October 2020

Cushioning Material For Packaging Electronics

N/A

Cushioning Material For Packaging Electronics

ABSTRACT

This disclosure describes a packaging cushion constructed from polyethylene foam that is resistant to atmospheric pressure changes. The cushion is assembled from polyethylene foam tubes that act as a buffer and provide a cushioning effect for package contents due to an air cushion (suspension) within the tube and damping from the polyethylene foam. Since the air cushion is formed within unpressurized foam tubes, the cushion is resistant to ambient pressure changes. A foam layer with suitable openings is utilized to create a lattice like structure from the foam tubes. The cushion can be placed at any side of a package container.

KEYWORDS

- Polyurethane form
- Polyethylene foam
- Packaging material
- Cushion
- Tubular airbag
- Air suspension

BACKGROUND

Convoluted open-cell polyurethane (PU) foams are commonly used as a cushioning material for transportation of individually packaged electronic devices, components, etc. However, PU material is expensive, difficult to source, and has poor recyclability due to which it is not permitted for use in some regions. An alternative option for packaging material is extruded or laminated closed-cell polyethylene foam (PE). Unlike PU foams, closed-cell PE cannot be cut

into convoluted shapes, and is usually cut and utilized only in block form. Additionally, closed-cell PE does not possess the softness characteristics of PU foam.

Tubular airbag based cushions are another alternative packaging material that utilizes an air cushion inflated with compressed air to inflate the airbag to its designed pressure. However, airbag based cushions can over-inflate when the atmospheric pressure drops, e.g., during shipment of a package via air and deflate when the package returns to ground.

DESCRIPTION

This disclosure describes a packaging cushion for storage and transportation of electronic devices and components. The cushion is constructed from polyethylene (PE) foam and is resistant to atmospheric pressure changes. Material properties of the PE foam can be specified to fall under a “static dissipative” surface resistivity. The packaging material is easier to recycle when compared to polyurethane (PU) foam and provides adequate cushioning and controlled softness.

Per techniques of this disclosure, a cushion is assembled from polyethylene foam tubes that act as a buffer to provide a cushioning effect for package contents due to an air cushion (suspension) within the tube and damping from the polyethylene foam. Since the air cushion is formed within unpressurized foam tubes, the cushion is resistant to ambient pressure changes.

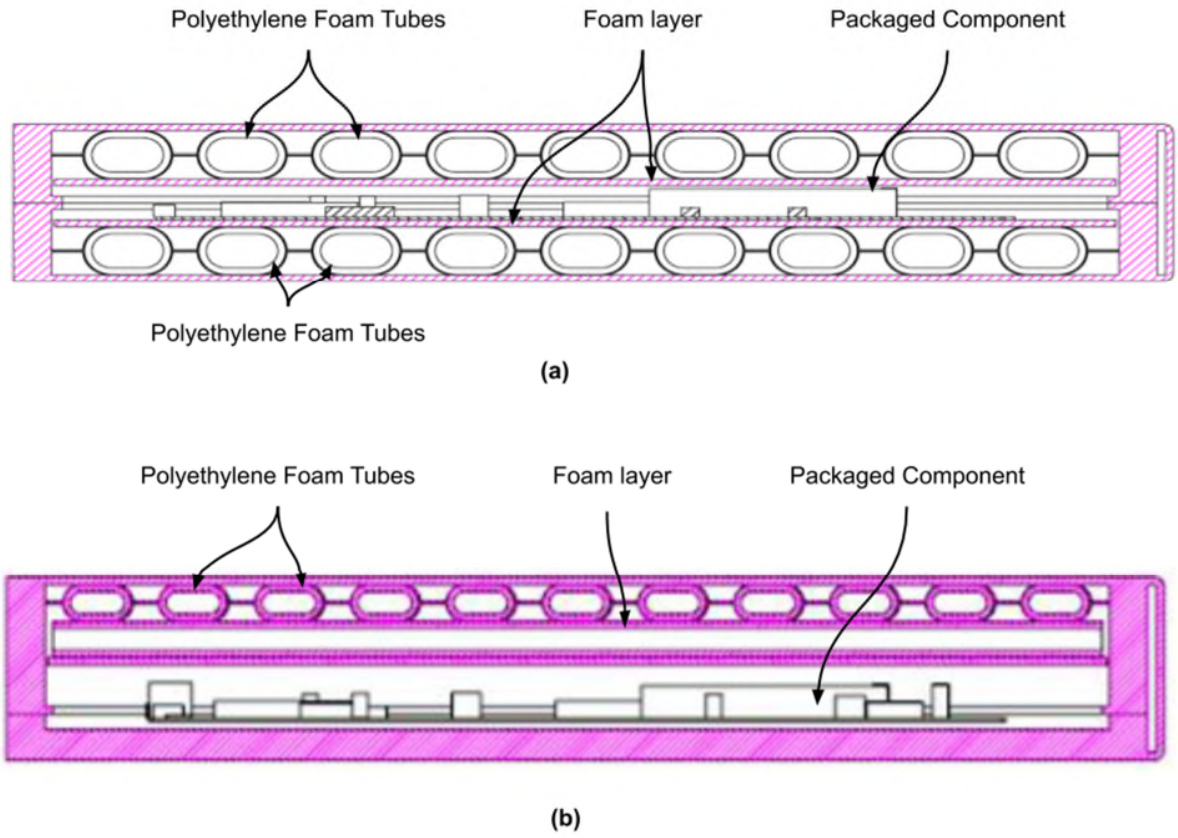

Fig. 1: Cross-sectional views of polyethylene tube foam based packaging cushion

Fig. 1 illustrates cross-sectional views of example cushions in use, per techniques of this disclosure. Fig. 1(a) depicts a cushion that includes a set of foam tubes placed both at a top, e.g., the lid side of a packaging container, and at the bottom of a package container, e.g. cardboard box. A foam layer that includes suitable openings is utilized to create a lattice like structure from the foam tubes. A cavity formed within a package container is utilized to place electronic devices and/or components for storage and transportation.

Fig. 1(b) depicts a cushion that includes a set of foam tubes disposed at the top of a cushion structure.

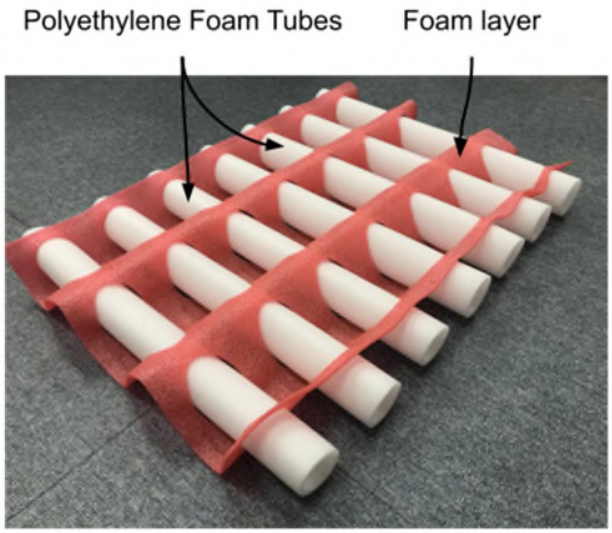

Fig. 2: View of polyethylene foam based cushion structure

Fig. 3: Polyethylene foam based cushion used with a packaging box

Fig. 2 depicts an example cushion lattice that is assembled from polyethylene foam tubes. The lattice can be utilized at a top and a bottom of a package container, or only on one of a top and bottom, as described earlier. Fig. 3 depicts an example packaging box that utilizes the cushion described herein. The cushion can be placed at any side, e.g., top/bottom, left/right, or front/back, of a package container. The cushion provides an easily recyclable option with good softness and is resistant to changes in ambient pressure.

CONCLUSION

This disclosure describes a packaging cushion constructed from polyethylene foam that is resistant to atmospheric pressure changes. The cushion is assembled from polyethylene foam tubes that act as a buffer and provide a cushioning effect for package contents due to an air cushion (suspension) within the tube and damping from the polyethylene foam. Since the air cushion is formed within unpressurized foam tubes, the cushion is resistant to ambient pressure changes. A foam layer with suitable openings is utilized to create a lattice like structure from the foam tubes. The cushion can be placed at any side of a package container.