GRAPHIC ARTICLE

Field

This invention relates to film articles, their method of production and their use as graphic films.

Background

Graphic films are used, for example, to apply designs, e.g. images, graphics, text and/or information, on windows, buildings, pavements or vehicles such as autos, vans, buses, trucks, streetcars and the like for e.g. advertising or decorative purposes. Many of the surfaces, e.g. vehicles, are irregular and/or uneven.

For graphic films, it is desirable to have a film that accommodates curves, depressions or projections on a substrate surface so that the film may be stretched around curves or projections, or may be pressed down into depressions without breaking or delaminating the film. This characteristic is generally referred to as conformability. It is also desirable that the film does not delaminate or release from the substrate surface after application (known as popping-up). Graphic films may also be imageable (i.e. able to receive printing and/or graphics) and exhibit good weathering for outdoor applications.

Polyvinyl chloride (PVC) films are conventionally used for a wide of variety of applications including graphic films. PVC has many properties that are advantageous for such applications and are easily printed using current printing technologies, e.g. piezo ink jet. For example, PVC graphic films are conformable to the varying topographies present on the exterior of a substrate, e.g. a vehicle. However, in some cases the application of halogen-containing plastics may be undesirable for environmental reasons.

Polyolefin films and their corresponding use as graphic films are advantageous in that they typically do not contain halogens. However, polyolefin films are difficult to image and thus may require the application of an additional image receptive layer, such as an ink receptive layer, toner receptive layer, primer layer or the like.

Summary

Embodiments of the present invention are~~The present application is~~ directed to articles useful as graphic films. An aspect of the present invention provides~~Specifically, the present application is directed to~~ an article comprising a film layer, the film layer comprising a

polymer blend comprising a thermoplastic polyurethane and at least 10% by weight of a cellulose ester, and an adhesive layer adjacent the film layer. The film layer is hot melt processable.

In some embodiments, the cellulose ester is a cellulose acetate butyrate. In some embodiments, the cellulose ester is a cellulose acetate propionate.

The film layer may additionally comprise polyester, a styrene copolymer (for example a styrene acrylonitrile copolymer), a plasticizer, a poly(meth)acrylate or all these materials. In some embodiments, the film layer is hot melt processable.

In some embodiments, the adhesive layer is a structured adhesive layer. In some embodiments, a primer layer in placed between the adhesive layer and the film layer. In some embodiments, a release liner is adjacent the adhesive layer opposite the film layer. In some embodiments, the article has any combination of these characteristics.

In some embodiments, the article is fixed to a substrate. In some embodiments, the substrate is a vehicle. In some embodiments, the substrate is a rough surface. In some embodiments, the surface is curved. In some embodiments, the surface has any combination of these characteristics.

Description

Articles of the present invention comprise a film, an adhesive layer on one major surface of the film; and optionally, a release liner on the adhesive layer.

The film according to the invention comprises a polymer blend. The blend comprises thermoplastic polyurethane and a cellulose ester. The cellulose ester may be, for example, cellulose acetate butyrate or a cellulose acetate propionate. Generally, the film is hot melt processable. Other materials may additionally be blended into the polymer blend. For example, a poly(meth)acrylate may be added to the polymer blend.

Thermoplastic polyurethane materials are blended with the cellulose ester. The thermoplastic polyurethane may be aliphatic or aromatic. Useful thermoplastic polyurethanes include, for example, those sold under the tradename ESTANE, for example ESTANE 58213, ESTANE 58277, ESTANE ALR CL87A TPU, and ESTANE ALR E60D TPU, from Lubrizol Advanced Materials, Inc., Cleveland, Ohio; KRYSTALGRAN PN3429-218 and KRYSTALGRAN PN03-217 from Huntsman Polyurethanes (an international business unit of