

CTS DIRECT EXPOSURE

There are some myths regarding the productivity of CTS direct exposure for screen printing that need to be addressed. Stefan Rothenbach looks at the influence different light sources and direct emulsions can have on the process



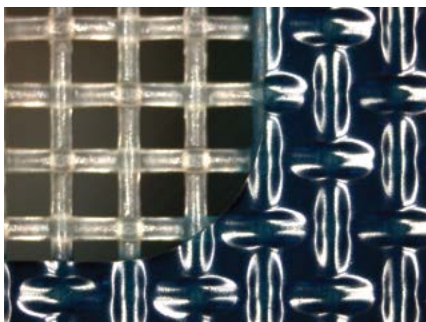
Stefan Rothenbach is an Application Engineer at SignTronic

Before broaching the subject of 'light sources and direct emulsions' in detail, let us recall the essential considerations for selecting the right type of computer-to-screen (CTS) system:

- Maximum – minimum screen format
- Required production capacity per day and shift
- Necessary resolution – dpi
- Stand-alone or IN-LINE operation = degree of automation
- Variety of mesh types and direct emulsions
- Particular characteristics such as steel mesh, relief printing (large EOM – Emulsion Over Mesh, etc.

The main purpose of CTS direct exposure systems is to guarantee correct exposure of the coated screens in the desired quality/resolution. The UV light source must therefore be strong enough to correctly cure the combination of mesh and coating (direct emulsion, capillary film, PCF mesh).

Correct curing is a central aspect



CTS direct exposure systems ensure correct exposure of the coated screens in the desired quality/resolution



SignTronic has been developing, producing and selling CTS direct exposure systems for the global market for almost 20 years

in order to avoid difficulties during the printing process, and afterwards, during the subsequent screen cleaning.

It goes without saying that a stable and precise resolution (between 1270 and 3040 dpi) as well as perfect edge sharpness are also indispensable prerequisites. However, the resolution and sharpness are not only provided by the light source but are due mainly to the high-quality optics.

SELECTING THE CORRECT EMULSION

Various emulsions can influence the CTS direct exposure speed and quality. We distinguish between Diazo, Diazo Dual-Cure and SBQ layers (which is often also called Hi-Speed

"A high-performing CTS system can cure all possible combinations of meshes and emulsions"

CTS, etc.). The type of emulsion to be selected depends on the customer's requirements with regard to quality and productivity. Other decisive factors are the used ink systems, i.e.: water colours or solvent-based colours, abrasiveness, solids content and viscosity.

SignTronic's high-performance CTS direct exposure systems are capable of exposing all types of emulsions – it's only a question of exposure time.

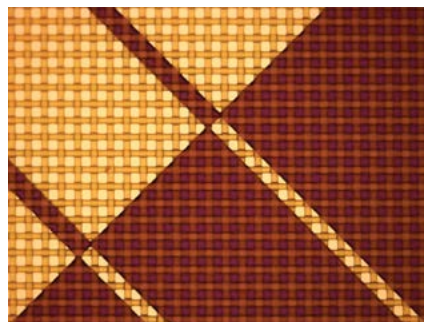
Normally, our customers are already using an emulsion that is optimally adapted to their

production processes/needs (with regard to quality and productivity) and that matches the requirements of the used exposure and colour system.

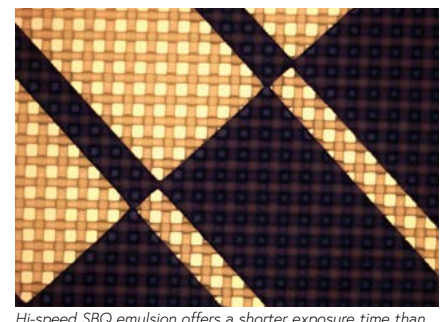
MARKET MYTH: SPEED IS EVERYTHING

Unfortunately, this undifferentiated half-truth regarding the productivity of a CTS direct exposure system still haunts many people's minds and is a widespread assumption on the market. And in far too many cases [we establish that] the supplier of the previously used emulsion has equipped the customer with a bucket full of a Hi-Speed SBQ/ photopolymer emulsion when they visit our factory here in Switzerland with their test screens. All this with the reasoning that CTS would be slower anyway. Even though this it is well-intentioned, it is clearly too short-sighted and puts the cart before the horse.

It is true that there are doubtless some CTS direct exposure systems with poor light intensity (less UV capacity), which makes it necessary to work with a Hi-speed emulsion. Nevertheless, considerable progress has been made during the past few years and actual CTS systems now have more exposure power than in the past. A more-than-sufficient performance is guaranteed by our CTS direct exposing systems with an energy density of more than 2.5 watts per cm² of pure UV light. It is therefore a good idea to start out by using the customer's current products for testing purposes.



The energy demand for correct curing increases exponentially along with the overall thickness of the screen



Hi-speed SBQ emulsion offers a shorter exposure time than a Diazo Dual-Cure emulsion but there is no difference from a qualitative point of view

EXPOSURE TIME

When working with the SignTronic StencilMaster, the image to be exposed is divided into sectors, i.e. the screen exposure is carried out horizontally from top to bottom. The quantity of energy that hits the emulsion is controlled by the travel speed of the exposure system, which results in the exposure time that is required for a screen. This value will then be the determining factor for a possibly required change of the used emulsion in order to enhance the production speed.

If an exposure time of three minutes (with the conventional method using film) turns into an exposure time of 6–7 minutes with the CTS system, this is still no reason to change the emulsion, due to the fact that the time saved thanks to the omitted film and copying frame handling procedures must also be taken into account.

FURTHER CHANGES

If the exposure time is still too slow, there are certain sequences and materials used in the screen-making process that can be adapted.

Mesh: Is it really necessary to use yellow fabrics for mesh widths coarser than 90 (threads per cm)/230 (threads per inch)? Changing to white mesh can save between 20 and 30% of the required exposure time.

Coating: Are the requirements clear? Is the required measuring equipment such as a layer thickness measuring device and a measuring instrument for the surface roughness (RZ measuring apparatus) available? Have the parameters (EOM, RZ value, layer thickness) been checked with regard to the planned application? The energy demand for the correct curing increases exponentially along with the overall thickness of the screen. This means that the correct coating thickness has a direct influence on the exposure time.

Previous and subsequent processes: These must also be included in the overall consideration. Have the coating parameters been regularly checked by means of the appropriate measuring equipment? Is the drying time correct? Does the selected mesh fineness still correspond to the requirements?

CHANGING EMULSION

And if you still decide to change the emulsion... The only advantage of a faster Hi-speed SBQ emulsion over a Diazo Dual-Cure emulsion is thus a shortened exposure time. However, from a qualitative point of view, there is no difference – provided that the application is accurate and that the processes have been correctly adapted.

However, the Hi-speed SBQ does have a disadvantage in as far as its application range is considerably restricted with regard to curing and correct exposure (curing of the emulsion). In practical applications, this often causes a problem in cases where an excessively fast exposure speed is selected, with the result that the screens are under-exposed.

In addition, our experience has shown that in many cases it is also possible to use two different emulsions in order to meet all requirements with regard to productivity.

CONCLUSION

A high-performing CTS system can cure all possible combinations of meshes and emulsions. It is the emulsion and the mesh which need to be adapted to the production process – NOT the light source.

SignTronic has been developing, producing and selling CTS direct exposure systems for the global market for almost 20 years. Now on its fourth generation of equipment, the company has achieved several hundreds of installations for customers around the world. ■

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