

The invention relates to an embossing foil, in particular a hot embossing foil, comprising a backing foil and a decorative layer, wherein the decorative layer comprises at least a layer of lacquer and optionally a layer of adhesive, a separating layer between the backing foil and the layer of lacquer and a metal or colour layer between the layer of lacquer and the adhesive layer.

In regard to such embossing foils, there is frequently a desire to provide for a decorative configuration thereof, in a specific manner. The decorative configuration of the embossing foil may be produced for example by the backing foil being scratched or marked at its surface on the side of the backing foil which is towards the decorative layer. However, such an embossing foil provides for orientation of the three-dimensional patterning effect in the longitudinal direction of the embossing foil.

In an embossing foil as is known for example from German laid-open application (DE-OS) No 26 49 479, it is admittedly possible to provide a three-dimensional patterning effect which is independent of an orientation of the embossing foil, but in that case the three-dimensional patterning effect is not provided on the side of the backing foil which is towards the decorative layer, that is to say, when the backing foil is removed, on the top side of the decorative layer, but between the layer of lacquer and the adhesive layer, in the interior of the decorative layer. Therefore the optical effect which is achieved with an embossing foil of the last-mentioned kind leaves something to be desired.

The present invention is therefore based on the problem of providing an embossing foil of the kind set forth in the opening part of this specification, in which not only is it possible to provide a three-dimensional patterning effect which is independent of a given orientation of the embossing foil, but in which in addition the three-dimensional patterning effect is on the top side of the decorative layer, which is towards the backing foil, and not in the interior of the decorative layer.

In accordance with the invention that problem is solved in that the backing foil is a per se known thermoplastic polyester triple-layer foil comprising outer, central and inner polyester layers, wherein the central polyester layer has a lower melting point than the outer and inner polyester layers, and that a three-dimensional patterning is provided at the inside surface of the backing foil, which is towards the decorative layer.

A backing foil of that kind is described in German laid-open application (DE-OS) No 32 48 670. The backing foil comprises two outwardly disposed polyester layers into which is embedded a central polyester layer which has a lower melting point and which can be embossed at elevated temperatures and which, in the case of a heat treatment which is necessary in terms of technical use, substantially retains the predetermined embossing depth. The outer and the inner polyester layers preferably comprise polyethylene terephthalate. The central polyester layer preferably comprises a co-polyester which contains between 5 and 95% by weight of ethylene isophthalate units. The backing foil is in particular a co-extruded triple-layer foil.

In the embossing foil according to the invention the central polyester layer of the backing foil is preferably between 4 μm and 10 μm in thickness. With a foil thickness in that range, structural images with sharp contours, that is to say three-dimensional patterning with sharp contours, are produced on the backing foil on an embossing calender or a similar machine with a roller having an engraved surface, which may be heated. In order to provide for durable embossing of the backing foil, it has been found advantageous for the surface of the embossing roller to be heated to about 160°C to 200°C. When using an embossing calender of that kind, or a similar machine, it is possible for any desired engraved patterning to be durably embossed on the inward surface of the backing foil, being the surface which is towards the decorative layer, prior to the application of the decorative layer. The engraved patterning may be for example geometrical lines, a wood grain effect, a stone-like structure, or the like.

It has been found particularly advantageous for the central deformable polyester layer of the backing foil to be of a thickness of 7.5 μm . After the operation of embossing of the backing foil, a decorative layer is applied in per se known manner on the side of the backing foil, which is then provided with the negative of the patterning of the backing foil. After the embossing operation, that is to say after transfer of the decorative layer on to a support and after release of the backing layer from the decorative layer which is fixed on the support, the three-dimensional patterning is at the free surface of the decorative layer, thus providing a good visual impression on the part of the embossed foil.

In the embossing foil according to the invention the inner polyester layer of the backing foil, which is towards the decorative layer, is preferably thinner than the outer polyester layer which is remote from the decorative layer. A backing foil of that kind also has the advantage that its tendency to adhere to the embossing calander during manufacture of the three-dimensional patterning is minimal so that embossing of the backing foil can be carried out at relatively high feed speeds.

The backing foil of the embossing foil according to the invention is preferably between 24 μm and 30 μm in thickness. A backing foil of a thickness of 27.5 μm has been found to be particularly advantageous.

The three-dimensional patterning may be the negative representation of an engraved pattern. Very fine three-dimensional patterning effects can be produced with an engraved pattern so that for example a wood grain effect can be faithfully simulated.

Further details, features and advantages will be apparent from the following description of two embodiments of the embossing foil according to the invention, which are diagrammatically illustrated in the drawing in which:

Figure 1 is a view in longitudinal section through a part of an embossing foil which is shown on an enlarged scale, wherein the

thicknesses of the individual foils and layers are not shown in their true relationship with each other, and

Figure 2 is a view in longitudinal section through a part of an embossing foil which is illustrated on an enlarged scale and which, in place of a metal layer and a bonding layer, has a colour layer.

Figure 1 shows an embossing foil 10, in particular a hot embossing foil, which has a backing foil 12 and a decorative layer 14. The backing foil is in the form of a polyester triple-layer foil comprising an outer polyester layer 16, a central polyester layer 18 and an inner polyester layer 20. The thickness of the backing foil 12 is in the range of between 24 μm and 30 μm . The inner polyester layer 20 which is towards the decorative layer 14 is thinner than the outer polyester layer 16. The central polyester layer 18 is between 4 μm and 10 μm in thickness. A three-dimensional patterning is provided at the inward surface 22 of the backing foil 12, which is towards the decorative layer 14. The three-dimensional patterning is of a depth which is greater than the thickness of the inner polyester layer 20. The thickness of the inner polyester layer 20 is of the order of magnitude of 1 μm . Reference numeral 24 identifies a separating layer which is of a thickness of the order of magnitude of 0.1 μm . The separating layer 24 permits the backing foil 12 to be easily peeled off the decorative layer 14 which is fixed on a support, directly following the embossing operation. The decorative layer 14 has a layer of lacquer 26 which adjoins the separating layer 24, and an adhesive layer 28, wherein disposed between the layer of lacquer 26 and the adhesive layer 28 are a metal layer 30 and a bonding layer 32. The layer of lacquer 26 comprises a transparent lacquer and is of a thickness of the order of magnitude of 2 μm . The metal layer 30 adjoining the layer of lacquer 26 is what is referred to as a thin film layer which is applied to the layer of lacquer 26 to bond thereto for example by cathode sputtering, vacuum vapour deposit or the like. The metal layer 30 is of a thickness of the order of magnitude of $5 \cdot 10^{-2}$ μm . The bonding layer 32 serves to produce a mechanically strong connection between the

metal layer 30 and the adhesive layer 28. The thickness of the bonding layer 32 is of the order of magnitude of $0.1\text{ }\mu\text{m}$. The adhesive layer 28 is of a thickness of the order of magnitude of 2 to $3\text{ }\mu\text{m}$.

Figure 2 shows an embossing foil 10' comprising a backing foil 12 and a decorative layer 14, wherein the backing foil 12 is of the same configuration as the backing foil shown in Figure 1. There is therefore no need for the outer polyester layer 16, the central polyester layer 18 and the inner polyester layer 20 which is towards the decorative layer 14 to be described once again in detail. Reference numeral 22 in this Figure also identifies the inside surface of the backing foil 12, which is provided with a three-dimensional patterning. The inside surface 22 which is provided with the three-dimensional patterning is provided with a separating layer 24, the thickness of which is of the order of magnitude of $0.1\text{ }\mu\text{m}$. The decorative layer 14' has a layer of lacquer 26 adjoining the separating layer 24, a colour layer 34 adjoining the layer of lacquer 26 and an adhesive layer 28 which adjoins the colour layer 34. The colour layer 34 is of a thickness of the order of magnitude of $3\text{ }\mu\text{m}$. The colour layer 34 may be coloured on one side so as to provide what is known as a unicolour embossing foil while the embossing foil diagrammatically illustrated in Figure 1 is what is known as a metallised foil.

Translation of the German claims:



CLAIMS

1. An embossing foil, in particular a hot embossing foil, comprising a backing foil and a decorative layer, wherein the decorative layer comprises at least a layer of lacquer and optionally a layer of adhesive, a separating layer between the backing foil and the layer of lacquer, and a metal or colour layer between the layer of lacquer and the adhesive layer, characterised in that the backing foil (12) is a per se known thermoplastic polyester triple-layer foil comprising outer, central and inner polyester layers (16, 18, 20), wherein the central polyester layer (18) has a lower melting point than the outer and inner polyester layers (16, 20) and a three-dimensional patterning is provided at the inside surface (22) of the backing foil (12), which is towards the decorative layer (14, 14').
2. An embossing foil according to claim 1 characterised in that the central polyester layer (18) is between 4 μm and 10 μm in thickness.
3. An embossing foil according to claim 2 characterised in that the central polyester layer (18) is 7.5 μm in thickness.
4. An embossing foil according to claim 1 characterised in that the inner polyester layer (20) of the backing foil (12), which is towards the decorative layer (14, 14'), is thinner than the outer polyester layer (16) which faces away from the decorative layer (14, 14').
5. An embossing foil according to one of the preceding claims characterised in that the backing foil (12) is between 24 μm and 30 μm in thickness.
6. An embossing foil according to claim 5 characterised in that the backing foil (12) is 27.5 μm in thickness.
7. An embossing foil according to claim 1 characterised in that the three-dimensional patterning is the negative representation of an engraving

Translation of the French claims:



CLAIMS

1. An embossing foil, in particular a hot embossing foil, comprising a backing foil and a decorative layer, wherein the decorative layer comprises at least a layer of lacquer and optionally a layer of adhesive, a separating layer between the backing foil and the layer of lacquer, and a metal or colour layer between the layer of lacquer and the adhesive layer, characterised in that the backing foil (12) is a per se known thermoplastic polyester triple-layer foil comprising outer, central and inner polyester layers (16, 18, 20), wherein the central polyester layer (18) has a lower melting point than the outer and inner polyester layers (16, 20) and a three-dimensional patterning is provided at the inside surface (22) of the backing foil (12), which is towards the decorative layer (14, 14').

2. An embossing foil according to claim 1 characterised in that the central polyester layer (18) is between 4 μm and 10 μm in thickness.

3. An embossing foil according to claim 2 characterised in that the central polyester layer (18) is 7.5 μm in thickness.

4. An embossing foil according to claim 1 characterised in that the inner polyester layer (20) of the backing foil (12), which is towards the decorative layer (14, 14'), is thinner than the outer polyester layer (16) which faces away from the decorative layer (14, 14').

5. An embossing foil according to one of the preceding claims characterised in that the backing foil (12) is between 24 μm and 30 μm in thickness.

6. An embossing foil according to claim 5 characterised in that the backing foil (12) is 27.5 μm in thickness.

7. An embossing foil according to claim 1 characterised in that the three-dimensional patterning is the negative representation of an engraving.