Title: PROCESS FOR RELIEF PRINTING

Abstract: A method for transmitting product information read from an identification tag to another processor and a system therefore. The system finds one application in radio frequency (RFID) tags. The method includes receiving data read from a tag by a tag reader, the data including product data identifying the product to which the tag is attached and tag data uniquely identifying the tag and forwarding the product data but not the tag data to another processor. This ensures that the part of the tag number which specifically identifies the particular product is kept private. This invention has one application in a retail environment where products are tagged with RFID transponders.
PROCESS FOR RELIEF PRINTING

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention pertains to a printing process for obtaining relief or embossing effects.

2. Description of the Prior Art

Printing processes for obtaining relief effects are known in the prior art and include embossing technology and silkscreen printing.

Embossing technology requires embossing cylinders comprising the desired patterns to be embossed on the printable medium. Embossing cylinders consist of 2 parts (one male cylinder and one female - or blank - counter cylinder), milled or etched in metal with gears, sometimes additionally hardened to increase durability. An important drawback of embossing technology is cost, since embossing cylinders are much more expensive than printing cylinders. Other drawbacks include possible deformation of the embossed medium (especially with line embossing), and added
costs due to the requirement of precise alignment of male and female embossing cylinders.

Silkscreen printing involves applying foaming ink on a printable medium. The main drawbacks of silkscreen printing include increased time for letting the foaming ink to rise, additional equipment such as printing units and powerful ovens for the drying process, fuzzy rendering of images and reduced durability of printing tools. Further, the line speed is reduced.

Accordingly, there is a need for a printing process for obtaining relief effects devoid of the drawbacks present in the prior art.

BRIEF DESCRIPTION OF THE INVENTION

The present invention provides a printing process for obtaining relief effects on a printable medium, said printing process comprising the following steps:

a. applying a layer of a UV-activable product (i.e. product whose polymerisation is triggered by application of ultraviolet light) on a printing tool,
the surface of said printing tool having engraved, direct lasered or etched cells containing said UV-activable product and forming desired patterns;

b. applying said printing tool onto said printable medium;

c. applying ultraviolet light to said printable medium comprising said UV-activable product.

Said UV-activable product may be UV-activable ink, UV-activable varnish or any other UV-activable product.

In addition, said UV-activable product may be based on a cationic UV-activable system or a radical UV-activable system.

Preferably, said UV-activable product has a solids content of at least 90% and a viscosity rating between 35 and 100 seconds (viscosity rating measured according to the 4 mm DIN cup method).

The printing tool according to the invention may be a printing cylinder, a printing plate or any other printing tool.
The printing process according to the invention is preferably gravure printing, but may also consist in any other printing techniques such as offset printing, etc.

The process of the invention is preferably used on foil, semi-rigid packaging material and rigid packaging material as printable medium, but may also be used with any other appropriate printable medium.

Preferably, the process according to the invention is used for printing cigarette packs, where relief effects help differentiating the packaging from competition.

DESCRIPTION OF THE INVENTION

The present invention consists in the application of a special varnish at a high layer thickness using existing gravure technique to imitate embossing. A varnish will be applied on the board online with gravure technique using a gravure cylinder without compromising on production speed. The normal layer thickness applied with gravure for printed board is in the range of 20 - 45 micron wet (= 12 - 27 micron dry at a solids content of 60%). In order to imitate
embossing, the layer thickness needs to be increased significantly, e.g. to a range of 60-100 micron.

Such thickness requires special ink type, e.g.

- High reactivity varnish to promote fast curing/polymerisation of the thick layer.
- High solids content, ideally 100%, to avoid reduction of the height of the relief during cure and to avoid long drying time due to solvent evaporation.
- Medium to high viscosity to avoid 'flow out' of varnish after application before it is cured.

A radical UV-varnish is ideal as it fulfils the above requirements. Cross-linking/polymerisation is initiated via UV-light. The initiation of the polymerisation is also conceivable via heat or other physico-chemical means.

Details on the UV-varnish:
- Viscosity: 35-100 sec (measured according to the 4 mm DIN cup method)
- solid contents: preferably 90 to 100%
- reactivity: immediate drying
Gravure cylinder:

In order to apply a thicker layer on the board, deeper cells are needed for the gravure cylinder to enable enough uptake of required ink.

Particularly for large surface reliefs, a special gravure cylinder is required, as scooped out of ink needs to be avoided during the printing process. Therefore, special cell walls have to be designed on the cylinder to avoid that the doctor blade scoops out to the ink in an uncontrolled way. On the other hand, the cell walls need to arrange in such a way that the ink still flows well together and to avoid that flow lines of the varnish are later visible.

In experiments, it was demonstrated that the application of the relief varnish for the imitation of embossing can be applied with conventional gravure technology at usual production speed.
The present invention provides the following advantages over prior art printing processes for obtaining relief effects:

- Gravure cylinders for applying UV-varnish are considerably cheaper (one order of magnitude) compared to embossing cylinders.

- Reduced preparation times in comparison to embossing cylinders, which require alignment of male and female cylinders.

- Reduced number of printing units and printing cylinders required when printing different types of patterns, such as dots and larger surfaces, on a same printable medium. The invention allows to obtain all types of patterns with only one printing unit and one gravure cylinder.

- High gloss is obtained without an extra printing step. One application of UV-varnish may be used to attain both relief printing and high gloss. With embossing technology, an extra layer of high gloss varnish is required.

- Use of existing gravure equipment and technology.
CLAIMS

1. A printing process for obtaining relief effects on a printable medium, said printing process comprising the following steps:
   a. applying a layer of a UV-activable product on a printing tool, the surface of said printing tool having engraved cells containing said UV-activable product and forming desired patterns;
   b. applying said printing tool onto said printable medium;
   c. applying ultraviolet light to said printable medium comprising said UV-activable product.

2. A printing process for obtaining relief effects on a printable medium, said printing process comprising the following steps:
   a. applying a layer of a UV-activable product on a printing tool, the surface of said printing tool having direct lasered or etched cells containing said UV-activable product and forming desired patterns;
b. applying said printing tool onto said printable medium;

c. applying ultraviolet light to said printable medium comprising said UV-activable product.

3. The process of claims 1 or 2, characterized in that said UV-activable product is selected from the group consisting of UV-activable inks and UV-activable varnishes.

4. The process of anyone claims 1 to 3, characterized in that said UV-activable product is selected from the group consisting of cationic UV-activable products and radical UV-activable products.

5. The process of anyone of claims 1 to 4, characterized in that said UV-activable product has a solids content of at least 90%.

6. The process of anyone of claims 1 to 5, characterized in that said UV-activable product has a viscosity rating between 35 and 100 seconds, as measured according to the 4 mm DIN cup method.
7. The process of anyone of claims 1 to 6, characterized in that said printing tool is a printing cylinder.

8. The process of anyone of claims 1 to 7, characterized in that said printing process is gravure printing.

9. The process of anyone of claims 1 to 8, characterized in that said printable medium is selected from a group consisting of foil, semi-rigid packaging material and rigid packaging material.

10. The process of anyone of claims 1 to 9, characterized in that said printable medium is a cigarette pack.