butylene homopolymer (melting point: 117°C, density: 0.908 g/cm$^3$)

C8-mPE: Ethylene copolymer produced by means of metallocene catalysis, polymerized with octene used as further comonomer alongside ethylene (ethylene content: at least 85%) (melting point: 124°C, density: 0.919 g/cm$^3$)

C6-mPE: Ethylene copolymer produced by means of metallocene catalysis, polymerized with hexene used as further comonomer alongside ethylene (ethylene content: at least 85%) (melting point: 118°C, density: 0.918 g/cm$^3$)

EVOH copolymer: Ethylene-vinyl alcohol copolymer (ethylene content: 38%)

AP1: LLDPE (modified with maleic anhydride)

AP2: Propylene copolymer (modified with maleic anhydride)

PA 6: Nylon-6

BOPET: Polyethylene terephthalate, biaxially oriented

PUR: Polyurethane-based adhesive

APET: Amorphous polyethylene terephthalate (density: 1.27 g/cm$^3$)

CPET: Crystalline polyethylene terephthalate

EMA: Ethylene-methacrylic acid copolymer (ethylene content: 76%) (density: 0.94 g/cm$^3$)

EVA: Ethylene-vinyl acetate copolymer (ethylene content: 82%) (density: 0.94 g/cm$^3$)

**II.** Production of the packaging

**II.1** *Production of the films used for the containers*

Films **F1-F3** were provided for the production of the containers respectively by extrusion (**F1** and **F2**) or by blown-film coextrusion (**F3**). The films **F1-F3** respectively have the layer structure below in accordance with Table 1. All of the % data hereinafter are % by weight.

Table 1

| *Container* (**F1-F3**) | *Raw material **F1*** | *Raw material **F2*** | *Raw material **F3*** | *Layer thickness* |
|---|---|---|---|---|
| Layer | Propylene homopolymer (100%) | APET (100%) | CPET (100%) | 500 µm |
| Sealable layer (s) | - | - | APET (100%) | 4 µm |

**II.2** *Production of the multilayer cover films*

The multilayer films **D1-D7** used as cover were produced as follows.

a) The layers (a), (b), (c), (d), (e), (f) and (h) of the multilayer cover films **D1-D4** were first produced respectively in the form of 8-layer multilayer films by blown-film coextrusion. The individual abovementioned resultant multilayer films here respectively adjoin one another directly in the sequence in which they are listed below. The layer (e) of the 8-layer film composite was then laminated respectively to a supportive layer (g) by means of a polyurethane-based adhesive (layer (i)), thus respectively giving, inclusive of the resultant adhesive layer (i), 10-layer multilayer film as cover film **D1-D4**. The multilayer films **D1-D4** respectively have the layer structure according to Table 2 below, and a total layer thickness that is respectively 54 µm. All of the % data in Table 2 are % by weight.

Table 2

| *Layer structure (respectively of **D1, D2, D3** and **D4*)*** | *Raw materials **D1*** | *Raw materials **D2*** | *Raw materials **D3*** | *Raw materials **D4**** | *Layer thickness* |
|---|---|---|---|---|---|
| Sealable layer (a) | Propylene copolymer (100%) | Propylene copolymer (100%) | Propylene copolymer (100%) | Propylene copolymer (100%) | 4 µm |
| Layer (b) | C8-mPE (70%), LDPE (30%) | C8-mPE (55%), LDPE (45%) | C6-mPE (100%) | LDPE (90%), PB (10%) | 8 µm |
| Adhesion-promoter layer (d) | AP1 (100%) | AP1 (100%) | AP1 (100%) | AP1 (100%) | 3 µm |
| Layer (h) | PA 6 (100%) | PA 6 (100%) | PA 6 (100%) | PA 6 (100%) | 3 µm |
| Barrier layer (c) | EVOH copolymer (100%) | EVOH copolymer (100%) | EVOH copolymer (100%) | EVOH copolymer (100%) | 3 µm |
| Layer (h) | PA 6 (100%) | PA 6 (100%) | PA 6 (100%) | PA 6 (100%) | 3 µm |
| Adhesion-promoter layer (f) | AP2 (100%) | AP2 (100%) | AP2 (100%) | AP2 (100%) | 3 µm |
| Layer (e) | Propylene copolymer (100%) | Propylene copolymer (100%) | Propylene copolymer (100%) | Propylene copolymer (100%) | 13 µm |
| Adhesive layer (i) | PUR (100%) | PUR (100%) | PUR (100%) | PUR (100%) | 2 µm |

| | | | | | |
|---|---|---|---|---|---|
| Supportive layer (g) | BOPET (100%) | BOPET (100%) | BOPET (100%) | BOPET (100%) | 12 µm |

***D4** is a multilayer film that is used for the production of packaging not of the invention.

b) The layers (a), (b), (c), (d), (e), and (f) of the multilayer cover films **D5** and, respectively, **D7** were first produced respectively in the form of 7-layer multilayer films by blown-film coextrusion. The individual abovementioned resultant multilayer films here respectively adjoin one another directly in the sequence in which they are listed below. The layer (e) of the 7-layer film composite thus coextruded was then laminated respectively to a supportive layer (g) by means of a polyurethane-based adhesive (layer (i)), thus respectively giving, inclusive of the resultant adhesive layer (i), 9-layer multilayer films as cover film **D5** and, respectively, **D7**. The multilayer films **D5** and **D7** respectively have a total layer thickness of 62 µm. The multilayer film **D6** was obtained by single-side coating of the sealable layer (a) of the multilayer film **D5** with an antifogging additive. The multilayer films **D5** and, respectively, **D7** used as cover have the layer structure according to Table 3 below. All of the % data in Table 3 are % by weight.

Table 3

| *Layer structure (respective of **D5** and **D7**)* | *Raw materials **D5*** | *Raw materials **D7*** | *Layer thickness* |
|---|---|---|---|
| Sealable layer (a) | APET (100%) | APET (100%) | 4 µm |
| Layer (b) | EMA (100%) | EVA (100%) | 10 µm |
| Adhesion-promoter layer (d) | AP1 (100%) | AP1 (100%) | 2 µm |
| Barrier layer (c) | EVOH copolymer (100%) | EVOH copolymer (100%) | 2 µm |
| Adhesion-promoter layer (f) | AP1 (100%) | AP1 (100%) | 2 µm |
| Layer (e) | LDPE (100%) | LDPE (100%) | 16 µm |
| Layer (e) | LDPE (100%) | LDPE (100%) | 12 µm |
| Adhesive layer (i) | PUR (100%) | PUR (100%) | 2 µm |
| Supportive layer (g) | BOPET (100%) | BOPET (100%) | 12 µm |

**D6** has the same layer structure as **D5**, but the sealable layer (a) has been coated on one side with an antifogging additive.

**II.3** *Production of the packaging*

Packaging of the invention, made of a cover and of a container, was produced by heat-sealing of the sealable layer (a) respectively of a cover film **D1-D3** in relation to a container made of a film **F1**, giving the packaging **B1-B3** of the invention, or packaging of the invention was produced by heat-sealing respectively of the sealable layer (a) of a cover film **D5-D7** in relation to a container made of one of the films **F2** and **F3** (where in the case of the container **F3** the sealing takes place in relation to the sealable layer (s) of the container), giving the packaging **B5-B7** of the invention.

Non-inventive packaging made of a cover and of a container was produced by heat-sealing of the sealable layer (a) of a cover film **D4** in relation to a container made of a film **F1**, giving the non-inventive packaging **V1**.

The sealing device used for each sealing process was a Sentinel 24ASG.

In the case of packaging **B1** to **B3**, and also **V1**, the sealing process carried out at 5 bar and at a temperature of 180°C for a period of 0.5 second. The sealing jaws here were smooth, 25 mm in width, and heated on both sides.

In the case of packaging **B4** to **B7**, the sealing process was carried out at 2.5 bar and at a temperature of 170°C for a period of 1 second. The sealing jaws here were smooth, 25 mm in width, and heated on only one side, and Teflon-coated on one side.

**III.** Determination of the strength of the seal

The strength of the seal between the sealable layer (a) of the multilayer films used according to the invention as cover and a container made of one of the films **F1** and **F2** was determined in a preliminary experiment as follows.

Two cover films **D1a** and **D5a** were first produced here, having a layer structure corresponding to the cover film **D1** and, respectively, **D5** (see Tables 2 and, respectively, 3 above), except that they respectively have no layer (b). **D1a** was sealed in relation to a container made of a film **F1**; the sealing parameters used here correspond to those used in the production of packaging **B1-B3** and, respectively, **V1** (see **II.3**). **D5a** was sealed in relation to a container made of a film **F2**; the sealing parameters used here correspond to those used in the production of packaging **B4-B7** (see **II.3**).

The strength of the seal between the sealable layer (a) of the cover **D1a** and, respectively, **D5a** and the container made of the film **F1** and, respectively, **F2** was

determined by the method described above. The test strips here were secured in a tensile-testing machine (Zwick Z 2.5 tensile-testing machine (100 N force sensor head)) and separated from one another at a velocity of 200 mm/min (in the case of packaging made of **D1a** and **F1**) and, respectively, 100 ml/min (in the case of packaging made of **D5a** and **F2**).

Table 4

| *Cover film* | *Sealed in relation to film* | *Strength of seal [N/15 mm]* |
|---|---|---|
| **D1a** | **F1** | 28.3 |
| **D5a** | **F2** | 23.1 |

**IV.** Determination of adhesion

The adhesion between the sealable layer (a) and the layer (b) was determined respectively by sealing the sealable layer (a) of one of the cover films **D1-D7** as described under **II.3** in relation to a container made of a film **F1**, **F2** or **F3**.

The adhesion between the sealable layer (a) and the layer (b) of the packaging **B1-B7**, and also **V1** was determined by the method described above. The test strips here were secured in a tensile-testing machine (Zwick Z 2.5 tensile-testing machine (100 N force sensor head)) and separated from one another at a velocity of 200 mm/min (in the case of packaging **B1** to **B3**, and also **V1**) and, respectively, 100 ml/min (in the case of packaging **B4** to **B7**).

The values determined are shown in Table 5 below.

Table 5

| *Packaging* | *Cover film* | *Sealed in relation to container made of* | *Adhesion [N/15 mm]* |
|---|---|---|---|
| **B1** | **D1** | **F1** | 10.0 |

| | | | |
|---|---|---|---|
| **B2** | **D2** | **F1** | 6.0 |
| **B3** | **D3** | **F1** | 6.0 |
| **V1** | **D4** | **F1** | 7.0 |
| **B4** | **D5** | **F2** | 9.5 |
| **B5** | **D5** | **F3** | 8.9 |
| **B6** | **D7** | **F2** | 16.1 |
| **B7** | **D7** | **F3** | 15.4 |

**V.** Determination of the opening behaviour of the packaging

The opening behaviour of the packaging **B1-B7** of the invention, and also of the packaging **V1** not of the invention was assessed in respectively five series of experiments for each packaging. Table 6 below shows the results.

Table 6

| *Packaging* | *Cover film* | *Sealed in relation to container made of* | *Opening behaviour* |
|---|---|---|---|
| **B1** | **D1** | **F1** | (+) |
| **B2** | **D2** | **F1** | (+) |
| **B3** | **D3** | **F1** | (+) |
| **V1** | **D4** | **F1** | (-) |
| **B4** | **D5** | **F2** | (+) |
| **B5** | **D5** | **F3** | (+) |
| **B6** | **D7** | **F2** | (+) |
| **B7** | **D7** | **F3** | (+) |

(+) = delaminable between sealable layer (a) and layer (b) in the seal seam region, with substantially precise break-out of the sealable layer (a) from the cover

(-) = not delaminable between sealable layer (a) and layer (b) in the seal seam region; instead, initiation of a fracture in the layer (b) causes initiation of a fracture in the cover outside of the seal seam region

There is therefore no peelable bond between the sealable layer (a) and the layer (b) of the cover of the packaging **V1** not of the invention in the seal seam region of the packaging.

**VI.** Determination of transparency

Transparency was determined for the cover films **D1-D6** by the method described above. Table 7 shows the values determined.

Table 7

| *Cover film* | *Haze [%]* |
|---|---|
| **D1** | 5.5 |
| **D2** | 4.9 |
| **D3** | 6.1 |
| **D4** | 11.0 |
| **D5** | 4.5 |
| **D6** | 4.0 |

The haze of the cover film **D4** used as cover for the production of the packaging **V1** is higher by at least 40% than that of the cover films **D1-D3, D5** and, respectively, **D6**, which are used as cover for the production of the packaging **B1** to **B7** of the invention.

**Patentkrav**

1. Emballage med en let kontrollerbar åbningsfunktion, hvilken emballage omfatter en beholder, der er baseret på en monolagsfilm, som er fremstillet af mindst en termoplastisk polymer, hvilken film eventuelt omfatter et forsegleligt lag (s), der er baseret på en varmeforseglelig, termoplastisk polymer, hvor åbningen af den nævnte beholder er forseglet med et dæksel, der er fremstillet af en transparent flerlagsfilm, som omfatter et forseglingslag (a), der er baseret på mindst én varmeforseglelig, termoplastisk, olefin homo- og/eller copolymer med en lagtykkelse på højst 12 µm og et til forseglingslaget (a) tilstødende lag (b), der er fremstillet af mindst én termoplastisk copolymer af ethylen og/eller propylen og af mindst en α-olefin, der har mindst fire carbonatomer, hvilket nævnte lag (b) er baseret på en termoplastisk polymer, der er forskellig fra de termoplastiske polymerer af forseglingslaget (a),
og eventuelt omfatter andre lag, hvor det eller de eventuelle tilstedeværende, forseglelige lag er baseret på den eller de samme polymerer som det forseglelige lag (a) og de termoplastiske olefin-homo- og/eller copolymerer, hvorfra monolagsfilmen af beholderen er fremstillet, er de samme som dem, hvorfra det forseglelige lag (a) er fremstillet,
eller alternativt
åbningen af beholderen er forseglet med et dæksel, der er fremstillet af en transparent flerlagsfilm, som omfatter
et forsegleligt lag (a), der er baseret på mindst én varmeforseglelig, termoplastisk, amorf homo- eller copolyester med en lagtykkelse på højst 12 µm og, tilstødende til det forseglelige lag (a), et lag (b), der er fremstillet af mindst en ethylen-copolymer, som er valgt fra gruppen, der omfatter ethylen-vinylacetat-copolymerer, ethylen-$C_{1-4}$-alkyl(meth)acrylat-copolymerer og ethylen-(meth)acrylsyre-copolymerer, hvor laget (b) er baseret på en termoplastisk polymer, der er forskellig fra de termoplastiske polymerer af forseglingslaget (a),
og eventuelt omfatter andre lag,
hvor det eventuelt tilstedeværende forseglelige lag (s) er baseret på de samme polymerer som det forseglelige lag (a) og monolagsfilmen af beholderen er fremstillet af en termoplastisk homo- og/eller copolyester,

hvor vedhæftningen mellem det forseglelige lag (a) og laget (b) i hvert tilfælde er med mindst 30 % mindre end forseglingsstyrken mellem beholderen og dækslet, hvilket bevirker at bindingen mellem det forseglelige lag (a) og laget (b) i flerlagsfilmen er tilstrækkelig aftrækkeligt til, at der under den første åbning af emballagen i området for forseglingssømmen kun er en sektion af det forseglelige lag (a) i bredden, der forbliver på beholderen, og der ikke finder yderligere delaminering sted mellem lagene (a) og (b).

**2.** Emballage ifølge krav 1, **kendetegnet ved, at** vedhæftningen mellem det forseglelige lag (a) og laget (b) er mindst 50 % mindre end forseglingsstyrken mellem beholderen og dækslet.

**3.** Emballage ifølge krav 1 eller 2, **kendetegnet ved, at** vedhæftningen mellem det forseglelige lag (a) og laget (b) er mindst 2,5 N/15 mm.

**4.** Emballage ifølge et af kravene 1 til 3, **kendetegnet ved, at** laget (b) er baseret på mindst en copolymer af ethylen og/eller propylen og buten, hexen og/eller octen.

**5.** Emballage ifølge et af kravene 1 til 4, **kendetegnet ved, at** det forseglelige lag (a) af flerlagsfilmen er baseret på mindst en amorf homopolyester af en aromatisk dicarboxylsyre og en alifatisk polyol eller baseret på mindst en amorf copolyester af mindst en aromatisk dicarboxylsyre og mindst en alifatisk og mindst en cycloalifatisk polyol, eller på mindst en propylen-homo- og/eller copolymer, fortrinsvis på mindst en propylencopolymer.

**6.** Emballage ifølge et af kravene 1 til 5, **kendetegnet ved, at** det forseglelige lag (a) har en lagtykkelse på fra 2 til 10 µm, fortrinsvis på fra 3 til 8 µm.

**7.** Emballage ifølge et af kravene 1 til 6, **kendetegnet ved, at** det forseglelige lag (a) har antidugdannelsesegenskaber.

**8.** Emballage ifølge et af kravene 1 til 7, **kendetegnet ved, at** flerlagsfilmen omfatter et lag (c) som barrierelag, fortrinsvis som et gasbarrierelag, der eventuelt i hvert tilfælde er bundet til et lag (h) af polyamid eller eventuelt er bundet i hvert tilfælde ved hjælp af et vedhæftningsfremmende lag (d) til det tilstødende lag.

**9.** Emballage ifølge krav 8, **kendetegnet ved, at** barrierelaget (c) er baseret på mindst én termoplastisk polymer, der er valgt fra gruppen, som omfatter ethylen-vinylalkohol-copolymerer, mindst delvist hydrolyserede polyvinylacetater, polyvinylidenchlorid, vinlyiden-copolymerer eller en blanding af mindst to af de nævnte polymerer, fortrinsvis på mindst en ethylen-vinylalkohol-copolymer.

**10.** Emballage ifølge et af kravene 1 til 9, **kendetegnet ved, at** flerlagsfilmen har et eventuelt mono- eller biaksialt orienteret substratlag (g).

**11.** Emballage ifølge et af kravene 1 til 10, **kendetegnet ved, at** emballagen er en emballage til fødevarer.

**12.** Emballage ifølge et af kravene 1 til 11, **kendetegnet ved, at** emballagen omfatter et emballeret produkt, fortrinsvis en fødevare.

**13.** Emballage ifølge et af kravene 1 til 12, **kendetegnet ved, at** dækslet af emballagen har et til forseglingssømmen tilstødende åbningshjælpemiddel, fortrinsvis en flap.

**14.** Emballage ifølge et af kravene 1 til 13, **kendetegnet ved, at** den er en selvafgassende emballage, der er egnet til opvarmning af den emballerede fødevare ved hjælp af mikrobølger.