Anti-counterfeiting and anti-piracy technology guide

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Thermochromic Inks

Thermochromic inks change colour when exposed to variations in temperature – even one as minimal and temporary as caused by finger rubbing. The colour change may be reversible, with the ink returning to its original colour when the temperature regains its initial level, or irreversible. Some inks turn clear when heated, revealing the colour of the background below.

Used for

- Authentication
- Anti-tampering / Anti-alteration

Suitable for

- Very small products
- Small products
- Medium-sized products
- Large products

Goes on

- Product
- Packaging

Can be used for

- Physical products

Visibility

- Visible

Reading device needed

- No

Connection to server

- No

Description

There are many different types of thermochromic ink: some change colour when heated, some change colour when cooled, some change temporarily and some change permanently. Some thermochromic inks consist of microcapsules that lose their colour to the point of transparency when the temperature rises above a certain level and revert to their original colour when the temperature drops again. When the ink is transparent, the background below it will show clearly through.

The point at which thermochromic inks become transparent depends on the temperature, colour, concentration and thickness of the dye. However, the standard temperatures at which the inks lose 95 % of their colour are 6°C and 31°C.

Uses

These inks are used on a diverse range of products and packaging. However, it should be noted that their colour sensitivity may deteriorate (or even disappear) in the event of prolonged exposure to high temperatures (above 50°C), to UV light, to certain fluorescent lights, or even excessive exposure to sunlight.

Implementation

If you want to print thermochromic ink directly onto the surface of your product(s), you will need to make sure you have the appropriate processes in place to do this during production. The printing stage will need to be adapted to ensure that the ink is applied in the desired position.

Cost

Given the diversity of thermochromic inks available and their wide-ranging uses, it is difficult to give a general idea of the costs involved in implementing this technology.

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