ABOUT ACTEGA

ACTEGA develops, produces and distributes specialty coatings, inks, adhesives and sealing compounds with a focus on the packaging, graphic arts and medical industries.

ACTEGA provides materials with a high-value appearance (visual/tactile) and innovative functionalities. We offer technically sophisticated product solutions for flexible and metal packaging, folding cartons, labels and commercial prints.

ACTEGA is one among four divisions of ALTANA and owns production facilities in Europe, North and South America as well as in China.

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UV-LED CURING FOR METAL PACKAGING DECORATION

SAVES ENERGY AND REDUCES THE CARBON FOOTPRINT

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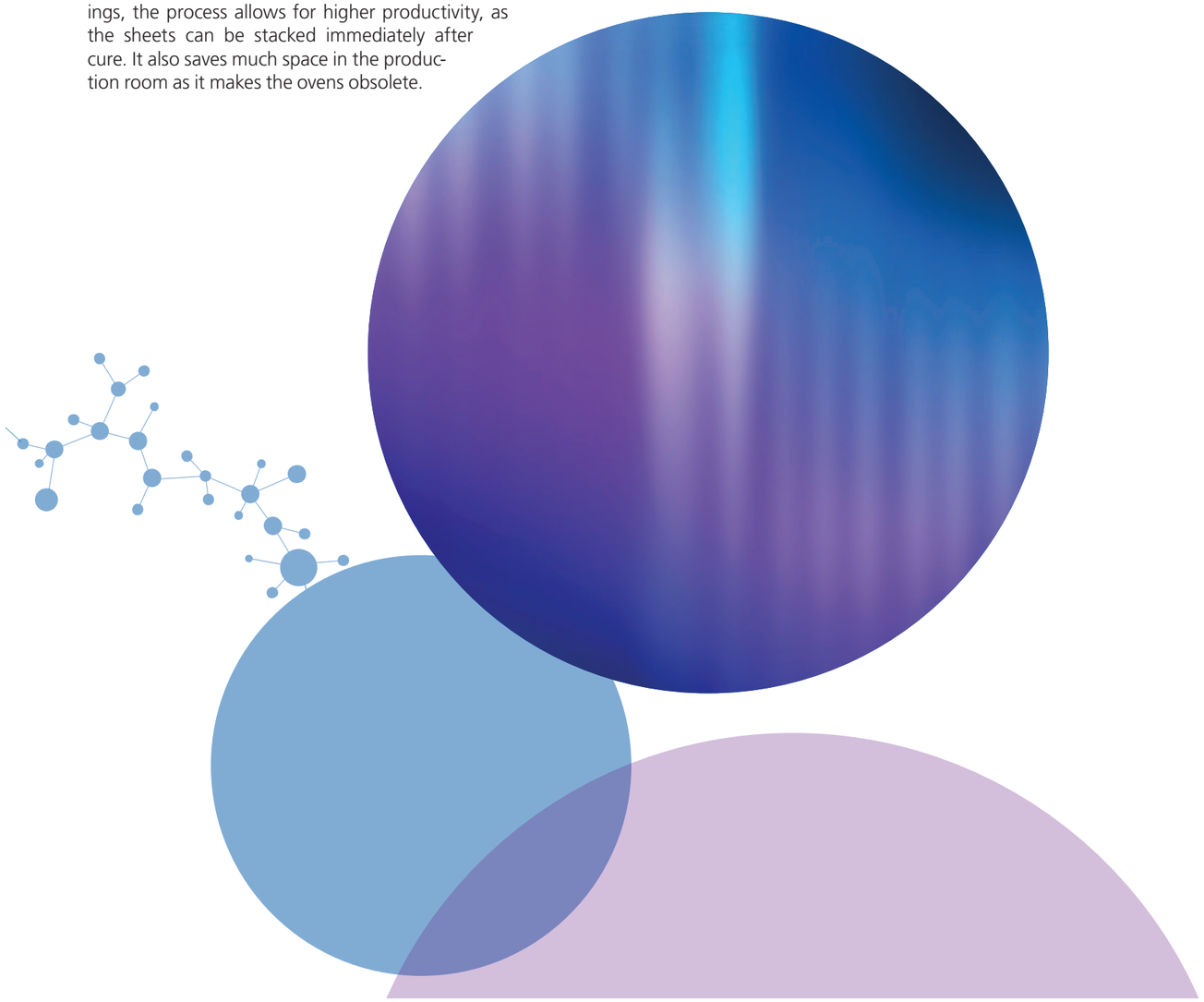
THERMAL DRYING AND ENERGY CURABLE INKS

The traditional method of printing inks for metal decoration involves the demand of heat to promote the reticulation of the highly viscous, yet still liquid, ink into a solid film that shows all its color strength, gloss and physicochemical properties. A typical drying condition can be keeping the printed sheets at 150°C PMT (peak metal temperature) for 10 minutes.

The development of energy curing, which started being adopted by the metal deco industry about 30 years ago, allowed the instantaneous drying of a coating without the need of heating. The polymerization of a film induced by the emission of UV radiation from a lamp containing mercury vapor has been shown to typically reduce the overall consumption of energy for the printing process in about 50%. In addition to these savings, the process allows for higher productivity, as the sheets can be stacked immediately after cure. It also saves much space in the production room as it makes the ovens obsolete.

Last but not least, when it comes to coatings, the UV technology makes it possible to implement a more environmentally clean process – every kg of a UV coating may reduce the emissions of VOCs in 48% when compared to a kg of a traditional, solvent-based coating.

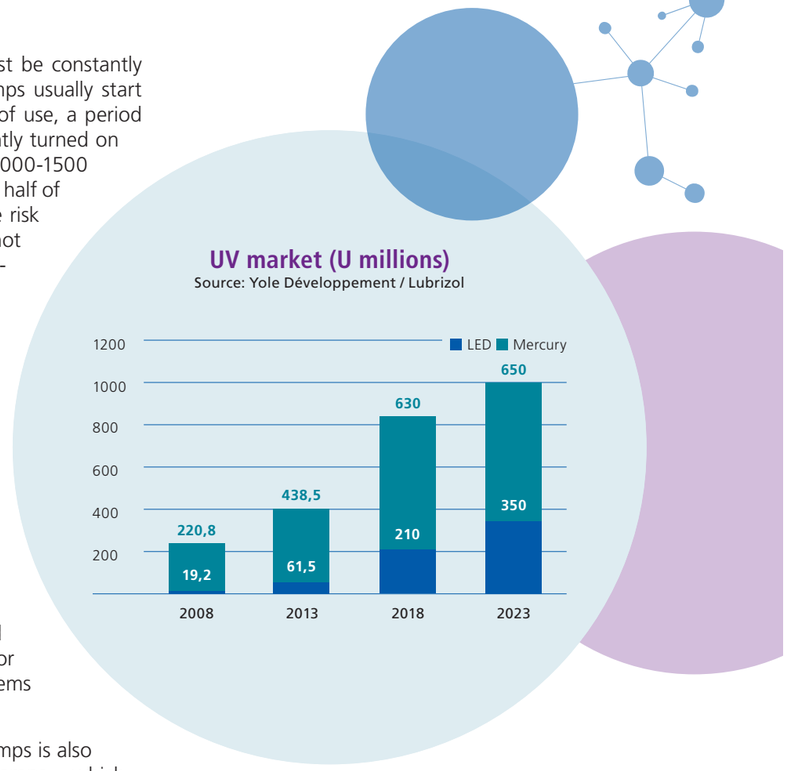


ENERGY CURING HAS EVOLVED – THE RISE OF THE LED TECHNOLOGY

UV-curable inks have brought many benefits to the metal deco industry – but they also posed some challenges: though solvent-free and low in VOC content, the lamps contain small amounts of mercury and the curing process generates ozone, both being hazardous chemicals.

The radiation emitted by a UV lamp must be constantly monitored to ensure a proper cure – lamps usually start losing power after some hundred hours of use, a period that can be shortened if they are constantly turned on and off during production breaks. After 1000-1500 hours they´ll have generally lost more than half of its original intensity, leading to the severe risk of undercuring Maintenance includes not only changing the lamps but often checking other parts such as the reflectors.

These downsides can be tackled with the use of UV-LED lamps, a technology that has been on the market for the last 20 years and is now dominant in digital printing and very common in flexo and offset. Unlike the common mercury lamps, LED diodes do not contain heavy metals and do not generate ozone. They also last for more than 30000 hours with only a minimal loss of power during their lifespan and do not require the use of reflectors; additionally, they can be instantly switched on and off, without having to warm up or cool off as traditional mercury-based systems demand.



The total energy consumed by UV-LED lamps is also significantly lower than that of mercury lamps – which already made the decoration process more economical than the thermal drying. This is also helped by the fact that LED curing is done without the use of interdecks (the UV lamps that are place between each printing unit to ensure the proper pinning of the colors).

One case study conducted by ACTEGA, Phoseon and CMP, showed that the replacement of mercury lamps for a 395nm, 24W/cm² LED system resulted in a reduction of 90% in the energy costs and a reduction of carbon emission in the order of 18 tons yearly.

The growth in adoption of LED curing in metal deco was usually limited by two factors: the equipment and consumable costs and technical factors. When it comes to cost, the more powerful lamps and the development of raw materials for inks and coatings for this specific purpose made the systems less expensive in terms of W/cm², which is reflected in the wider adoption. A study by Yule Développement showed that while LED accounted for 8% of the total UV market in 2008, the share has increased to 25% in 2018 and is estimated to reach 35% in 2023.

Technical aspects like obtaining the proper adhesion and chemical resistance are now mostly overcome in such a way that LED prints offer the same features as their mercury-based equivalents. A formulation in accordance to national and international regulations, as well as customer-devised ones, for food packaging is as possible for LED as it is for regular UV curing products. The Regulatory Team of ACTEGA will be happy to provide you more information on this topic.