



THERMAL SYSTEMS

Press Release

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Curing in Seconds: Rehm Thermal Systems Sets New Standards in Efficient UV LED Drying with RDS UV LED

Compact oven technology combines stationary full-area exposure, high homogeneity and resource-efficient process control for conformal coatings, adhesives and potting compounds in electronics manufacturing.

UV LED technology is becoming a key technology for electronics manufacturing when conformal coatings, adhesives or potting compounds need to be cured quickly, reproducibly and energy-efficiently. With the RDS UV LED, Rehm Thermal Systems transfers the advantages of modern LED radiation sources into a compact oven concept suitable for inline production. The system was developed for high-precision curing processes and combines short cycle times with controlled, homogeneous exposure as well as a significantly improved energy, space and cost balance.

Compared with conventional UV systems using mercury vapor lamps, UV LED technology requires no warm-up time, is ready for operation immediately and can be precisely controlled. It is mercury-free, does not generate ozone at the relevant UVA wavelengths and reduces heat input into the assembly. This offers clear advantages for future-proof production, especially when processing temperature-sensitive components, meeting increasing sustainability requirements and addressing the growing importance of traceability.

Stationary Full-Area Exposure as the Core of the Process

The central process principle of the RDS UV LED is stationary full-area exposure. While continuous systems can be influenced by transport dynamics, belt speed and position-dependent dwell times, the PCB in the RDS UV LED remains fixed in position during the defined exposure time and is irradiated simultaneously across the entire activated area. This creates reproducible conditions: exposure time, intensity, working distance and active segment areas can be clearly defined and stored in recipes.

This concept enhances process reliability, particularly for assemblies with different component heights. Distance and alignment remain constant during the exposure step; shadowed areas and fluctuations caused by relative motion are reduced. For users, this means uniform curing across the entire

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usable area and therefore high coating quality, even with demanding layouts and sensitive coating systems.

Homogeneity Through Segmentation and Targeted Overexposure

The RDS UV LED operates with a 500 x 500 mm UV LED exposure field. The LED light source consists of four separately controllable segments, each 125 mm wide, which are activated depending on the defined PCB width. This ensures that only the area actually required is activated. It reduces unnecessary energy input outside the usable area and supports gentle thermal process control.

For the quality of UV curing, maximum intensity alone is not decisive; the uniformity of the radiation distribution is equally important. The system concept therefore provides for targeted overexposure beyond the PCB edge: for PCB sizes of up to 410 x 410 mm, 45 mm of overexposure is available on each side. As a result, the assembly is positioned within the particularly homogeneous area of the exposure field, with homogeneity distribution of up to 95%. As an option, the system can process PCBs up to 500 x 500 mm; when the full exposure field is used, edge homogeneity must be evaluated depending on the application.

Defined Wavelengths for Controlled Curing

UV LED systems do not emit a broad spectrum, but defined wavelengths. The RDS UV LED is designed for modules with 365, 385, 395 or 405 nm. This allows the irradiated energy to be precisely matched to the respective coating or adhesive system. The appropriate wavelength is selected depending on the photoinitiators, layer thickness and material approval. Rehm Thermal Systems points out that switching from broadband UV to UV LED is not simply a matter of replacing a lamp: for stable results, wavelength, dose, intensity, homogeneity, temperature control and material chemistry must be validated together.

The precise controllability of UV LED technology opens up a very robust process window. Since LED modules reach full output without preheating time, they can be activated precisely in line with the production cycle and switched to standby mode during pauses. This lowers energy demand and simplifies process control. At the same time, the long service life of the LED modules, exceeding 20,000 operating hours, reduces maintenance requirements and increases system availability.

Compact, Integrated and Industry 4.0-Ready

The RDS UV LED was developed to meet the requirements of modern electronics production lines. In semi-batch operation, the system combines the advantages of stationary exposure with the requirements of inline production and enables cycle times of just a few seconds. Automatic transport width adjustment covers a range from 50 to 508 mm. The system is designed

as an inline solution and prepared for integration into digitalized manufacturing concepts.

Traceable process values may include exposure time, intensity, active UV LED segments, segment temperatures, operating hours and system status messages. Interfaces such as SMEMA, Hermes or MES connectivity allow the curing process to be linked with quality-relevant production data. The user-friendly ViCON software supports operation via touch functions and clearly displays key system and process information.

Sustainability with Economic Benefits

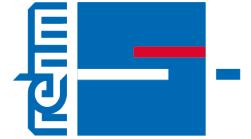
In addition to process quality, the RDS UV LED drying system addresses key economic and sustainability objectives. UV LED technology enables up to 70% lower energy consumption compared with conventional UV lamps and up to 70% less footprint. The exhaust air volume is 500 m³/h, which is significantly lower than in many conventional systems. Since no mercury-containing emitters are used and no ozone is generated, the oven supports environmentally friendly and legally compliant production processes.

“With the RDS UV LED, we think of UV curing as a controlled process – not merely as a light source,” says Manuel Schwarzenbolz, Research & Development at Rehm Thermal Systems. “Stationary full-area exposure, segmentation, homogeneity management and digital process data create the basis for reproducible quality, short cycle times and resource-efficient electronics manufacturing.”

RDS UV LED Product Information at a Glance

The RDS UV LED cures UV conformal coatings, adhesives and potting compounds quickly, uniformly and resource-efficiently. Key elements include a 500 x 500 mm UV LED panel, four segments of 125 mm each, defined wavelengths of 365, 385, 395 or 405 nm, stationary full-area exposure, overexposure of up to 45 mm on each side for high edge homogeneity, low thermal load, LED modules with more than 20,000 operating hours, automatic transport width adjustment from 50 to 508 mm, the ViCON user interface, and compatibility with inline production, MES and Hermes.

Attached you will find image material: 1) RDS UV LED 2) LED segment 3) Full-area exposure of the assembly Images: Rehm Thermal Systems



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About Rehm Thermal Systems

Rehm Thermal Systems is an expert in joining technologies for electronics manufacturing. With innovative system solutions for soldering, drying, and coating, we enable our customers to create reliable connections on electronic assemblies – tailor-made, process-safe, and future-oriented.

Since 1990, we have been developing and manufacturing energy-efficient production equipment to the highest quality standards at our headquarters in Germany and at an additional production site in China. Our global subsidiaries and distributors provide customized solutions and competent service – wherever electronics are made.

Create your Connections – with Rehm, you shape the joining technology of tomorrow.