

LumProtect Flex

“Our innovative lamination technology offers reliable protection against a wide range of environmental influences”

OPE journal sat down for an exclusive interview with Paul Sparenborg, sales director at LUMITRONIX LED-Technik GmbH (Hechingen, Germany)

OPE journal: Mr Sparenborg, the market for flexible electronics is growing. What are the opportunities and challenges for Lumitronix arising from this fact?

Paul Sparenborg: We also sense this growth significantly and are increasingly producing lighting solutions based on flexible substrates, thus advantageously replacing rigid circuit boards. Even outside the lighting industry, we are implementing a growing number of solutions with flexible electronics that score points with multifunctionality and minimal space requirements.

However, problems become apparent in practice, as flexible electronics are much more sensitive both during further processing and in application. In addition, different environmental factors can also damage the flexible electronics units, so we have to look at protective methods as part of project development to ensure the functionality and required service life of our solutions. But the results with conventional methods are often not satisfactory for us.

OPE journal: What are the weaknesses of conventional technologies in this context?

P. Sparenborg: To protect our flexible modules, we use various external partners for conformal potting and coating. Depending on the project, we have to choose a method and are repeatedly confronted with disadvantages of the existing technologies. With potting, we experience severe losses in flexibility and a large shift in light colour, which is serious for lighting applications. Coating, on the other hand, offers hardly any protection



Paul Sparenborg

against heavy mechanical stress and does not have sufficient protection against chemicals and moisture. In demanding applications, our electronic assemblies must reliably withstand the stress in the respective application and ideally not lose any technical or photometric properties. For this reason, we have established our own in-house production process called LumProtect to make the sensitive Flex modules more robust.

OPE journal: What is LumProtect? What distinguishes the innovation?

P. Sparenborg: In our new production unit, both flat and linear electronic assemblies are laminated with several polymer materials. Depending on the intended use of the assembly, we can adjust the material composition

of the layers. In the lamination process, multiple layers of plastic are applied to the front and back of the flexible PCB material using heat and pressure. This encapsulates the components mounted on the flexible PCB and eliminates residual air in the composite material. We only use very thin, transparent layers, so the flexibility of the module is still maintained with only a low weight and at the same time the mechanical resistance increases significantly.

The basic principle of lamination as a thermal joining process is already known. However, by fine-tuning the composites and process steps, we can now innovatively offer lamination as a protection method for flexible electronics.

OPE journal: Which features are expected to convince potential customers of LumProtect?

P. Sparenborg: Our innovative lamination technology offers reliable protection against a wide range of environmental influences. Whether solar radiation, wind or water – the modules can withstand any weather and can for example be used outdoors in flexible lighting solutions. Furthermore, the lamination protects the Flex module against various chemicals in the air (e. g. exhaust gases) or when in direct contact with the surface (e. g. paint, cleaning agents, dust). Mechanical stresses, such as a direct impact on the electronics by the user, can also be largely avoided. Despite the lamination, the flexibility of the assembly is maintained so that multi-dimensional installations remain possible.



LumProtect Z-Flex

OPE journal: What are the technical limitations you are still facing?

P. Sparenborg: Currently, we can only use the process to protect flexible assemblies, not rigid ones. Due to the high temperature during the lamination process, there are restrictions regarding the choice of flexible board material. Therefore, at this point we are limited to laminating flexible modules with the base material Polyimide. Other possible substrates still need to be evaluated. Another critical factor is the size of the components. It is difficult for us to process parts with a height of more than 2mm.

As this is still a very new process, we currently only laminate flexible modules that we also

produce ourselves in-house on our reel-to-reel production line. This is the only way we can ensure that the layout of the electronic board and all material combinations harmonise well with our lamination process.

OPE journal: What are your company's goals and expectations for the coming months?

P. Sparenborg: We offer two laminated standard modules for lighting applications at the moment and will expand our portfolio with further laminated LED strips and area modules. Our goal, however, is to establish LumProtect throughout the industry. We are therefore focusing intensively on different, industry-specific requirements and customer wishes as of now.

We can already offer different connection and sealing options with cables, plugs, eyelets & crimp contacts and enable different designs and colours with optional textile layers in the material composite.

Furthermore, we are running numerous endurance tests with a view towards chemical resistance and mechanical stress, which prove the durability of our protection method. We expect to see results and new insights into the novel possibilities for LumProtect this autumn. In ongoing development work, we will further optimise and specify our lamination process with the aim of reacting flexibly and quickly to the many individual customer requirements.

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