CONTACT LENS SECONDARY PACKAGING AND METHODS

TECHNICAL FIELD

[0001] The present systems and methods relate to contact lens packaging and more particularly, to secondary contact lens packaging and related methods.

BACKGROUND

[0002] Soft disposable contact lenses are commonly contained in disposable packages. As packaging adds to the overall cost of the lens, it should be made as economically as possible but without compromise to the requisite packaging criteria. The traditional blister pack packaging used for disposable lenses (both bi-weekly and daily) consists of a polypropylene receptacle for the lens (herein after referred to as a "boat"), topped by a multi-layer film that may include polyethylene, aluminum, a bonding agent and polypropylene. The boat is typically an injection molded plastic which has high stiffness and includes a preformed recess. The boat is filled with a suitable storage solution, such as saline, and receives a single lens in situ. The blister pack is then sterilized, typically by being autoclaved using steam and pressure, to terminal sterility. These blister packs are presented to the patient in boxes of individual packs or as multiple blister strips.

[0003] The lens is stored in the package for an extended period of time, which may include months or years. The lens must be kept hydrated while in the package. Consequently, the package must be well sealed and should minimize water vapor transmission through the boat and laminated layer to maximize the shelf life and prevent dehydration of the lens contained therein. During use, the user removes the laminated material from a flange formed on the boat by peeling back the cover to expose the lens immersed in a hydrating solution.

[0004] The package may be exposed to various potentially detrimental environmental conditions and damaging forces during shipping, handling and storing of the package. As the package becomes smaller, thinner and lighter as a result of efforts to reduce material and manufacturing costs, the more susceptible the package may become to such environmental conditions and damaging forces. Further, the use of

certain materials and constructions for the package may affect the shelf-life of the product held in the package.

[0005] In order to protect the package during shipping, handling, and storage, primary contact lens packages are typically grouped into a usable quantity and inserted into a secondary package for storage and transport. Traditionally, secondary packages for contact lenses constitute a cardboard box including supplier information and directions printed thereon.

[0006] Many contact lens users store their contact lenses in the bathroom where they have access to a mirror and a sink to aid in the insertion or retraction of their contact lenses. Bathrooms are usually wet environments. However, traditional secondary packages for contact lenses are typically made from a paper-based material that is inadequate for use in a wet environment.

SUMMARY

[0007] One aspect of the present disclosure relates to a contact lens package assembly. The contact lens package assembly includes a sealable first lens package, at least one contact lens sealed within the first lens package, and a sealable second or secondary lens package. In one embodiment, the secondary package is waterproof. The first or primary lens package is sealed within the second or secondary lens package to increase a shelf life of the at least one contact lens. The secondary lens package may be resealable. The secondary lens package may be configured to retain a plurality of first lens packages. The contact lens package assembly may further include at least one inert gas sealed within the secondary lens package and outside of the first lens package.

[0008] Another aspect of the present disclosure relates to a package system that includes primary and secondary packages. The primary package is configured to hold a product with a finite shelf life. The secondary package portion may be configured to hold the primary package and provides an inert environment for the primary package that maintains or extends the shelf life of the product. The product may be, for example, a contact lens or a medicament, and may have a nutritional value.

[0009] Another aspect of the present disclosure relates to a method for manufacturing a contact lens package. The method includes sealing a contact lens

within a first or primary package, and sealing the first or primary lens package within a secondary lens package, wherein the secondary lens package provides an inert storage conditioned for the first or primary lens package. The method may further include storing a volume of inert gas within the secondary lens package. The secondary lens package may include two foil layers that are secured together to define an interior sized to receive the first or primary lens package.

[0010] Another aspect of the present disclosure relates to a method of forming a secondary contact lens package. The method includes providing first and second foil layers, connecting the first and second foil layers together to define a secondary package interior, wherein the secondary package interior is configured to receive a primary contact lens package that holds at least one contact lens. The method also includes creating an inert environment within the secondary package interior. The method may include providing a waterproof environment within the secondary package interior.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The accompanying drawings illustrate various embodiments of the principles described herein and are a part of the specification. The illustrated embodiments are merely examples and do not limit the scope of the claims.

[0012] FIG. 1 is a top perspective view of an example contact lens package assembly in accordance with the present disclosure.

[0013] FIG. 2 is a partially exploded top perspective view of the contact lens package assembly of FIG. 1.

[0014] FIG. 3 is a partially exploded bottom perspective view of the contact lens package assembly of FIG. 1.

[0015] FIG. 4 is an exploded top perspective view of the contact lens package assembly of FIG. 1.

[0016] FIG. 5 is a cross-sectional side view of the contact lens package assembly of FIG. 1 taken along cross-section indicators 5-5.

[0017] FIG. 5A is a cross-sectional view of the contact lens package assembly of FIG. 5 taken along cross-section indicator 5A.

[0018] FIG. 6 is a cross-sectional view of the contact lens package assembly of FIG. 1 taken along cross-section indicators 6-6.

[0019] FIG. 7 is a top perspective view of another example contact lens package assembly in accordance with the present disclosure.

[0020] FIG. 8 is an exploded top perspective view of the contact lens package assembly of FIG. 7.

[0021] Throughout the drawings, identical reference numbers designate similar, but not necessarily identical, elements.

DETAILED DESCRIPTION

[0022] The present disclosure relates to a secondary packaging for use with primary contact lens packages. In one example, at least one contact lens is held in a first or primary contact lens package, and the first contact lens package is inserted into and sealed within a second or secondary contact lens package. The secondary contact lens package may provide an inert environment that helps maintain a useful life or shelf life of the contact lens held in the primary contact lens package. The secondary contact lens package may also provide a waterproof environment within which the primary contact lens package is stored. The secondary contact lens package may also provide a level of protection for the primary contact lens package during shipping and handling.

[0023] The secondary contact lens package may, according to one exemplary embodiment, be a resealable package that permits inserting and removing at least one primary contact lens package. The secondary contact lens package may, according to one exemplary embodiment, include inert materials. The secondary contact lens package may also, according to one exemplary embodiment, include layers of metal-based materials such as foil. The secondary contact lens package may further include at least first and second laminate sheets or members that are sealed together around a periphery to define an interior sized to receive the primary contact lens package that holds at least one contact lens. Each of the laminate sheets may include a polymer layer and a metal (e.g., foil) layer.

[0024] The secondary contact lens package may have other uses outside of retaining at least one primary contact lens package that holds at least one contact lens. Other example uses include, for example, retaining one or more prepackaged

medicaments, vitamins, supplements, and other volatile products that would benefit from storage within an inert secondary storage environment.

[0025] The secondary package may be used in combination with a support structure such as a drawer or tray type structure that retains at least one primary contact lens package and is insertable with the primary contact lens package into the secondary package. The support structure may provide additional rigidity and resistance to deformation and impact forces that might otherwise damage the primary contact lens package and the at least one contact lens retained therein. In at least some examples, the secondary contact lens package has a flexible or deformable construction and the support structure provides at least some rigidity for a contact lens package assembly that comprises the primary and secondary contact lens packages and the support structure. Further details concerning example support structures are provided in Singapore Patent Application filed on 18 October 2011 and entitled "Support Structure for Shipping and Storage of Replacement Contact Lenses", which is incorporated herein in its entirety by this reference.

[0026] As disclosed in the above-mentioned Singapore Patent Application entitled "Support Structure for Shipping and Storage of Replacement Contact Lenses", the support structure may be used to support at least one primary contact lens package during shipping of the contact lens package. Similarly, the support structure may be used to carry or support at least one primary contact lens package during storage of the contact lens package. The same support structure may be used for both shipping and storage of at least one primary contact lens package. The support structure may have a greater rigidity property than the primary contact lens package. The support structure may further provide at least one of additional strength, support and protection for the primary contact lens package during at least one of shipping and storage of the primary contact lens package.

[0027] The support structure may be insertable into the secondary contact lens package. The secondary contact lens package may define an interior sized to receive at least one support member carrying at least one primary contact lens package. The support member may be configured to be removably positioned within a separate storage case for storage of at least one primary contact lens package retained in the support member. According to one exemplary embodiment, the support member may

have a drawer-shaped construction having a cavity or interior sized to receive at least one contact lens package. The drawer-shaped support member may slide into and out of a storage case having at a least one slot or opening sized to receive the support member. The support member may be substantially enclosed within the storage case. A portion of the support member may be visible from outside of the storage case when the support member is positioned within the storage case.

[0028] The support member may include at least one graphic that is visible when the support member is stowed within the storage case. The graphic may include information related to the at least one primary contact lens package retained by the support member. The graphic of the storage case may also provide information related to the at least one primary contact lens package retained by the support member. The support member may comprise materials that are recycled from other contact lens-related manufacturing processes. For example, the support member may include materials recycled from the plastic molds used to form the contact lenses that are held in the primary contact lens packages. Using such recycled materials may reduce overall material waste in the process of manufacturing, shipping and storage of contact lens-related products.

[0029] The example secondary packages disclosed herein may have several advantages as compared to traditional paper-based secondary packages commonly used for storing primary packages. Traditional secondary packaging comprises paper-based materials that generally lack sterility and resistance to water/humidity damage. Further, traditional secondary packages are bulky and occupy a significant amount of space. The example secondary packages disclosed herein may be relatively slim, lightweight and take up a smaller volume of space as compared to paper-based secondary packaging. Further, the example secondary packaging may be waterproof as discussed above and provide an improved sterile environment. The inclusion of foil layers in the secondary packaging may help minimize light and oxygen transmission into the secondary packaging. Further, the secondary packaging may be filled with an inert gas that contributes to greater product stability and improved shelf life of the product held within the secondary package.

[0030] As used in the present specification and in the appended claims, the term “inert” refers generally to something that is not chemically reactive, or, in other

words, something that is chemically stable. Typically, the noble gases have been considered inert gases because of their perceived lack of participation in any chemical reactions. The term inert may be applied in a relative sense to describe the lack of chemical reactions for an object under normal or typical environmental conditions.

[0031] The terms “sterile” and "sterilize" refer generally to any material or combination of materials which may come into physical and fluid contact with a contact lens or other object contained within a finally formed package. Although polypropylene is commonly used as a sterilizable material in packages, any other material that is capable of creating a sterile environment for contact lenses, medical devices, or dental devices can be used in the present article and method as well. According to one exemplary embodiment, a sterile material may include any material accepted by the U.S. Food and Drug Administration (FDA) as suitable for the packaging of sterile medical devices.

[0032] The phrases “shelf life” and “useful life” refer generally to a length of time that food, drink, medicine, chemicals, and many other perishable items are given before they are considered unsuitable for sale, use, or consumption. Shelf life or useful life is the recommendation of time that products can be stored, during which the defined quality of a specified proportion of the goods remains acceptable under expected (or specified) conditions of distribution, storage and display. Most shelf life labels or listed expiration dates are used as guidelines based on normal handling of products. Contact lenses are a product that is typically subject to a predetermined shelf life. The shelf life of a contact lens may be dependent on a number of conditions such as, for example, the material of the contact lens, packaging conditions, and storage conditions.

[0033] In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present systems and methods. It will be apparent, however, to one skilled in the art that the present apparatus, systems and methods may be practiced without these specific details. Reference in the specification to "an embodiment," "an example" or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment or example is included in at least that one embodiment, but not necessarily in other embodiments. The various instances of the phrase "in one

embodiment" or similar phrases in various places in the specification are not necessarily all referring to the same embodiment.

[0034] Referring now to FIGS. 1-6, an example contact lens package assembly 10 is shown and described. The contact lens package assembly 10 includes a plurality of first or primary lens packages 14, and a second or secondary lens package 12. At least one primary lens package 14 may be inserted into and stored within the secondary contact lens package 12. In some embodiments, the secondary contact lens package 12 is at least partially formed around at least one primary lens package 14 rather than the primary lens package 14 being inserted into the secondary contact lens package 12. The secondary contact lens package 12 may provide an inert environment within which the primary lens package 14 is stored. The secondary contact lens package 12 may, according to one exemplary embodiment, include a pair of foil layers that are sealed around a periphery of the secondary contact lens package 12 to define an interior or cavity within which the primary lens package 14 is stored. According to one exemplary embodiment, the secondary contact lens package 12 may define a flexible, pliable construction. The secondary contact lens package 12 may also be resealable.

[0035] The first or primary lens packages 14 may, according to the exemplary embodiment, each include a plurality of first lens package portions 20A-C that each include a substrate 26, a cover sheet 28 and a contact lens receiving portion 30 (see FIGS. 4-6). The first exemplary lens package portions 20A-C may be separable along perforation lines 22 (see FIG. 4). The first lens packages 14 may retain a plurality of contact lenses 24 that are held within the contact lens receiving portions 30 between the substrate 26 and cover sheet 28 (see FIG. 4). The present exemplary system and method will be described, for ease of explanation only, as incorporating primary contact lens packages that include a polypropylene boat for receiving and holding the lens, topped by a multi-layer film. However, any primary contact lens packaging configuration may be secured within the present secondary contact lens package 12, including, but in no way limited to, primary contact lens packaging disclosed in U.S. Pat. No. 7,828,137, which patent is incorporated herein by reference in its entirety.

[0036] Each of the primary lens packages 14 illustrated in FIG. 4 includes three primary lens package portions. Other constructions and configurations are possible for the primary lens packages 14 including, for example, a construction having

a single first lens package portion that retains a single contact lens 24. Other embodiments include two or more primary lens package portions that each includes a single contact lens 24 for each of the primary lens packages 14.

[0037] The primary lens packages 14 may be relatively thin and have a relatively low profile. In one example, the first lens packages 14 may have a maximum thickness between about .25 to 2 times a sagittal height of the contact lens 24 when the contact lens 24 is uncompressed and in a state of rest. In another example, the first lens packages 14 have a maximum thickness that is less than a sagittal height of the contact lens 24 when the contact lens 24 is uncompressed and in a state of rest.

[0038] At least one of the substrate 26 and cover sheet 28 may comprise a metal material such as a foil. The metal material of the substrate 26 and cover sheet 28 may be provided as a layer or sheet of material. At least one of the substrate 26 and cover sheet 28 may also include a polymer material that is provided in the form of a layer or sheet. The polymer material may include, for example, polypropylene. The substrate 26 and cover sheet 28 may be sealed together using, for example, a heat seal or adhesive. Additionally, according to one exemplary embodiment, the primary lens package may assume any configuration, including, but in no way limited to, a package formed from a plurality of sheets.

[0039] Storing the first lens packages 14 in an inert environment may increase the shelf-life or useful life of the contact lenses 24 retained within the first lens packages 14. Further, the first lens packages 14 may have a generally flexible, pliable construction that may benefit from being stored and shipped within a structure having additional rigidity and strength to help protect the contact lenses 24. A secondary contact lens package 12 may provide such additional protection and support as well as an inert environment for the first lens packages 14 containing the contact lenses 24.

[0040] The secondary contact lens package 12 may include first and second sheets or layers 40, 42, first and second ends 44, 46, first and second side edges 48, 50, a top surface 52, and a bottom surface 54. The secondary contact lens package 12 may define an interior 56 having an interior opening 58 at the first end 44 (see FIG. 2). The secondary contact lens package 12 may also include a closure assembly 60 positioned at the first end 40 and associated with the interior opening 58. The closure assembly 60

may include first and second closure members 59, 61 that meet together to releasably close the interior opening 58.

[0041] According to one exemplary embodiment, the first and second sheets 40, 42 may be connected to each other around a periphery. A sealed portion 63 may extend around a portion of the periphery of the first and second sheets 40, 42, such as, for example, around all edges except for at the interior opening 58. Separate sealing steps or features (e.g., the closure assembly 60) may be used to seal closed the interior opening 58. The sealed portion 63 may be defined using a heat sealing method. Other methods and forms of connecting the first and second sheets 40, 42 are possible including, for example, adhesives, and infrared, ultrasound, and sonic bonding (see FIG. 4).

[0042] The secondary contact lens package 12 may include a plurality of graphics positioned on the top and bottom surfaces 52, 54. FIGS. 1 and 3 illustrate a first graphic 62 positioned on the top surface 52, and second a third graphics 64, 66 positioned on the bottom surface 54. An additional graphic or reflective member 70 may be positioned on one of the surfaces, such as the bottom surface 54 as shown in FIG. 3. A reflective member support 72 (see FIG. 4) may be included with the sheet upon which the reflective member 72 is mounted (e.g., on an internal surface of the second sheet 42 opposite a position of the reflective members). Any one or all of the first, second and third graphics 62, 64, 66 and the reflective member 72 may convey information to a user or provide other functions. For example, the contents of the package, directions, logos, and other information may be conveyed through the first, second and third graphics 62, 64, 66. One of the first, second and third graphics 62, 64, 66 and the reflective member 72 may include, for example, a bar code, security features, and tracking data.

[0043] According to one exemplary embodiment, the secondary contact lens package 12 may be filled with an inert gas that assists in providing an inert environment within the interior 56. In an example assembly method, the at least one primary lens package 14 is inserted through the interior opening 58 into the interior 56 of the secondary contact lens package 12. An inert gas is then injected into the interior 56 to expose exterior surfaces of the primary lens package 14 to the inert gas. The closure assembly 60 is sealed or otherwise closed to retain the inert gas within the interior 56.

An additional method step may include removing air or oxygen from within the interior 56 prior to, during, or after injecting the inert gas into the interior 56. In some arrangements, an additional seal may be formed along the interior opening 58 in addition to or in place of the closure assembly 60, wherein that additional seal may be broken to obtain access to the first lens packages 14. The closure assembly 60 may be used after breaking the additional seal to provide waterproof releasable closing of the interior opening 58.

[0044] Each of the first and second sheets 40, 42 of the secondary contact lens package 12 may, according to one exemplary embodiment, include a plurality of layers. The first and second sheets 40, 42 may be constructed as laminates. Referring to FIG. 5A, the first sheet 40 may include a first foil layer 90 and a first polymer layer 92. The second sheet 42 may include a second foil layer 94 and a second polymer layer 96. The first and second polymer layers 92, 96 may be arranged facing each other so that application of heat to the first and second sheets 40, 42 bonds the first and second polymer layers 92, 96 to form the seal portion 63.

[0045] Each of the first and second sheets 40, 42 may include additional materials and layers including, for example, at least one layer that includes one or more of the graphic portions 62, 64, 66. The use of foil layers in a secondary contact lens package 12 may provide light reflectivity that inhibits the egress of light into the interior 56, wherein that light may otherwise provide at least some degradation of the first lens packages 14 or influence the inert environment within the interior 56. The polymer layers 92, 96 of the first and second sheets 40, 42 may include an inert material such as polypropylene. Other inert materials may similarly be used to create an inert environment within the secondary contact lens package 12.

[0046] The foil layers 90, 94 of the secondary contact lens package 12 may also provide additional strength and durability for the secondary contact lens package 12. The foil layers 90, 94 may also comprise a corrosive resistant material. The foil layers 90, 94 may be encapsulated within other layers of non-corrosive material such as, for example, polymer-based layers.

[0047] The material composition of the first and second sheets 40, 42 and other features of the secondary contact lens package 12 may provide a waterproof environment within the interior 56. Providing a waterproof environment may have

advantages when using the contact lens package assembly 10 in a high moisture environment such as, for example, within a storage cabinet, on a sink top, or in a cupboard in a bathroom where contact lenses are typically stored. The waterproof aspects of the secondary contact lens package 12 may also provide benefits when transporting the contact lens package assembly 10 in, for example, a person's pocket, purse, wallet, bag, suitcase or other carrying member where the contact lens package assembly 10 may be exposed to, for example, perspiration, food or drink, or high humidity conditions.

[0048] The combination of a foil layer with a polymer layer such as polypropylene in the first and second sheets 40, 42 of the secondary contact lens package 12 may provide improved resistance to the passage of moisture or gas through a secondary contact lens package 12 either into or out of the interior 56. Details concerning the construction, advantages and manufacturing of a package layer comprising foil, such as foil-on-foil packaging, and related systems and methods are disclosed in U.S. Patent No. 7,828,137, which is hereby incorporated in its entirety by this reference. Other features and functionality related to lens package constructions and materials are described in Singapore Patent Application filed on 18 October 2011 and entitled "Packaging for Disposable Soft Contact Lenses Having Pre-Formed Multi-Layer Structural Laminate", which patent application is incorporated herein in its entirety by this reference.

[0049] As disclosed in the above-mentioned Singapore Patent Application entitled "Packaging for Disposable Soft Contact Lenses Having Pre-Formed Multi-Layer Structural Laminate", a primary lens package may include a preformed laminate substrate. One layer of the laminate substrate is configured to provide sufficient structural rigidity to maintain a shape (e.g., a lens receiving portion) that is preformed in the substrate. In one example, the first layer includes a polymer material such as polypropylene. Another layer of the laminate substrate may include a second material that provides different properties from the first layer such as, for example, light-reflectivity, strength, and resistance to water/vapor permeability. The package also includes a cover sheet that is connected to the substrate and seals a contact lens within a lens receiving portion formed in the substrate. The cover sheet may also be a laminate having at least two layers. The first layer may comprise, for example, a polymer that

assists in connecting the cover sheet to the substrate. Another layer of the cover sheet may include a material having different properties such as, for example, greater light-reflectivity, strength, or resistance to water/vapor permeability.

[0050] A further aspect related to the primary lens package is directed to a single contact lens package that houses multiple contact lenses. The contact lens package may include a plurality of lens receiving portions (e.g., recesses, depressions or "boats") formed in the substrate. The lens receiving portions may be arranged in multiple directions such as multiple rows, wherein each row includes at least one contact lens receiving portion. The rows may be arranged opposite each other or side-by-side. Some contact lens packages may provide for separation of at least one lens receiving portion from the other lens receiving portions. Other arrangements may include a plurality of lens receiving portions that are inseparable from each other once the contact lens package is assembled.

[0051] Some primary lens packages may include layers of material for the cover sheet and substrate that are added during assembly of the contact lens package rather than being provided with the substrate and/or cover sheet as a laminate. In one example, at least one layer of light-reflective material or liquid/vapor impermeable material is added to the substrate or the cover sheet after sealing a contact lens within a lens receiving portion of the substrate.

[0052] The primary lens packages may be created in a single manufacturing line. The substrate and sheet may include materials capable of maintaining a sterile environment within the package where the lens is disposed. The sterile environment may be created by heating the first material of the substrate. Light-sensitive materials disposed within the package may also be protected from light to limit degradation of the light-sensitive materials. The substrate and cover sheet may comprise materials that permit printing of graphics that minimize negative effects on the light-reflecting attributes or the sterile environment of the contact lens package. In some arrangements, the contact lens package may be configured for use as an insertion aid. The materials of the contact lens package may promote improved sealing between the substrate and cover sheet layers. For example, the laminate materials used for at least one of the substrate and cover sheet may include layers of material in the area where a seal is formed

between the substrate and cover sheet that provide improved seals (e.g., releasable seals, permanent seals, hermetic seals, heat seals, etc.).

[0053] The secondary contact lens package 12 disclosed herein may have other constructions such as a construction wherein one of the first and second sheets 40, 42 is configured as a substrate that is relatively rigid and the other of the first and second sheets 40, 42 is configured as a cover sheet sealed to the substrate to define an interior sized to receive at least one of the first lens packages 14. This alternative embodiment may provide an inert environment for storage of the first lens packages 14. The alternative embodiment may provide a waterproof environment for storage of the first lens packages 14. The alternative embodiment may include one or more foil layers.

[0054] One objective in providing an inert environment within the interior 56 of the secondary contact lens package 12 (e.g., using an inert gas) is to improve a sterility assurance level for the primary lens package 14. Providing an inert environment within the interior 56 may limit the growth of bacteria. Providing an inert environment may also permit storage within the secondary contact lens package 12 of a primary package (e.g., the primary lens package 14) having lower standards of water-resistance, light reflectivity, gas permeability, etc. Furthermore, the additional protection against environmental conditions provided by the secondary contact lens package 12 may permit reduced standards for the primary lens package 14 related to strength, durability, and protection against environmental conditions.

[0055] Another application for the secondary contact lens package 12 is for the storage of non-contact lens products that may be volatile for any number of reasons such as, for example, freshness and shelf-life. In one example, the secondary contact lens package 12 is referred to generally as a secondary package used to store pre-packaged products such as, for example, medications, vitamins, supplements, and other food and drug-related products. In at least some instances, both physical and chemical aspects of the product being stored may be protected and/or given an extended shelf life as a result of storage within the inert environment provided by the secondary packaging.

[0056] The use of a secondary package for storing of such relatively volatile products may be enhanced with the use of a cold sterilization process when sterilizing the secondary package after product has been sealed therein. Even after the secondary package has been opened to obtain access to the product, providing the secondary

package with a resealable opening may further extend at least some benefits of using the secondary package such as, for example, the waterproof environment, protection against physical harm, reduced exposure to light, and protection against egress of bacteria, additional oxygen or other debilitating conditions for the stored product.

[0057] In addition to a foil based package, the secondary contact lens package 12 disclosed herein may be manufactured in according to any number of manufacturing methods and using a number of materials. Specifically, according to one exemplary embodiment, the secondary contact lens package 12 may be an injection case molded plastic packaging, a card or paper material that is wax or polymer coated so as to be waterproof, a foil or foil composite package, a package made from materials that are recycled from other contact lens-related manufacturing processes such as plastic molds used to form the contact lenses that are held in the primary contact lens packages, and combinations thereof.

[0058] Referring now to FIGS. 7-8, another example contact lens package assembly 100 is shown. The contact lens package assembly 100 includes a first or primary lens package 112 stored within a second or secondary lens package 114. The first lens package 112 may be held within a support member 182 prior to being inserted into and stored within a secondary package 114. The primary lens package 112 may have the same or similar construction to the primary lens packages 14 described above with reference to FIGS. 1-6.

[0059] The secondary lens package 114 may include first and second ends 144, 146, first and second side edges 148, 150, top and bottom surfaces 152, 154, an interior 156, an interior opening 158, and sealed portions 162 at opposing ends (see FIG. 7). The secondary lens package 114 may also include an expansion portion 180 along the first and second side edges 148, 150. The expansion portion 180 may include a fold or expandable portion that helps increase a size of the interior 156 to accommodate, for example, the support member 182.

[0060] The support member 182 may include a periphery wall 184 and a recess or cavity 186. The cavity 186 may be sized to receive at least one of the primary lens packages 112. A plurality of primary lens packages 112 may be positioned within the cavity 186. The support member 182 retaining the primary lens package 112 may be inserted through the interior opening 158 into the interior 156. An inert gas may be

injected into the interior 156 prior to sealing closed the secondary lens package 114. At least one of the sealed portions 162 may include a closure assembly that provides a resealable opening into the secondary lens package 114.

[0061] Details concerning the support member 182 and its possible functions related to, for example, carrying and supporting the first lens package 112 during shipping, storage and use is described in Singapore Patent Application filed on 18 October 2011 and entitled "Support Structure for Shipping and Storage of Replacement Contact Lenses", mentioned above.

[0062] The secondary lens package 114 may, according to one exemplary embodiment, be formed using a single sheet (e.g., a laminate sheet including a foil layer) that is folded over and sealed along opposing free edges to create a tubular-shaped structure. The tubular-type structure may be sealed at opposing ends to create the secondary lens package 114 shown in FIGS. 7 and 8. The expansion portions 180 may be folded or otherwise formed into the secondary lens package 114 prior to creating the sealed portions 162. The primary lens package 112 may be inserted into the secondary lens package 114 before sealing either of the sealed portions.

[0063] In other examples, first and second sheets of material (e.g., laminate sheets each including a foil layer) may be sealed together around a periphery such as described above with reference to secondary contact lens package 12. The sealed portions 162 may be formed in the first and second ends 144, 146 in separate sealing steps. In a still further embodiment, the secondary lens package is formed using a continuous, unbroken tubular member that is sealed closed at the first and second ends 144, 146 to create the sealed portions 162. The expansion portions 180 may be formed in the tubular structure prior to or as part of forming the sealed portions 162.

[0064] The materials used for the secondary lens package 114 may have the same or similar properties, features, layers, manufacturing methods and constructions as described above with reference to secondary contact lens package 12.

[0065] One aspect of the present disclosure relates to packaging with the inclusion of some form of inert medium to preserve a desired condition within the packaging until the time of opening the packaging. Another aspect relates to packaging and other features that may be used to tune or match the internal conditions of the packaging to the properties of the product being stored in the packaging to optimize a

shelf-life or product-life of that product. Another aspect relates to an ability to use thermally-sensitive ingredients, dyes, and material as part of the primary packaging held within the secondary packaging because of the inert environment provided within the secondary packaging. Another aspect relates to secondary packaging that provides an improved storage and/or shipping condition for thermally-sensitive medications, vitamins, supplements, and other products. A still further aspect relates to secondary packaging and permits the use of primary packaging designs and materials that have lower standards of, for example, strength, sterility, shelf-life, and gas permeability. At least some of these aspects of the present disclosure are possible or enhanced with the use of cold sterilization techniques related to sterilizing the secondary packaging.

[0066] Some example inert gasses or other gasses that may be used within the secondary packaging include, for example, nitrogen, argon, and other gasses (e.g., noble gases) that may, for example, match the properties, attributes, or other aspects of the product held in the secondary packaging.

[0067] Example methods in accordance with the present disclosure relate to assembly of a contact lens package having at least one first lens package stored within a secondary lens package. Other aspects relate to methods of manufacturing or forming a secondary lens package. Further aspects relate to creating an inert environment for storage of at least one primary lens package. Other aspects relate to methods of accessing and storing a plurality of first lens packages within a secondary, resealable lens package. Another method relates to storage of a plurality of first lens packages within a waterproof secondary lens package. The secondary lens package may be resealable. Many other methods and aspects of the present disclosure are possible.

[0068] The preceding description has been presented only to illustrate and describe exemplary embodiments of the system and process. It is not intended to be exhaustive or to limit the system and process to any precise form disclosed. Many modifications and variations are possible in light of the above teaching. It is intended that the scope of the system and process be defined by the following claims.

WHAT IS CLAIMED IS:

1. A contact lens package assembly, comprising:

a sealable primary lens package;

at least one contact lens sealed within the primary lens package;

a sealable secondary lens package;

wherein the first lens package is sealed within the secondary lens package to increase a shelf life of the at least one contact lens.

2. The contact lens package assembly of claim 1, wherein the secondary lens package is resealable.

3. The contact lens package assembly of claim 1, wherein the secondary lens package is configured to retain a plurality of primary lens packages.

4. The contact lens package assembly of claim 1, further comprising at least one inert gas sealed within the secondary lens package and outside the primary lens package.

5. The contact lens package assembly of claim 1, further comprising a support structure interposed between the primary lens package and the secondary lens package.

6. The contact lens package assembly of claim 1, wherein the secondary lens package includes opposing first and second package portions that are sealed around a perimeter of the secondary lens package to form an interior within which the primary lens package is positioned.

7. The contact lens package assembly of claim 6, wherein each of the first and second package portions of the secondary lens package include at least one foil layer.

8. The contact lens package assembly of claim 6, wherein each of the first and second package portions of the secondary lens package include a laminate material having at least one polymer layer and at least one layer comprising a metal material.

9. The contact lens package assembly of claim 1, wherein the secondary lens package is constructed as a pouch comprising flexible material.

10. The contact lens package assembly of claim 1, wherein the secondary lens package is waterproof.

11. A package system, comprising:

a first package configured to hold a product with a finite shelf life;

a second package configured to hold the first package, the second package providing an inert environment for the first package that extends the shelf life of the product.

12. The package system of claim 11, wherein the product is a contact lens.

13. The package system of claim 11, wherein the product is a medicament.

14. The package system of claim 11, wherein the product has nutritional value.

15. The package system of claim 11, wherein the second package is resealable.

16. The package system of claim 11, wherein the second package has a flexible construction.

17. The package system of claim 11, wherein the second package retains a volume of inert gas.

18. A method for manufacturing a contact lens package, comprising:

sealing a contact lens within a primary lens package;

sealing the primary lens package within a secondary lens package, the secondary lens package providing an inert storage condition for the primary lens package.

19. The method of claim 18, further comprising storing a volume of inert gas within the secondary lens package.

20. The method of claim 18, further comprising providing the secondary lens package with a resealable opening.

21. The method of claim 18, further comprising providing the secondary lens package with first and second laminate layers that are sealed together arranged a periphery of the secondary lens package to form an interior sized to receive the primary lens package.

22. The method of claim 21, wherein the secondary lens package includes two foil layers that are secured together to define an interior sized to receive the primary lens package.

23. A method of forming a secondary contact lens package, comprising:

providing first and second foil layers;

connecting the first and second foil layers together to define a package interior, the package interior configured to receive a primary contact lens package that holds at least one contact lens;

creating an inert environment within the package interior.

24. The method of claim 23, further comprising forming a resealable opening in the secondary contact lens package.

25. The method of claim 23, wherein connecting the first and second foil layers includes creating a heat seal.

26. The method of claim 23, wherein creating an inert environment includes filling the package interior with an inert gas.

27. The method of claim 23, further comprising sealing closed the package interior to maintain the inert environment.

28. The method of claim 23, wherein creating the inert environment includes providing the first and second foil layers with inert materials.

29. The method of claim 23, further comprising providing a waterproof environment within the package interior.

30. The contact lens package assembly of claim 10, wherein the secondary lens package is made of one of a laminate foil substrate, an injection cast molded plastic packaging, a wax or polymer coated paper, or a vacuum formed plastic.