



Edwin Tafelmeier
Research and
Development

CURING OF SCREEN INKS WITH LED TECHNOLOGY

In our 198th German edition of Screen News we first reported about the possibilities and prospects of LED technology. We are convinced that this UV-curing technology will play an increasingly important role for the screen process in the future. Innovative screen printers are already successfully using this LED technology. You can be sure that this modern technique will soon set new standards for screen printing.

Experts are in agreement: LED curing has an enormous potential. This was made quite clear on occasion of the UV LED symposium mid of December, which was organised by the company IST Metz. In addition to speakers of this manufacturer, there were also well-known lecturers of various raw material suppliers and universities.

One month before that another event, the "User's discussions UV-Printing" was organised by FOGRA in Munich. One of the most significant lectures there was: "Is UV-LED the Future Radiation Source". Most of the participants there thought so.

Beginning of December 2010 a 6-colour sheetfed offset printing equipment with coating unit for package printing was introduced in Japan. This equipment uses UV-LED curing only. Another novelty in the cosmetics industry are small UV LED curing equipments (made in China) for fingernail studios. When viewing most press reports about UV-LED technology you can almost get the impression that in this country we are neglecting this new technology and that in Germany no suitable inks and varnishes are yet available.

That however, is not true. There are several reasons that many ink manufacturers do not yet offer special ink ranges for LED-curing. This technology is still quite new so that to date lamps offered on the market still have no uniform standard. However, you can only achieve optimum printing results if printing equipment, dryer and ink are optimally adjusted to one-another. Especially in screen printing there is a great variety of possible substrates so that one UV-LED ink range will not be sufficient. However, for innovative printers using this new technology LED screen inks are already available. A good co-operation of printers, machine and ink manufacturers would be useful. Meantime there is enough practical experience to estimate present possibilities of this technology. However, some interested printers are still waiting if the new technology will penetrate the markets. But that is not the question, it already has...

INVESTMENT COSTS SLOWING DOWN THE PROCESS?

Due to significant costs companies will at first postpone the necessary investments. However, you need to consider that operating costs are significantly lower. Easytec GmbH has calculated that in the best case the equipment will easily pay off within one year however no later than within 4 years. This saving potential is due to the lower operating cost mainly resulting from 75% less energy consumption than conventional radiators. Maintenance is also less costly. The radiation energy can be focussed to those areas where printing ink or varnishes require curing. For unprinted areas you can switch off the LED lamps or adjust cycles, warm up times are unnecessary. In addition the lamps can be controlled and adjusted so that only the actually required range will become effective.



PHOSEON® RX FireLine



EASYTEC UV-LED-Lamp MP8

AMORTIZATION*

3 Shift Operation

Amortization Time: **1,4 Years**
LED-Life Time: **6,9 Years**

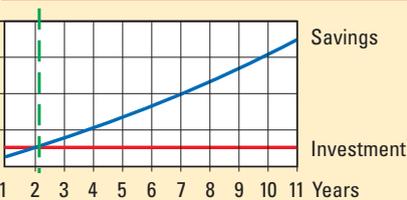
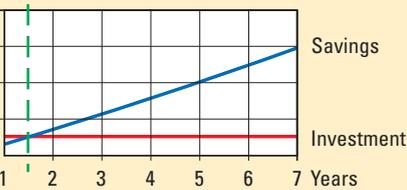
2 Shift Operation

Amortization Time: **2,1 Years**
LED-Life Time: **10,4 Years**

1 Shift Operation

Amortization Time: **3,9 Years**
LED-Life Time: **20,8 Years**

LED-Life Time 50.000h



TOTAL COSTS ARE NOT THE ONLY FACTOR

When planning to invest in new printing equipment you should consider possible cost saving factors of UV-LED technology. You have to analyse the whole process and compare the cost. Multi-colour equipment could also be a combination of LED and conventional UV-curing. Refitting of existing equipment may also be suitable.

In addition to cost saving UV-LED technology is also of advantage in respect to environmental, health and safety aspects. There is no problem with ozone as the short wavelengths causing that ozone are missing in the UV spectrum. In addition the low energy requirement will reduce CO₂ emissions. Products produced with cleaner production will have a "greener" image, a great advantage for marketing purposes.

CONSTANT IMPROVEMENT

Meantime UV-LED lamps can be adjusted in any way in width and length. In addition, several lamps installed in one housing can also be equipped with various wave length peaks. Therefore ink manufacturers have more possibilities when formulating the inks and consequently there are more fields of application. Vice versa such lamps can also be adjusted to various ink formulations. Feasible radiation efficiencies have already been doubled within a short time period; currently 8 W/cm can be reached.

Radiation can still be increased by bunching the beams thus counteracting the problem of oxygen inhibition often appearing in UV curing applications. Also

raw material manufacturers of radiation curing products have developed new products suitable for the special requirements of UV LED curing. The gap between conventional UV-curing and LED-curing will - from a technical point of view - become smaller and smaller. Therefore finally economic aspects will decide which technology will be used. Naturally this does not mean the end of mercury vapour lamps, but no one can neglect this new trend.

STATE OF THE ART

In some industries UV-LED curing is already considered as state-of-the-art. The wood industry - for example coating of furniture and parquet floors - is already using machines, only equipped with UV-LEDs. This breakthrough is still pending for printing inks.

Printers who do not consider the possibilities of this new technology will miss out on future techniques. Contact us for further information.

Edwin Tafelmeier

+49 911 64 22-242 +49 911 64 22-283
edwin.tafelmeier@sunchemical.com