(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
18 July 2019 (18.07.2019)

WIPO | PCT

(10) International Publication Number
WO 2019/140376 A1

(51) International Patent Classification:
C09J 7/30 (2018.01) *B65D 75/58* (2006.01)
B65D 33/20 (2006.01)

(21) International Application Number:
PCT/US2019/013474

(22) International Filing Date:
14 January 2019 (14.01.2019)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/616,746 12 January 2018 (12.01.2018) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:
— *with international search report (Art. 21(3))*

(54) Title: FLEXIBLE PACKAGING RECLOSURE TAPE

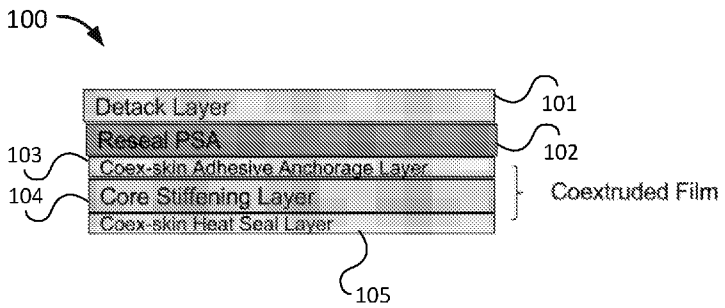

FIG. 1

(57) Abstract: Provided herein is an adhesive tape comprising an anchorage adhesive layer, a porous detackifying layer, and a reseal adhesive layer, at least a portion of which is disposed between the anchorage adhesive layer and the porous detackifying layer. When pressure is applied to the detackifying layer, such as for example when pressing the detackifying layer of a first adhesive tape against the detackifying layer of a second adhesive tape, the detackifying layer is capable of allowing at least a portion of the reseal adhesive layer to flow therethrough. Also provided are methods for producing the provided adhesive tape, and reclosable articles that include the provided adhesive tape.

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FLEXIBLE PACKAGING RECLOSURE TAPE

CROSS REFERENCE TO RELATED APPLICATION

[0001] The present application claims the benefit of U.S. Provisional Patent Application No. 62/616,746 filed January 12, 2018, which is incorporated herein by reference for all purposes.

FIELD

[0002] The present disclosure relates generally to adhesive tapes and, in particular, to improved adhesive tapes that include an exterior porous detackifying layer and an underlying reseal adhesive layer.

BACKGROUND

[0003] A wide array of resealable containers are known. Typically, a container, such as a flexible bag or rigid walled housing, is provided with an opening that serves to provide access to the interior of the container. A lid or cover is positioned over the opening and bonded to the container, typically by heat sealing, to enclose and seal the container interior and its contents from the external environment. For bag type containers, a portion of the flexible wall of the bag may serve as the cover and be folded or otherwise positioned over an opening in the bag. A reseal feature enables the lid or cover, or a portion thereof, to be removed or otherwise repositioned so as to allow access to the interior of the container. After accessing the interior of the container, the lid or cover can be appropriately positioned over the opening and engaged with the container to thereby reseal the container.

[0004] Numerous strategies have been devised for a lid or cover to seal (and reseal) the interior of a container from the outside environment. An example of a sealing strategy is the provision of corresponding, e.g. male and female, (mechanical) engagement structures on the respective contacting surfaces of the container and lid. Another example is the use of a layer of a pressure sensitive adhesive on the contacting surfaces of the lid or cover, and/or the corresponding region of the container extending about the periphery of the opening. This latter strategy is widely used, particularly for disposable packaging as used for storing and preserving perishable items, such as food, in which it is desirable to minimize exposure to air.

[0005] These conventional approaches to resealable containers generally involve the use of attached adhesive products in which the pressure sensitive adhesive is located on an external face or surface of the adhesive product. This allows the pressure sensitive adhesive to contact and adhere to another element of the container, such as a container surface or another attached adhesive product. Because the pressure sensitive adhesive is thus exposed to the internal or external environment of the container, there are possibilities for the adhesive to interact, potentially undesirably, with elements in that environment. For example, the adhesive can unintentionally and nonspecifically bind to features or contents of the container. Also, the adhesive can bind to undesirable particles present in the environment, e.g., dust or lint, which may adversely affect the ability to effectively reseal. The adhesive can transfer components or odors of the adhesive composition to the container contents, which may be sensitive or prone to related spoilage. The container contents can also potentially degrade the adhesive, causing it to lose its integrity or tack properties.

[0006] In view of these undesired effects, the need exists for reclosure adhesive tapes having improved performance characteristics, e.g., abilities to reduce exposure of the reseal adhesive to undesirable elements.

SUMMARY

[0007] In one embodiment, the disclosure relates to an adhesive tape comprising a porous detackifying layer defining spaces therein. Preferably, the detackifying layer comprises a heat-activated hot melt adhesive. Preferably, the detackifying layer has a porosity ranging from 10% to 50%. Preferably, the detackifying layer comprises fibers having an average diameter of less than 100 microns. Preferably, the detackifying layer has a coat weight of less than 15 gsm. Preferably, the detackifying layer has a thickness of less than 2 mil. The adhesive tape further comprises an anchorage adhesive layer, and a reseal adhesive layer, wherein at least a portion of the reseal adhesive layer is disposed between the detackifying layer and the anchorage adhesive layer. Preferably, the reseal adhesive layer and the anchorage adhesive layer each independently comprise a pressure sensitive adhesive. Preferably, the ratio of the reseal pressure sensitive adhesive peel strength to the anchorage pressure sensitive adhesive peel strength is less than 1. Preferably, the ratio of the detackifying layer coat weight to the reseal adhesive layer coat weight is less than 1. Preferably, the ratio of the detackifying layer thickness to the reseal adhesive layer thickness is less than 1. Preferably, the adhesive tape further comprises a support layer, at least a portion of which is disposed between the anchorage adhesive layer and the reseal adhesive layer.

[0008] In another embodiment the disclosure relates to a method for producing an adhesive tape. The method comprises providing a multilayer film comprising a support layer and an anchorage adhesive layer. Preferably, the multilayer film comprises a heat seal layer or a release liner, wherein at least a portion of the anchorage adhesive layer is disposed between the support layer and the heat seal layer or release liner. The method further comprises spray coating a pressure sensitive adhesive onto a face of the multilayer film, thereby generating a reseal adhesive layer such that at least a portion of the support layer is disposed between the reseal adhesive layer and the anchorage adhesive layer. The method further comprises spray coating a heat-activated hot melt adhesive onto the reseal adhesive

layer, thereby generating a porous detackifying layer defining spaces therein. Preferably, the spray coating of the heat-activated hot melt adhesive comprises fiberizing the heat-activated hot melt adhesive.

[0009] In another embodiment, the disclosure relates to a reclosable article. The reclosable article comprises a first surface adhered to a first adhesive tape, and a second surface adhered to a second adhesive tape. The first adhesive tape and the second adhesive tape are each independently an adhesive tape of any of the provided embodiments. At least a portion of the reseal adhesive layer of the first adhesive tape releasably adheres to the reseal adhesive layer of the second adhesive tape. Preferably, the reclosable article defines an interior cavity. Preferably, the reclosable article is a flexible pouch or bag.

BRIEF DESCRIPTION OF DRAWINGS

[0010] The disclosure is described in detail below with reference to the appended drawings, wherein like numerals designate similar parts.

[0011] FIG. 1 illustrates a cross section of an adhesive tape having a porous detackifying layer, a reseal adhesive layer, an anchorage adhesive layer, and a heat seal layer, in accordance with an embodiment.

[0012] FIG. 2 illustrates an adhesive tape having a porous detackifying layer, a reseal adhesive layer, an anchorage adhesive layer, and a release liner, in accordance with an embodiment.

DETAILED DESCRIPTION

[0013] The present disclosure generally relates to adhesive tapes and resealable articles using such adhesive tapes that, when employed, provide advantageous improvements in resealing by, *inter alia*, reducing the exposure of the adhesive tape reseal adhesive to undesirable elements. For example, it is beneficial for a resealable adhesive product to be configured so as to limit the interaction of the adhesive with components of a resealable article, package, or container. Such interactions can have negative effects

on the package, its contents, and the adhesive itself. Also, exposure of the adhesive to undesirable particles present in the environment, e.g., dust or lint, may adversely affect the adhesive properties of the adhesive, thus affecting the ability to effectively reseal. Conventional approaches to sealing and resealing have found it difficult to address these issues. One reason for this is that conventional resealable adhesive tapes, labels, and other assemblies and products are typically configured to have an adhesive layer as the uppermost or outermost layer. By positioning the adhesive layer in this fashion, conventional resealable adhesive products have adhesive layers that are directly exposed and are then available to create releasable and resealable bonds to close and open the package.

[0014] The inventors have now discovered that multilayer adhesive tapes can be assembled in such a way as to advantageously position a reseal adhesive layer underneath a porous detackifying layer, e.g., a permeable top layer. By doing so, the reseal adhesive can have a reduced exposure when not being used to seal a package, but can be exposed through the detackifying layer when used for sealing, e.g., through light pressure. In particular, it has been found that by applying the porous detackifying layer to the reseal adhesive layer, the reseal adhesive is generally accessible only when the detackifying layer and reseal adhesive layer are squeezed together with, for example, typical finger pressure. For example, by spray coating a heat-activated hot melt adhesive onto a pressure sensitive reseal adhesive, a porous detackifying layer comprising fibers and void spaces can be constructed above the reseal adhesive layer. In addition, the provided adhesive tapes provide the added advantages of lower manufacturing costs associated with smaller adhesive layer coat weights and thicknesses, and good compatibility with existing conventional tape affixing equipment and practices.

Adhesive Tape

[0015] In one embodiment, an adhesive tape is disclosed. The adhesive tape comprises a (porous) detackifying layer, a reseal adhesive layer, and an anchorage adhesive layer. The layers of the

adhesive tape are arranged such that at least a portion of the reseal adhesive layer is disposed between the detackifying layer and the anchorage adhesive layer. In some cases, the detackifying layer, the reseal adhesive layer, and the anchorage adhesive layer are coextensive with one another. In some cases, other layers may also be included, and the reseal adhesive layer may not necessarily be in direct contact with the other layers. That is to say, "disposed between" does not necessarily mean "in contact with." As used herein, the term "coextensive" refers to a relationship between two or more layers such that the surface areas of adjacent or parallel faces of the layers are aligned with one another with little or no overhang (of at least one of the areas or layers). In some cases, the extents of the areas or faces are within 90% of one another. For example, two or more layers are coextensive if the surface areas of adjacent or parallel faces of the layers are within 90%, within 92%, within 94%, within 96%, or within 98% of one another. The term "coextensive" can also refer to a relationship between two or more layers such that the lengths of the layers are within 90% of one another. For example, two or more layers are coextensive if the lengths of the layers are within 90%, within 92%, within 94%, within 96%, or within 98% of one another. The term "coextensive" can also refer to a relationship between two or more layers such that the widths of the layers are within 90% of one another. For example, two or more layers are coextensive if the widths of the layers are within 90%, within 92%, within 94%, within 96%, or within 98% of one another.

[0016] The reseal adhesive layer can be directly adjacent to the detackifying layer, and the detackifying layer can be configured to be capable of allowing at least a portion of the reseal adhesive layer to flow within and/or through the detackifying layer when pressure is applied, e.g., to the detackifying layer. In particular, when pressure is applied to the adhesive tape to compress the tape in a direction at least partially orthogonal to the major plane of the tape layers, the pressure acts to force at least some of the adhesive within the reseal adhesive layer to travel through spaces within the porous detackifying layer. In this way, squeezing or pressing the tape can, for example, provide exposure or

increase the exposure of the reseal adhesive of one adhesive tape to a substrate, e.g., the reseal adhesive of an adjacent adhesive tape.

Detackifying Layer

[0017] The porous detackifying layer of the adhesive tape serves as a permeable or semi-permeable barrier to the reseal adhesive, providing the adhesive tape with a low tack external surface or face (in the absence of pressure or squeezing). The detackifying layer may define spaces therein, e.g., the detackifying layer may include open space in the layer itself. For example, the porous detackifying layer can have a configuration that includes a dispersion of channels defining spaces within the layer. The degree to which the detackifying layer is composed of these spaces can be measured as a porosity value. As used herein, the term "porosity" refers to the measure of space, e.g., open space or void space, in a material, and is represented as a percentage of the volume of voids in the total volume of the material. A material with 0% porosity has no voids and a material with a porosity of 30%, for example, has one or more void spaces comprising 30% of the total volume of the material. The porosity of the detackifying layer of the adhesive tape can, for example, range from 0.5% to 50%, e.g., from 10% to 30%, from 10% to 22%, from 12% to 24%, from 14% to 26%, from 16% to 28%, or from 18% to 30%. In terms of upper limits, the detackifying layer porosity can be less than 30%, e.g., less than 28%, less than 26%, less than 24%, less than 22%, less than 20%, less than 18%, less than 16%, less than 14%, or less than 12%. In terms of lower limits, the detackifying layer porosity can be greater than 10%, e.g., greater than 12%, greater than 14%, greater than 16%, greater than 18%, greater than 20%, greater than 22%, greater than 24%, greater than 26%, or greater than 28%.

[0018] In certain embodiments, the porous nature of the detackifying layer is the result of a network of fibers that make up the porous detackifying layer. The detackifying layer can comprise a configuration of intersecting and interconnected fibers that are separated from one another by void

regions responsible for the detackifying layer porosity. Because the layer porosity can depend at least in part on the sizes and packing densities of constituent fibers, the fiber morphologies can be selected or controlled to achieve desired detackifying layer porosity properties. For example, the sizes of the fibers can be chosen to provide a desired degree of migration of the underlying reseal adhesive through the detackifying layer in response to pressure. Other configurations of detackifying layers are also contemplated, e.g., layers with spaces formed, e.g., cut or punched, into the layer material or layers that are extruded or otherwise formed to define the spaces.

[0019] The fibers of the detackifying layer can, for example, have an average size (diameter) ranging from 1 micron to 100 microns, e.g., from 1.5 micron to 15 microns, from 2.5 microns to 25 microns, from 3 microns to 40 microns, from 4 microns to 65 microns, or from 6.5 microns to 100 microns. In terms of upper limits, the average fiber diameter can be less than 100 microns, e.g., less than 65 microns, less than 40 microns, less than 25 microns, less than 16 microns, less than 10 microns, less than 6 microns, less than 4 microns, less than 2.5 microns, or less than 1.5 microns. In terms of lower limits, the average fiber diameter can be greater than 1 micron, e.g., greater than 1.5 micron, greater than 2.5 micron, greater than 4 microns, greater than 6.5 microns, greater than 10 microns, greater than 15 microns, greater than 25 microns, greater than 40 microns, or greater than 65 microns. Lower diameter fibers, e.g., nanofibers having diameters less than 1 micron, are also contemplated.

[0020] The ability of the reseal adhesive to travel through the detackifying layer can also be influenced by the coat weight and thickness of the detackifying layer. In general, a detackifying layer having smaller values of coat weight and thickness will allow for greater penetration of the reseal adhesive into the detackifying layer when the adhesive tape is squeezed. The disclosed adhesive tape provides the surprising benefit of being able to employ lesser coat weight and/or thickness (as compared to conventional resealable adhesive tapes), which advantageously leads to reduced production costs.

[0021] In some embodiments, the coat weight of the detackifying layer ranges from 1 gram per square meter (gsm) to 15 gsm, e.g., from 1 gsm to 9.4 gsm, from 2.4 gsm to 10.8 gsm, from 3.8 gsm to 12.2 gsm, from 5.2 gsm to 13.6 gsm, or from 6.6 gsm to 15 gsm. In terms of upper limits, the detackifying layer coat weight can be less than 15 gsm, e.g., less than 13.6 gsm, less than 12.2 gsm, less than 10.8 gsm, less than 9.4 gsm, less than 8 gsm, less than 6.6 gsm, less than 5.2 gsm, less than 3.8 gsm, or less than 2.4 gsm. In terms of lower limits, the detackifying layer coat weight can be greater than 1 gsm, e.g., greater than 2.4 gsm, greater than 3.8 gsm, greater than 5.2 gsm, greater than 6.6 gsm, greater than 8 gsm, greater than 9.4 gsm, greater than 10.8 gsm, greater than 12.2 gsm, or greater than 13.6 gsm.

[0022] In some embodiments, the thickness of the detackifying layer ranges from 0.05 mil to 10 mil, e.g., from 0.05 mil to 1.2 mil, from 0.08 mil to 2 mil, from 0.14 mil to 3.5 mil, from 0.25 mil to 5.9 mil, or from 0.42 mil to 10 mil. In terms of upper limits, the detackifying layer thickness can be less than 10 mil, e.g., less than 5.9 mil, less than 3.5 mil, less than 2 mil, less than 1.2 mil, less than 0.71 mil, less than 0.42 mil, less than 0.25 mil, less than 0.14 mil, or less than 0.08 mil. In terms of lower limits, the detackifying layer thickness can be greater than 0.05 mil, e.g., greater than 0.08 mil, greater than 0.14 mil, greater than 0.25 mil, greater than 0.42 mil, greater than 0.71 mil, greater than 1.2 mil, greater than 2 mil, greater than 2 mil, greater than 3.5 mil, or greater than 5.9 mil. In some embodiments, the thickness of the detackifying layer ranges from 10 mil to 20 mil, e.g. from 10 mil to 16 mil, from 11 mil to 17 mil, from 12 mil to 18 mil, from 13 mil to 19 mil, or from 14 mil to 20 mil. In terms of upper limits, the detackifying layer thickness can be less than 20 mil, e.g., less than 19 mil, less than 18 mil, less than 17 mil, less than 16 mil, less than 15 mil, less than 14 mil, less than 13 mil, less than 12 mil, or less than 11 mil. In terms of lower limits, the detackifying layer thickness can be greater than 10 mil, e.g., greater than 11 mil, greater than 12 mil, greater than 13 mil, greater than 14 mil, greater than 15 mil, greater than 16 mil, greater than 17 mil, greater than 18 mil, or greater than 19 mil.

[0023] The detackifying layer can comprise a heat-activated hot melt adhesive. Beneficially, the use of such a heat-activated hot melt adhesive can assist in the formation of the porous configuration of the layer. For example, a heat-activated hot melt adhesive can be heated and then applied to the tape in a heated and melted state to form the desired network of fibers and void spaces. After cooling, the heat-activated hot melt adhesive can then rigidify, preserving the desired layer morphology and porosity in the form of a permeable solid layer. In some embodiments, the detackifying layer consists of a heat-activated hot melt adhesive. In some embodiments, the detackifying layer consists essentially of a heat-activated hot melt adhesive. The detackifying layer can include one or more additives such as, for example, one or more waxes, surfactants, talc, powdered silicates, filler agents, defoamers, colorants, antioxidants, UV stabilizers, luminescents, crosslinkers, buffer agents, anti-blocking agents, wetting agents, matting agents, antistatic agents, acid scavengers, flame retardants, processing aids, extrusion aids, and others.

[0024] In some embodiments, the heat-activated hot melt adhesive of the detackifying layer comprises linear low-density polyethylene (LLDPE). In some embodiments, the heat-activated hot melt adhesive comprises metallocene linear low-density polyethylene (mLLDPE). Commercial mLLDPE-based heat-activated hot melt adhesives useful in the practice of the present disclosure include, for example, ADVANTRA® 9200, available from H.B. Fuller (St. Paul, MN). In some embodiments, the heat-activated hot melt adhesive of the detackifying layer comprises ethyl-vinyl acetate (EVA). Commercial EVA-based heat-activated hot melt adhesives useful in the practice of the present disclosure include, for example, SWIFTTHERM® 84659, available from H.B. Fuller. Other suitable materials for use in the detackifying layer include, but are not limited to, ethylene copolymers such as ethylene methyl acrylate (EMA) and ethylene ethyl acrylate (EEA), polypropylene copolymers, and polybutylene.

Reseal Adhesive Layer

[0025] The reseal adhesive layer of the adhesive tape serves as a releasable adhesive that can be used to repeatedly adhere to another material, e.g., a substrate or another adhesive tape. Preferably, the reseal adhesive layer of one adhesive tape can be used to releasably adhere to the reseal adhesive layer of another similarly or identically configured adhesive tape.

[0026] Because the reseal adhesive is intended for repeated and releasable adhesion, the composition of the reseal adhesive layer can be selected to have a relatively low peel strength. In some embodiments, the adhesive of the reseal adhesive layer has a peel strength ranging from 0.5 pounds per inch width (PIW) to 1.5 PIW as measured on an EVA-modified polyethylene substrate, e.g., from 0.5 PIW to 1.1 PIW, from 0.6 PIW to 1.2 PIW, from 0.7 PIW to 1.3 PIW, from 0.8 PIW to 1.4 PIW, or from 0.9 PIW to 1.5 PIW. In terms of upper limits, the reseal adhesive peel strength can be less than 1.5 PIW, e.g., less than 1.4 PIW, less than 1.3 PIW, less than 1.2 PIW, less than 1.1 PIW, less than 1 PIW, less than 0.9 PIW, less than 0.8 PIW, less than 0.7 PIW, or less than 0.6 PIW. In terms of lower limits, the reseal adhesive peel strength can be greater than 0.5 PIW, e.g., greater than 0.6 PIW, greater than 0.7 PIW, greater than 0.8 PIW, greater than 0.9 PIW, greater than 1 PIW, greater than 1.1 PIW, greater than 1.2 PIW, greater than 1.3 PIW, or greater than 1.4 PIW.

[0027] The coat weight and thickness of the reseal adhesive layer can be selected to supply adequate reseal adhesive to flow through the adjacent detackifying layer, but not so much as to unnecessarily increase the dimensions of the adhesive tape. As with the detackifying layer, smaller reseal layer coat weights and thicknesses can be associated with reduced manufacturing costs for the adhesive tape.

[0028] In some embodiments, the coat weight of the reseal adhesive layer of the adhesive tape ranges from 2 gsm to 30 gsm, e.g., from 2 gsm to 18.8 gsm, from 4.8 gsm to 21.6 gsm, from 7.6 gsm to 24.4 gsm, from 10.4 gsm to 27.2 gsm, or from 13.2 gsm to 30 gsm. In terms of upper limits, the reseal

adhesive layer coat weight can be less than 30 gsm, e.g., less than 27.2 gsm, less than 24.4 gsm, less than 21.6 gsm, less than 18.8 gsm, less than 16 gsm, less than 13.2 gsm, less than 10.4 gsm, less than 7.6 gsm, or less than 4.8 gsm. In terms of lower limits, the reseal adhesive layer coat weight can be greater than 2 gsm, e.g., greater than 4.8 gsm, greater than 7.6 gsm, greater than 10.4 gsm, greater than 13.2 gsm, greater than 16 gsm, greater than 18.8 gsm, greater than 21.6 gsm, greater than 24.4 gsm, or greater than 27.2 gsm.

[0029] In some embodiments, the thickness of the reseal adhesive layer of the adhesive tape ranges from 0.05 mil to 10 mil, e.g., from 0.05 mil to 1.2 mil, from 0.08 mil to 2 mil, from 0.14 mil to 3.5 mil, from 0.25 mil to 5.9 mil, or from 0.42 mil to 10 mil. In terms of upper limits, the reseal adhesive layer thickness can be less than 10 mil, e.g., less than 5.9 mil, less than 3.5 mil, less than 2 mil, less than 1.2 mil, less than 0.71 mil, less than 0.42 mil, less than 0.25 mil, less than 0.14 mil, or less than 0.08 mil. In terms of lower limits, the reseal adhesive layer thickness can be greater than 0.05 mil, e.g., greater than 0.08 mil, greater than 0.14 mil, greater than 0.25 mil, greater than 0.42 mil, greater than 0.71 mil, greater than 1.2 mil, greater than 2 mil, greater than 2 mil, greater than 3.5 mil, or greater than 5.9 mil. In some embodiments, the thickness of the reseal adhesive layer ranges from 10 mil to 20 mil, e.g. from 10 mil to 16 mil, from 11 mil to 17 mil, from 12 mil to 18 mil, from 13 mil to 19 mil, or from 14 mil to 20 mil. In terms of upper limits, the reseal adhesive layer thickness can be less than 20 mil, e.g., less than 19 mil, less than 18 mil, less than 17 mil, less than 16 mil, less than 15 mil, less than 14 mil, less than 13 mil, less than 12 mil, or less than 11 mil. In terms of lower limits, the reseal adhesive layer thickness can be greater than 10 mil, e.g., greater than 11 mil, greater than 12 mil, greater than 13 mil, greater than 14 mil, greater than 15 mil, greater than 16 mil, greater than 17 mil, greater than 18 mil, or greater than 19 mil.

[0030] The reseal adhesive can vary widely. The use of the aforementioned detackifying layer beneficially allows for a wide variety of adhesives and adhesive types (including those that have not been

traditionally used as resealable adhesives) to be employed. This benefit advantageously provides for improvements in permitting greater materials options and associated cost-effectiveness.

[0031] It has been found that because at least a portion of the reseal adhesive layer is intended to flow through at least a portion of the detackifying layer, it can be beneficial for the adhesive tape to be configured such that the porous detackifying layer has a lesser coat weight and/or thickness than that of the reseal adhesive layer. In some cases, the inclusion of the spaces in the detackifying layer advantageously provides for lesser overall coat weight and/or thickness, e.g., less adhesive is required to cover a set area. For example, in some embodiments, the ratio of the coat weight of the detackifying layer to the coat weight of the reseal adhesive layer ranges from 0.1 to 1, e.g., from 0.1 to 0.64, from 0.19 to 0.73, from 0.28 to 0.82, from 0.37 to 0.91, or from 0.46 to 1. In terms of upper limits, the ratio of the detackifying layer coat weight to the reseal adhesive coat weight can be less than 1, e.g., less than 0.91, less than 0.82, less than 0.73, less than 0.64, less than 0.55, less than 0.46, less than 0.37, less than 0.28, or less than 0.19. In terms of lower limits, the ratio of the detackifying layer coat weight to the reseal adhesive layer coat weight can be greater than 0.1, e.g., greater than 0.19, greater than 0.28, greater than 0.37, greater than 0.46, greater than 0.55, greater than 0.64, greater than 0.73, greater than 0.82, or greater than 0.91. Higher ratio values, e.g., ratio values of 1 to 3.4, 1.4 to 3.8, 1.8 to 4.2, 2.2 to 4.6, or 2.6 to 5, are also contemplated. In some embodiments, the ratio of the detackifying layer coat weight to the reseal adhesive layer coat weight is less than 5, e.g., less than 4.6, less than 4.2, less than 3.8, less than 3.4, less than 3, less than 2.6, less than 2.2, less than 1.8, or less than 1.4.

[0032] In certain embodiments, the ratio of the thickness of the detackifying layer to the thickness of the reseal adhesive layer ranges from 0.1 to 1, e.g., from 0.1 to 0.64, from 0.19 to 0.73, from 0.28 to 0.82, from 0.37 to 0.91, or from 0.46 to 1. In terms of upper limits, the ratio of the detackifying layer thickness to the reseal adhesive thickness can be less than 1, e.g., less than 0.91, less than 0.82, less than 0.73, less than 0.64, less than 0.55, less than 0.46, less than 0.37, less than 0.28, or less than 0.19. In

terms of lower limits, the ratio of the detackifying layer thickness to the reseal adhesive layer thickness can be greater than 0.1, e.g., greater than 0.19, greater than 0.28, greater than 0.37, greater than 0.46, greater than 0.55, greater than 0.64, greater than 0.73, greater than 0.82, or greater than 0.91. Higher ratio values, e.g., ratio values of 1 to 3.4, 1.4 to 3.8, 1.8 to 4.2, 2.2 to 4.6, or 2.6 to 5, are also contemplated. In some embodiments, the ratio of the detackifying layer thickness to the reseal adhesive layer thickness is less than 5, e.g., less than 4.6, less than 4.2, less than 3.8, less than 3.4, less than 3, less than 2.6, less than 2.2, less than 1.8, or less than 1.4.

[0033] The reseal adhesive layer can comprise a pressure sensitive adhesive. In some embodiments, the reseal adhesive layer consists of a pressure sensitive adhesive. In some embodiments, the reseal adhesive layer consists essentially of a pressure sensitive adhesive. The reseal adhesive layer can include one or more additives such as, for example, one or more waxes, surfactants, talc, powdered silicates, filler agents, defoamers, colorants, antioxidants, UV stabilizers, luminescents, crosslinkers, buffer agents, anti-blocking agents, wetting agents, matting agents, antistatic agents, acid scavengers, flame retardants, processing aids, extrusion aids, and others.

[0034] In some embodiments, the pressure sensitive adhesive of the reseal adhesive layer of the adhesive tape comprises a rubber-based adhesive. Commercial rubber-based pressure sensitive adhesives suitable for use in the reseal adhesive layer of the present disclosure include, for example, FASSON® 3000, available from Avery Dennison (Mentor, OH), and HL 2811, available from H.B. Fuller. Other suitable materials for use in the reseal adhesive layer include, but are not limited to, elastomeric adhesives such as rubbers, rubber modified acrylics, and urethanes.

Anchorage Adhesive Layer

[0035] The anchorage adhesive layer of the adhesive tape serves to affix the tape to another material. Preferably, the anchorage adhesive layer can be used to adhere the tape assembly to a surface

of a reclosable and resealable package or container. Because the anchorage adhesive is intended to maintain adherence of the tape to the package surface during repeated opening and closing of the package, the composition of the anchorage adhesive layer can be selected to have a relatively high peel strength. In some embodiments, the adhesive of the anchorage adhesive layer has a peel strength ranging from 1.5 PIW to 5 PIW as measured on an EVA-modified polyethylene substrate, e.g., from 1.5 PIW to 3.6 PIW, from 1.85 PIW to 3.95 PIW, from 2.2 PIW to 4.3 PIW, from 2.55 PIW to 4.65 PIW, or from 2.9 PIW to 5 PIW. In terms of upper limits, the anchorage adhesive peel adhesion can be less than 5 PIW, e.g., less than 4.65 PIW, less than 4.3 PIW, less than 3.95 PIW, less than 3.6 PIW, less than 3.25 PIW, less than 2.9 PIW, less than 2.55 PIW, less than 2.2 PIW, or less than 1.85 PIW. In terms of lower limits, the anchorage adhesive peel strength can be greater than 1.5 PIW, e.g., greater than 1.85 PIW, greater than 2.2 PIW, greater than 2.55 PIW, greater than 2.9 PIW, greater than 3.25 PIW, greater than 3.6 PIW, greater than 3.95 PIW, greater than 4.3 PIW, or greater than 4.65 PIW.

[0036] Because the bond between the adhesive tape and a package surface is intended to be stronger than the releasable bond between two adhesive tapes of a reclosure system, the anchorage adhesive is generally stronger than the reseal adhesive. In some embodiments, the ratio of the peel strength of the reseal adhesive to the peel strength of the anchorage adhesive ranges from 0.1 to 1, e.g., from 0.1 to 0.64, from 0.19 to 0.73, from 0.28 to 0.82, from 0.37 to 0.91, or from 0.46 to 1. In terms of upper limits, the ratio of the reseal adhesive peel strength to the anchorage adhesive peel strength can be less than 1, e.g., less than 0.91, less than 0.82, less than 0.73, less than 0.64, less than 0.55, less than 0.46, less than 0.37, less than 0.28, or less than 0.19. In terms of lower limits, the ratio of the reseal adhesive peel strength to the anchorage adhesive peel strength can be greater than 0.1, e.g., greater than 0.19, greater than 0.28, greater than 0.37, greater than 0.46, greater than 0.55, greater than 0.64, greater than 0.73, greater than 0.82, or greater than 0.91. Higher ratio values, e.g., ratio values of 1 to 3.4, 1.4 to 3.8, 1.8 to 4.2, 2.2 to 4.6, or 2.6 to 5, are also contemplated. In some embodiments, the ratio of the reseal

adhesive peel strength to the anchorage adhesive peel strength is less than 5, e.g., less than 4.6, less than 4.2, less than 3.8, less than 3.4, less than 3, less than 2.6, less than 2.2, less than 1.8, or less than 1.4.

[0037] The anchorage adhesive layer can comprise a pressure sensitive adhesive. In some embodiments, the anchorage adhesive layer consists of a pressure sensitive adhesive. In some embodiments, the anchorage adhesive layer consists essentially of a pressure sensitive adhesive. The anchorage adhesive layer can include one or more additives such as, for example, one or more waxes, surfactants, talc, powdered silicates, filler agents, defoamers, colorants, antioxidants, UV stabilizers, luminescents, crosslinkers, buffer agents, anti-blocking agents, wetting agents, matting agents, antistatic agents, acid scavengers, flame retardants, processing aids, extrusion aids, and others.

[0038] In some embodiments, the pressure sensitive adhesive of the anchorage adhesive layer of the adhesive tape comprises a rubber-based adhesive. Commercial rubber-based pressure sensitive adhesives useful for practice in the anchorage adhesive layer of the present disclosure include, for example, S462, available from Avery Dennison. Other suitable materials for use in the anchorage adhesive layer include, but are not limited to, tackified acrylics.

Support Layer

[0039] The adhesive tape can further include a support layer, at least a portion of which is disposed between the anchorage adhesive layer and reseal adhesive layer. The support layer can serve as a barrier, separating the different adhesives of the anchorage adhesive layer and the reseal adhesive layer. The support layer can also provide structure or increased rigidity to the adhesive tape. The support layer can also function as a base onto which other layers are added during manufacture of the adhesive tape. In some embodiments, one or both of the anchorage adhesive layer and the reseal adhesive layer are directly adjacent to the support layer. In some embodiments, one or more intervening layers are disposed between the support layer and one or both of the anchorage adhesive layer and the reseal adhesive layer.

In certain cases, the support layer is coextensive with one or both of the anchorage adhesive layer and the reseal adhesive layer.

[0040] The support layer can be configured to have a thickness great enough to impart the features and benefits described above to the adhesive tape, but small enough to preserve the flexibility and low manufacturing cost of the tape. In some embodiments, the support layer has a thickness ranging from 0.2 mil to 5 mil, e.g., from 0.2 mil to 1.4 mil, from 0.3 mil to 1.9 mil, from 0.4 mil to 2.6 mil, from 0.5 mil to 3.6 mil, or from 0.7 mil to 5 mil. In terms of upper limits, the support layer thickness can be less than 5 mil, e.g., less than 3.6 mil, less than 2.6 mil, less than 1.9 mil, less than 1.4 mil, less than 1 mil, less than 0.7 mil, less than 0.5 mil, less than 0.4 mil, or less than 0.3 mil. In terms of lower limits, the support layer thickness can be greater than 0.2 mil, e.g., greater than 0.3 mil, greater than 0.4 mil, greater than 0.5 mil, greater than 0.7 mil, greater than 1 mil, greater than 1.4 mil, greater than 1.9 mil, greater than 2.6 mil, or greater than 3.6 mil.

[0041] In some embodiments, the support layer of the adhesive tape comprises one or more plastics. The support layer can include or be formed from any suitable polymer or mixture of polymers. The support layer can comprise a thermoplastic polymer. The polymer or mixture of polymers of the support layer can include, for example, polyethylene terephthalate (PET), recycled polyethylene terephthalate (rPET), high density polyethylene (HDPE), polyvinyl chloride (PVC), poly lactic acid (PLA), cellulose, biopolymer films, low density polyethylene (LDPE), polypropylene (PP), polystyrene (PS), polyesters, or other types of polymers or plastics. In some embodiments, the support layer comprises PET. In some embodiments, the support layer consists of PET. In some embodiments, the support layer consists essentially of PET.

Release Liner

[0042] The adhesive tape can further include a release liner located on an external face of the tape. The release liner can be located directly adjacent to the anchorage adhesive layer, and configured to be removable prior to an application of the tape to a surface by contacting the thus exposed anchorage adhesive layer to the surface. In some embodiments, one or more intervening layers are disposed between the release liner and the anchorage adhesive layer. In certain cases, the release liner is coextensive with the anchorage adhesive layer.

[0043] The releasable liner can function as a protective cover such that the release liner remains in place until the sheet is ready for attachment to an object or surface. If a liner or release liner is included in the adhesive tape, a wide array of materials and configurations can be used for the liner. In many embodiments, the liner is a paper or paper-based material. In many other embodiments, the liner is a polymeric film of one or more polymeric materials. Typically, at least one face of the liner is coated with a release material such as a silicone or silicone-based material. The liner can be in the form of a single sheet. Alternatively, the liner can be in the form of multiple sections or panels.

Heat Seal Layer

[0044] The adhesive tape can further include a heat seal layer located on an external face of the tape. The heat seal layer can serve as an alternative means for attaching the tape to, for example, a surface of a reclosable and resealable package or container. Because the heat seal adhesive is intended to maintain adherence of the tape to the package surface during repeated opening and closing of the package, the composition of the heat seal layer can be selected to have a relatively high peel strength that is generally higher than that of the reseal adhesive. In some cases, the presence of an external heat seal layer in the adhesive tape assembly provides advantages associated with improved compatibility of the tape with, for example, existing heat sealing equipment and processes. In this way, methods and devices

that have been designed for the application of heat seal tapes and labels to surfaces can be used with the adhesive tapes provided herein with minimal or no adaptation.

[0045] At least a portion of the anchorage adhesive layer can be disposed between the reseal adhesive layer and the heat seal layer. In some embodiments, the anchorage adhesive layer is directly adjacent to the heat seal layer. In some embodiments, one or more intervening layers are disposed between the heat seal layer and the anchorage adhesive layer. For example, the adhesive tape can include a stiffening layer disposed between the heat seal layer and the anchorage adhesive layer. In some embodiments, the stiffening layer and the anchorage adhesive layer are coextruded with one another prior to the addition of the heat seal layer. In certain cases, the heat seal layer is coextensive with the anchorage adhesive layer. The adhesive tape can further include a release liner as described above, wherein the release liner is disposed adjacent to the heat seal layer and is removable to thereby expose the heat seal face of the adhesive tape.

[0046] The heat seal layer can be configured to have a thickness ranging from, for example, 5 microns to 90 microns, e.g., from 5 microns to 56 microns, from 13.5 microns to 64.5 microns, from 22 microns to 73 microns, from 30.5 microns to 81.5 microns, or from 39 microns to 90 microns. In terms of upper limits, the heat seal layer thickness can be less than 90 microns, e.g., less than 81.5 microns, less than 73 microns, less than 64.5 microns, less than 56 microns, less than 47.5 microns, less than 39 microns, less than 30.5 microns, less than 22 microns, or less than 13.5 microns. In terms of lower limits, the heat seal layer thickness can be greater than 5 microns, e.g., greater than 13.5 microns, greater than 22 microns, greater than 30.5 microns, greater than 39 microns, greater than 47.5 microns, greater than 64.5 microns, greater than 73 microns, or greater than 81.5 microns.

[0047] The heat seal layer of the adhesive tape can be water-based or solvent-based. The heat seal layer is optionally clear, opaque, or translucent. The heat seal layer can be colored and can exhibit a white, off-white, or nearly any other color. In some embodiments, the heat seal layer is in the form of

thin, frangible polymeric films. Such films could be transferred via release liner to a desired surface or substrate region. An example of such a polymeric film is a heat activated thermoplastic dry film. Materials for the heat seal layer can in certain embodiments include, but are not limited to, one or more of polyethylene, metallocene catalyzed polyolefins, syndiotactic polystyrene, syndiotactic polypropylene, cyclic polyolefins, polyethylene methyl acrylic acid, polyethylene ethyl acrylate, polyethylene methyl acrylate, acrylonitrile butadiene styrene polymer, polyethylene vinyl alcohol, EVA, polybutylene, polystyrene, polyurethane, polysulfone, polyvinylidene chloride, polypropylene, polymethyl pentene, styrene maleic anhydride polymer, styrene acrylonitrile polymer, ionomers based on sodium or zinc salts of ethylene/methacrylic acid, polymethyl methacrylates, cellulosics, polyacrylonitriles, thermoplastic polyesters, amorphous polyethylene terephthalate (APET), and glycol-modified polyethylene terephthalate (PETG). In certain embodiments, polyethylene (PE) is used in the heat seal layer, and particularly, a blend of PE and EVA, such as for example, a blend of PE and EVA with special antiblock and antistatic additives. The heat seal layer can include one or more additives such as, for example, one or more waxes, surfactants, talc, powdered silicates, filler agents, defoamers, colorants, antioxidants, UV stabilizers, luminescents, crosslinkers, buffer agents, anti-blocking agents, wetting agents, matting agents, antistatic agents, acid scavengers, flame retardants, processing aids, extrusion aids, and others.

Configurations

[0048] FIG. 1 illustrates one provided embodiment. Shown in the figure is adhesive tape assembly 100. The adhesive tape includes an upper porous detackifying layer 101, one face of which is an external face of the tape assembly. Underlying the detackifying layer is a reseal adhesive layer 102 that includes a reseal pressure sensitive adhesive. One face of the reseal adhesive layer is in contact with the detackifying layer, and an opposite face of the reseal adhesive layer is in contact with a coextruded film that includes a coextruded skin adhesive anchorage adhesive layer 103, and a core stiffening layer 104. A

coextruded skin heat seal layer 105 is disposed beneath the core stiffening layer of the coextruded film, with one face of the heat seal layer acting as an external face of the adhesive tape assembly opposite the detackifying layer. With an adhesive tape configuration as shown in FIG. 1, the tape can act as a pressure-sensitive reclosure tape that can be applied to, for example, pouches and bags, by affixing using conventional heat sealing equipment.

[0049] FIG. 2 illustrates another provided embodiment. Shown in the figure is adhesive tape assembly 200. The adhesive tape includes upper porous detackifying layer 201, one face of which is an external face of the tape assembly. Underlying the detackifying layer is a reseal adhesive layer 202 that includes a reseal pressure sensitive adhesive. One face of the reseal adhesive layer is in contact with the detackifying layer, and an opposite face of the reseal adhesive layer is in contact with a support layer 203 in the form of a PET film. The PET film separates the reseal adhesive layer from the anchorage adhesive layer 204, which is also in contact with the PET film support layer, and which includes an anchorage pressure sensitive adhesive. A release liner 205 is disposed beneath the anchorage adhesive layer, with one face of the release liner acting as an external face of the adhesive tape assembly opposite the detackifying layer. With an adhesive tape configuration as shown in FIG. 2, the tape can act as a pressure-sensitive reclosure tape that can be produced, for example, by applying the reseal adhesive layer and the detackifying layer sequentially via spray coating to beneficially have low layer coat weights and reduced associated costs.

Methods

[0050] Also provided are methods of producing an adhesive tape. The methods can include providing a multilayer film, wherein the multilayer film comprises a support layer and an anchorage adhesive layer. The support layer can be as described above. In some embodiments, the support layer is a PET film. The anchorage adhesive layer can be as described above. In some embodiments, the anchorage

adhesive layer includes a rubber-based anchorage pressure sensitive adhesive having a peel strength greater than 1.5 PIW. In some embodiments, the multilayer film is a coextruded film. The multilayer film can include one or more of a coextruded skin, a heat seal layer, or a release liner. The heat seal layer can be any of the heat seal layers described above. The release liner can be any of the release liners described above.

[0051] The methods can further include spray coating a (heat-activated) pressure sensitive adhesive onto a face of the multilayer film, thereby generating a reseal adhesive layer. Subsequent to the spray coating and the generating of the reseal adhesive layer, the support layer of the multilayer film can be disposed between the reseal adhesive layer and the anchorage adhesive layer. The reseal adhesive layer can be as described above. In some embodiments, the reseal adhesive layer includes a rubber-based reseal pressure sensitive adhesive having a peel strength less than 1.5 PIW. The spray coating step can be configured to produce a reseal adhesive layer having, for example, a coat weight of less than 30 gsm and a thickness of less than 0.8 mil.

[0052] The methods can further include (spray) coating a heat-activated hot melt adhesive onto the reseal adhesive layer, thereby generating a porous detackifying layer defining spaces therein. The detackifying layer can be as described above. In some embodiments, the detackifying layer has a porosity as discussed above. The spray coating can be configured to produce a detackifying layer having, for example, a coat weight and a thickness as described above.

[0053] In some embodiments, the spray coating of the heat-activated hot melt adhesive includes fiberizing the heat-activated hot melt adhesive. As used herein, the term “fiberizing” refers to the dispensing of material such that the material forms fibers as it is dispensed. For example, fiberizing can refer to the dispensing of a hot melt material via spray coating. Hot melt material, such as a hot melt adhesive, can be provided in a molten state, and then sprayed through an applicator. The applicator can be configured to, for example, contact the molten adhesive with heated air as the adhesive is dispensed.

The applicator can shape the dispensing streams such that, upon cooling, the molten adhesive solidifies into a network of fibers. Commercial applicators suitable for fiberizing the heat-activated hot melt adhesive of the present disclosure include, for example, CONTROL COAT® QE Applicators commercially available from Nordson (Duluth, GA). In some embodiments, the fiberizing generates fibers having an average diameter of less than 100 microns.

Reclosable articles

[0054] Also provided are reclosable articles that can comprise two or more surfaces, each independently adhered to a provided adhesive tape of the configuration described above. In some embodiments, a provided reclosable article includes a first surface adhered to a first adhesive tape, and a second surface adhered to a second adhesive tape. At least a portion of the detackifying layer of each of the adhesive tapes is capable of allowing at least a portion of the reseal adhesive of the tape to flow therethrough when pressure is applied to the detackifying layer. Furthermore, the adhesive tapes and the reclosable article surfaces are configured such that the tapes can be brought in contact with one another. In particular, the porous detackifying layer of one adhesive tape can be brought in contact with the porous detackifying layer of another adhesive tape. When the two opposing and contacting adhesive tapes are then pressed towards one another, the resulting pressure can cause the reseal adhesive within each of the tapes to flow through the porous detackifying layers. As the reseal adhesives thus contact one another, at least a portion of the reseal adhesive layer of the first adhesive tape can releasably adhere to at least a portion of the reseal adhesive layer of the second adhesive tape. In this way, the adhesive tapes and the reclosable article together form a pressure-sensitive reclosable system.

[0055] In some embodiments, the reclosable article is a container defining an interior cavity. The reclosable article can be, for example, a box, a bag, or a pouch. The reclosable article can be rigid, with foldable or hinged portions to allow the adhesive tapes to be brought into and out of contact with

one another. The reclosable article can have flexible portions that can be flexed to allow the adhesive tapes to be brought into and out of contact with one another. In some embodiments, at least one of the reclosable article surfaces attached to an adhesive tape is a surface of a container lid, and at least one of the reclosable article surfaces attached to an adhesive tape is a surface of a container wall.

[0056] In some embodiments, each of the first surface and the second surface of the reclosable article are independently an interior surface of the article. In this way, the adhesive tapes are not located on the exterior of the article. This can be beneficial when, for example, it is desired that the adhesive tape not disrupt a desired article texture or appearance, such as that involving printing or other graphic design. In some embodiments, each of the first surface and the second surface are independently an exterior surface of the article. In this way, the adhesive tapes are not located in the interior of the article. This can be beneficial when, for example, it is desired that the adhesive tape not contact or otherwise interact with any of the article contents, such as food items or liquids. In some embodiments, one of the first and second surfaces is an interior surface of the article, and the other of the first and second surfaces is an exterior surface of the article.

[0057] The first adhesive tape and the second adhesive tape can be adhered to the first reclosable article surface and the second reclosable article surface, respectively, through the anchorage adhesive layers of the adhesive tapes. The first adhesive tape and the second adhesive tape can be adhered to the first surface and the second surface, respectively, through heat seal layers of the adhesive tapes. In some embodiments, one of the first and the second adhesive tapes is adhered to an article surface through an anchorage adhesive layer, and the other of the first and the second adhesive tapes is adhered through a heat seal layer.

[0058] The reclosable article surfaces to which the adhesive tapes are adhered can include a wide range of surface substrates. The article surfaces can include glass, plastic, wood, metal, paper, a combination of these, and other materials. In some embodiments, the article surfaces each independently

include one or more plastics. The article surfaces can include or be formed from any suitable polymer or mixture of polymers. The polymer or mixture of polymers can include, for example, PET, rPET, HDPE, PVC, PLA, cellulose, biopolymer films, LDPE, PP, PS, polyesters, or other types of polymers or plastics. In some embodiments, the article surfaces include PET.

Embodiments

[0059] The following embodiments are contemplated. All combinations of features and embodiment are contemplated.

[0060] Embodiment 1: An adhesive tape comprising: a porous detackifying layer defining spaces therein; an anchorage adhesive layer; and a reseal adhesive layer, at least a portion of which is disposed between the detackifying layer and the anchorage adhesive layer.

[0061] Embodiment 2: An embodiment of embodiment 1, wherein at least a portion of the detackifying layer is capable of allowing at least a portion of the reseal adhesive layer to flow therethrough when pressure is applied to the detackifying layer.

[0062] Embodiment 3: An embodiment of embodiment 1 or 2, wherein the detackifying layer has a porosity ranging from 10% to 50%.

[0063] Embodiment 4: An embodiment of any of the embodiments of embodiment 1-3, wherein the detackifying layer comprises fibers having an average diameter of less than 100 microns.

[0064] Embodiment 5: An embodiment of any of the embodiments of embodiment 1-4, wherein the detackifying layer has a coat weight of less than 15 gsm.

[0065] Embodiment 6: An embodiment of any of the embodiments of embodiment 1-5, wherein the reseal adhesive layer has a coat weight of less than 30 gsm.

[0066] Embodiment 7: An embodiment of any of the embodiments of embodiment 1-6, wherein the ratio of the detackifying layer coat weight to the reseal adhesive coat weight is less than 1.

[0067] Embodiment 8: An embodiment of any of the embodiments of embodiment 1-7, wherein the detackifying layer has a thickness of less than 2 mil.

[0068] Embodiment 9: An embodiment of any of the embodiments of embodiment 1-8, wherein the reseal adhesive layer has a thickness of less than 3.5 mil.

[0069] Embodiment 10: An embodiment of any of the embodiments of embodiment 1-9, wherein the ratio of the detackifying layer thickness to the reseal adhesive coat thickness is less than 1.

[0070] Embodiment 11: An embodiment of any of the embodiments of embodiment 1-11, wherein the detackifying layer comprises a heat-activated hot melt adhesive.

[0071] Embodiment 12: An embodiment of embodiment 11, wherein the heat-activated hot melt adhesive comprises metallocene linear low-density polyethylene (mLLDPE).

[0072] Embodiment 13: An embodiment of embodiment 11, wherein the heat-activated hot melt adhesive comprises ethylene-vinyl acetate (EVA).

[0073] Embodiment 14: An embodiment of any of the embodiments of embodiment 1-13, wherein the anchorage adhesive layer comprises an anchorage pressure sensitive adhesive having a peel strength of greater than 1.5 pounds per inch width on an EVA-modified polyethylene substrate.

[0074] Embodiment 15: An embodiment of embodiment 14, wherein the anchorage pressure sensitive adhesive is an anchorage rubber-based adhesive.

[0075] Embodiment 16: An embodiment of embodiment 14 or 15, wherein the reseal adhesive layer comprises a reseal pressure sensitive adhesive having a peel strength of less than 1.5 pounds per inch width on an EVA-modified polyethylene substrate.

[0076] Embodiment 17: An embodiment of embodiment 16, wherein the ratio of the reseal pressure sensitive adhesive peel strength to the anchorage pressure sensitive adhesive peel strength is less than 1.

[0077] Embodiment 18: An embodiment of embodiment 16 or 17, wherein the reseal pressure sensitive adhesive is a reseal rubber based adhesive.

[0078] Embodiment 19: An embodiment of any of the embodiments of embodiment 1-18, further comprising: a support layer, at least a portion of which is disposed between the anchorage adhesive layer and the reseal adhesive layer.

[0079] Embodiment 20: An embodiment of embodiment 19, wherein the support layer comprises a thermoplastic polymer.

[0080] Embodiment 21: An embodiment of embodiment 20, wherein the thermoplastic polymer is polyethylene terephthalate (PET).

[0081] Embodiment 22: An embodiment of any of the embodiments of embodiment 19-21, wherein the support layer has a thickness ranging from 0.2 mil to 5 mil.

[0082] Embodiment 23: An embodiment of any of the embodiments of embodiment 1-22, further comprising: a heat seal layer, wherein at least a portion of the anchorage adhesive layer is disposed between the reseal adhesive layer and the heat seal layer.

[0083] Embodiment 24: An embodiment of any of the embodiments of embodiment 1-22, further comprising: a release liner, wherein at least a portion of the anchorage adhesive layer is disposed between the reseal adhesive layer and the release liner.

[0084] Embodiment 25: A method for producing an adhesive tape, the method comprising: providing a multilayer film comprising a support layer and an anchorage adhesive layer; spray coating a pressure sensitive adhesive onto a face of the multilayer film, thereby generating a reseal adhesive layer such that at least a portion of the support layer is disposed between the reseal adhesive layer and the anchorage adhesive layer; and spray coating a heat-activated hot melt adhesive onto the reseal adhesive layer, thereby generating a porous detackifying layer defining spaces therein.

[0085] Embodiment 26: An embodiment of embodiment 25, wherein the spray coating of the heat-activated hot melt adhesive comprises fiberizing the heat-activated hot melt adhesive.

[0086] Embodiment 27: An embodiment of embodiment 26, wherein the fiberizing generates fibers having an average diameter of less than 100 microns.

[0087] Embodiment 28: An embodiment of any of the embodiments of embodiment 25-27, wherein the detackifying layer has a porosity ranging from 10% to 50%.

[0088] Embodiment 29: An embodiment of any of the embodiments of embodiment 25-28, wherein the ratio of the detackifying layer coat weight to the reseal adhesive coat weight is less than 1.

[0089] Embodiment 30: An embodiment of any of the embodiments of embodiment 25-29, wherein the ratio of the detackifying layer thickness to the reseal adhesive coat thickness is less than 1.

[0090] Embodiment 31: An embodiment of any of the embodiments of embodiment 25-30, wherein anchorage adhesive layer comprises an anchorage pressure sensitive adhesive, and wherein the ratio of the reseal pressure sensitive adhesive peel strength to the anchorage pressure sensitive adhesive peel strength is less than 1.

[0091] Embodiment 32: An embodiment of any of the embodiments of embodiment 25-31, wherein the multilayer film is a coextruded film.

[0092] Embodiment 33: An embodiment of any of the embodiments of embodiment 25-32, wherein the multilayer film further comprises a heat seal layer, wherein at least a portion of the anchorage adhesive layer is disposed between the support layer and the heat seal layer.

[0093] Embodiment 34: An embodiment of any of the embodiments of embodiment 25-33, wherein the multilayer film further comprises a release liner, wherein at least a portion of the anchorage adhesive layer is disposed between the support layer and the release liner.

[0094] Embodiment 35: A reclosable article comprising: a first surface adhered to a first adhesive tape; and a second surface adhered to a second adhesive tape; wherein each of the first adhesive

tape and the second adhesive tape comprises: a porous detackifying layer defining spaces therein; an anchorage adhesive layer; and a reseal adhesive layer, at least a portion of which is disposed between the detackifying layer and the anchorage adhesive layer, wherein at least a portion of the detackifying layer is capable of allowing at least a portion of the reseal adhesive to flow therethrough when pressure is applied to the detackifying layer; and wherein at least a portion of the reseal adhesive layer of the first adhesive tape releasably adheres to at least a portion of the reseal adhesive layer of the second adhesive tape.

[0095] Embodiment 36: An embodiment of embodiment 35, wherein the reclosable article defines an interior cavity, and wherein each of the first surface and the second surface is independently an interior surface of the article.

[0096] Embodiment 37: An embodiment of embodiment 35, wherein the reclosable article defines an interior cavity, and wherein each of the first surface and the second surface is independently an exterior surface of the article.

[0097] Embodiment 38: An embodiment of any of the embodiments of embodiment 35-37, wherein the anchorage adhesive layer of the first adhesive tape is adhered to the first surface, and wherein the anchorage adhesive layer of the second adhesive tape is adhered to the second surface.

[0098] Embodiment 39: An embodiment of any of the embodiments of embodiment 35-37, wherein each of the first adhesive tape and the second adhesive tape further comprises: a heat seal layer, wherein at least a portion of the anchorage adhesive layer is disposed between the reseal adhesive layer and the heat seal layer, and wherein the heat seal layer of the first adhesive tape is adhered to the first surface, and wherein the heat seal layer of the second adhesive tape is adhered to the second surface.

[0099] Embodiment 40: An embodiment of any of the embodiments of embodiment 35-39, wherein the reclosable article is a flexible pouch or bag

[00100] While the disclosure has been described in detail, modifications within the spirit and scope of the disclosure will be readily apparent to those of skill in the art. In view of the foregoing discussion, relevant knowledge in the art and references discussed above in connection with the Background and Detailed Description, the disclosures of which are all incorporated herein by reference. In addition, it should be understood that aspects of the disclosure and portions of various embodiments and various features recited below and/or in the appended claims may be combined or interchanged either in whole or in part. In the foregoing descriptions of the various embodiments, those embodiments which refer to another embodiment may be appropriately combined with other embodiments as will be appreciated by one of skill in the art. Furthermore, those of ordinary skill in the art will appreciate that the foregoing description is by way of example only, and is not intended to limit the disclosure.

We claim:

1. An adhesive tape comprising:

a porous detackifying layer defining spaces therein;

an anchorage adhesive layer; and

a reseal adhesive layer, at least a portion of which is disposed between the detackifying layer and the anchorage adhesive layer.

2. The adhesive tape of claim 1, wherein at least a portion of the detackifying layer is capable of allowing at least a portion of the reseal adhesive layer to flow therethrough when pressure is applied to the detackifying layer.

3. The adhesive tape of claim 1 or 2, wherein the detackifying layer has a porosity ranging from 10% to 50%.

4. The adhesive tape of any of claims 1-3, wherein the detackifying layer comprises fibers having an average diameter of less than 100 microns.

5. The adhesive tape of any of claims 1-4, wherein the detackifying layer has a coat weight of less than 15 gsm.

6. The adhesive tape of any of claims 1-5, wherein the reseal adhesive layer has a coat weight of less than 30 gsm.

7. The adhesive tape of any of claims 1-6, wherein the ratio of the detackifying layer coat weight to the reseal adhesive coat weight is less than 1.

8. The adhesive tape of any of claims 1-7, wherein the detackifying layer has a thickness of less than 2 mil.

9. The adhesive tape of any of claims 1-8, wherein the reseal adhesive layer has a thickness of less than 3.5 mil.

10. The adhesive tape of any of claims 1-9, wherein the ratio of the detackifying layer thickness to the reseal adhesive coat thickness is less than 1.

11. The adhesive tape of any of claims 1-10, wherein the detackifying layer comprises a heat-activated hot melt adhesive.

12. The adhesive tape of claim 11, wherein the heat-activated hot melt adhesive comprises metallocene linear low-density polyethylene (mLLDPE).

13. The adhesive tape of claim 11, wherein the heat-activated hot melt adhesive comprises ethylene-vinyl acetate (EVA).

14. The adhesive tape of any of claims 1-13, wherein the anchorage adhesive layer comprises an anchorage pressure sensitive adhesive having a peel strength of greater than 1.5 pounds per inch width on an EVA-modified polyethylene substrate.

15. The adhesive tape of claim 14, wherein the anchorage pressure sensitive adhesive is an anchorage rubber-based adhesive.

16. The adhesive tape of claim 14 or 15, wherein the reseal adhesive layer comprises a reseal pressure sensitive adhesive having a peel strength of less than 1.5 pounds per inch width on an EVA-modified polyethylene substrate.

17. The adhesive tape of claim 16, wherein the ratio of the reseal pressure sensitive adhesive peel strength to the anchorage pressure sensitive adhesive peel strength is less than 1.

18. The adhesive tape of claim 16 or 17, wherein the reseal pressure sensitive adhesive is a reseal rubber based adhesive.

19. The adhesive tape of any of claims 1-18, further comprising:

a support layer, at least a portion of which is disposed between the anchorage adhesive layer and the reseal adhesive layer.

20. The adhesive tape of claim 19, wherein the support layer comprises a thermoplastic polymer.

21. The adhesive tape of claim 20, wherein the thermoplastic polymer is polyethylene terephthalate (PET).

22. The adhesive tape of any of claims 19-21, wherein the support layer has a thickness ranging from 0.2 mil to 5 mil.

23. The adhesive tape of any of claims 1-22, further comprising:

a heat seal layer, wherein at least a portion of the anchorage adhesive layer is disposed between the reseal adhesive layer and the heat seal layer.

24. The adhesive tape of any of claims 1-22, further comprising:

a release liner, wherein at least a portion of the anchorage adhesive layer is disposed between the reseal adhesive layer and the release liner.

25. A method for producing an adhesive tape, the method comprising:

providing a multilayer film comprising a support layer and an anchorage adhesive layer;

spray coating a pressure sensitive adhesive onto a face of the multilayer film, thereby generating a reseal adhesive layer such that at least a portion of the support layer is disposed between the reseal adhesive layer and the anchorage adhesive layer; and

spray coating a heat-activated hot melt adhesive onto the reseal adhesive layer, thereby generating a porous detackifying layer defining spaces therein.

26. The method of claim 25, wherein the spray coating of the heat-activated hot melt adhesive comprises fiberizing the heat-activated hot melt adhesive.

27. The method of claim 26, wherein the fiberizing generates fibers having an average diameter of less than 100 microns.

28. The method of any of claims 25-27, wherein the detackifying layer has a porosity ranging from 10% to 50%.

29. The method of any of claims 25-28, wherein the ratio of the detackifying layer coat weight to the reseal adhesive coat weight is less than 1.

30. The method of any of claims 25-29, wherein the ratio of the detackifying layer thickness to the reseal adhesive coat thickness is less than 1.

31. The method of any of claims 25-30, wherein anchorage adhesive layer comprises an anchorage pressure sensitive adhesive, and wherein the ratio of the reseal pressure sensitive adhesive peel strength to the anchorage pressure sensitive adhesive peel strength is less than 1.

32. The method of any of claims 25-31, wherein the multilayer film is a coextruded film.

33. The method of any of claims 25-32, wherein the multilayer film further comprises a heat seal layer, wherein at least a portion of the anchorage adhesive layer is disposed between the support layer and the heat seal layer.

34. The method of any of claims 25-33, wherein the multilayer film further comprises a release liner, wherein at least a portion of the anchorage adhesive layer is disposed between the support layer and the release liner.

35. A reclosable article comprising:

a first surface adhered to a first adhesive tape; and

a second surface adhered to a second adhesive tape;

wherein each of the first adhesive tape and the second adhesive tape comprises:

a porous detackifying layer defining spaces therein;

an anchorage adhesive layer; and

a reseal adhesive layer, at least a portion of which is disposed between the detackifying layer and the anchorage adhesive layer, wherein at least a portion of the detackifying layer is capable of allowing at least a portion of the reseal adhesive to flow therethrough when pressure is applied to the detackifying layer; and

wherein at least a portion of the reseal adhesive layer of the first adhesive tape releasably adheres to at least a portion of the reseal adhesive layer of the second adhesive tape.

36. The reclosable article of claim 35, wherein the reclosable article defines an interior cavity, and wherein each of the first surface and the second surface is independently an interior surface of the article.

37. The reclosable article of claim 35, wherein the reclosable article defines an interior cavity, and wherein each of the first surface and the second surface is independently an exterior surface of the article.

38. The reclosable article of any of claims 35-37, wherein the anchorage adhesive layer of the first adhesive tape is adhered to the first surface, and wherein the anchorage adhesive layer of the second adhesive tape is adhered to the second surface.

39. The reclosable article of any of claims 35-37, wherein each of the first adhesive tape and the second adhesive tape further comprises:

a heat seal layer, wherein at least a portion of the anchorage adhesive layer is disposed between the reseal adhesive layer and the heat seal layer, and wherein the heat seal layer of the first adhesive tape is adhered to the first surface, and wherein the heat seal layer of the second adhesive tape is adhered to the second surface.

40. The reclosable article of any of claims 35-39, wherein the reclosable article is a flexible pouch or bag

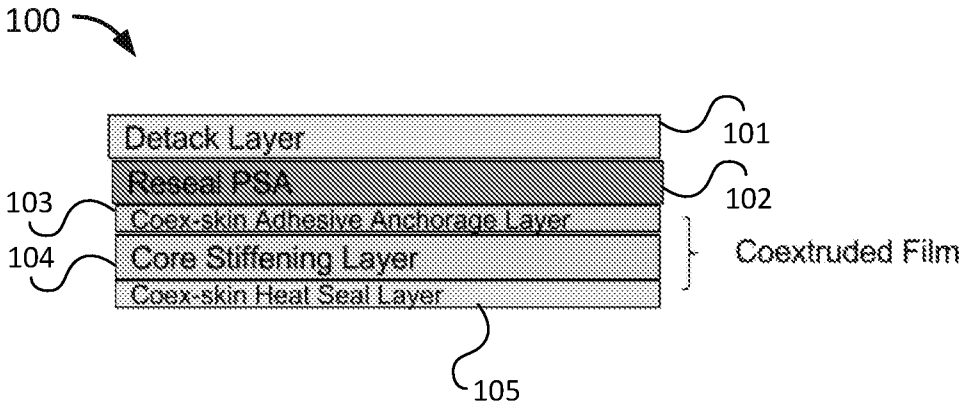
100
Detack Layer
Reseal PSA
Coex-skin Adhesive Anchorage Layer
Core Stiffening Layer
Coex-skin Heat Seal Layer
101
102
103
104
105
Coextruded Film

FIG. 1

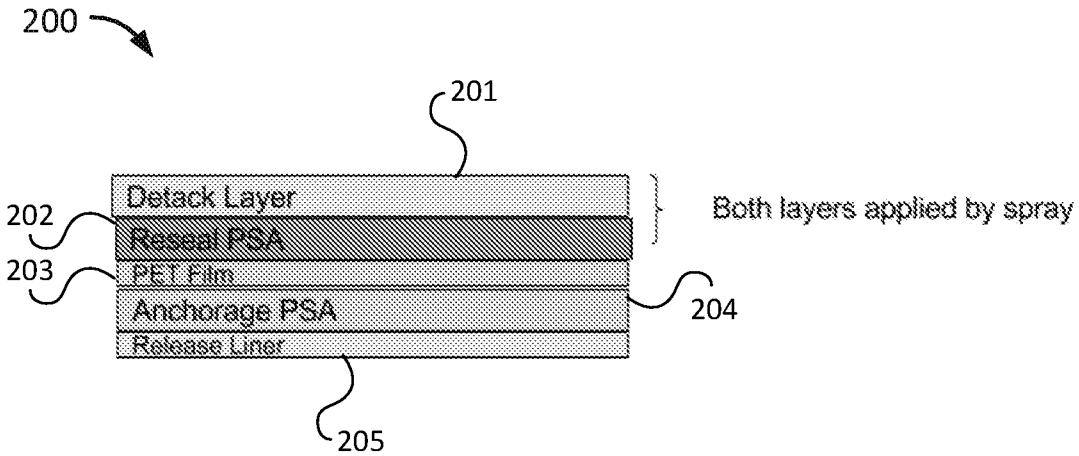
200
201
Detack Layer
Reseal PSA
PET Film
Anchorage PSA
Release Liner
202
203
204
205
Both layers applied by spray

FIG. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/013474

A. CLASSIFICATION OF SUBJECT MATTER
INV. C09J7/30 B65D33/20 B65D75/58
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C09J B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2017/017613 A1 (3M INNOVATIVE PROPERTIES CO [US]) 2 February 2017 (2017-02-02) page 7, line 20 - page 8, line 20 page 12, line 8 - page 15, line 5 claims 1,2	1-4,7, 10,11, 16,18-20

X	JP H06 32359 A (TOYO ALUMINIUM KK) 8 February 1994 (1994-02-08)	1,2,7, 10, 17-22, 35-40
A	paragraphs [0001], [0008], [0011] - [0017], [0023]; figures 1-5	3-6,8,9, 11-16, 23-34

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X Further documents are listed in the continuation of Box C.

X See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 March 2019	04/04/2019

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/013474

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	paragraphs [0001], [0014], [0023], [0029], [0030], [0035]; claim 1; figure 5	3-5,8,9, 11-14, 16-22, 24-34

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A	abstract; figure 7 column 2, line 50 - column 3, line 5 column 3, lines 55-62 column 4, line 45 - column 5, line 25	3-6,8,9, 11-14, 16-34

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PCT/US2019/013474

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