

Dispensing cell with thin layer degassing for LED potting

At the Fakuma 2015 plastics fair, the Sonderhoff group presented its new three-component dispensing cell Smart-L / DM 403. This low pressure mixing and dosing machine, thoroughly modular constructed, is adaptable to various production concepts. The thin layer degassing for complete air evacuation of the potting material in the pressure tanks is one of the new features of the machine. This degassing method results in a crystal clear potting transparency free of air inclusions.

For protection against moisture, water, dust and other weather effects as well as for temperature and vibration stability, LEDs are mostly encapsulated with two-component casting resins based on polyurethane or silicone. This affects long durability of LEDs, e. g. in weather resistant LED arrays for illuminated advertising, street and tunnel lights or information screens. **Sonderhoff Chemicals** is a manufacturer of potting and foam seal material systems on the basis of polyurethane or silicone, especially for the foam sealing of housings for lamps and electronics and in particular for the encapsulation of LED lighting.

At the trade show, Sonderhoff demonstrated the potting of flexible LED stripes with a transparent two-component polyurethane casting resin system from the product family **Fermadur** using the new three-component dispensing cell **Smart-L / DM 403** with thin layer degassing. The air evacuation of the potting compound results in a crystal clear potting transparency free of air inclusions and streaks. Opacification and as a result deviation from the ideal LED light distribution caused by air inclusions will be avoided. With this bubble-free LED encapsulation ingress protection classes up to IP67 and an optimal lighting effect can be reached. The transparent or opaque LED potting systems do not become yellow over time. Using aliphatic isocyanate they are highly resistant against

ultraviolet radiation and therefore have a very good light transmission of up to 89 %. Unlike plastics, as for instance PC, PS or SAN, Fermadur clear potting compounds have the resiliency to return to their original undamaged condition by a "self-healing effect" on scratches and cracks which occur under mechanical load. Thus, the transparent LED potting retains its constant light transmission this technology is also suitable for demanding surface coating applications.

Besides LEDs, electronics and electrical elements are also cast with the Fermadur potting systems. The systems are designed for various applications and according to requested properties, e. g. different hardnesses, material density, temperature resistance, mechanical stability, and processing parameters like viscosity, pot life and tack-free time. For potting of electronic elements customers can choose between different colours. However, for optically attractive LED solutions transparent or opaque potting systems are used. Ingress protection classes up to IP67 are achievable depending on the part construction, so that external applications, e. g. swimming pool lighting, are possible. For tunnel lighting in non-explosive areas, the potting systems are adjustable flame-retardant, so that they pass the testing according to US fire protection classes UL94.

Process reliable potting application

The application of industrial parts occurs economically and on a high level of process reliability with the dosing technique "Formed In-Place (FIP)" using semi or fully automatic low pressure dosing and mixing machines from

Sonderhoff Engineering. Due to a good flow rate the polyurethane-based potting compound even dispenses into remote corners of complex parts, equally distributed and full-surface. Using the thin layer degassing method air inclusions in the potting material will be avoided. Several LED series of diverse parts or shapes can be cast with the same potting product processed on the mixing and dosing machine. Flexible LED stripes are encapsulated in a two-layer application process, first with a transparent potting and after curing in a second step covered with an opaque potting, which provides an optimal light dispersion. Both potting layers are UV resistant. Although LED light generates much less warmth as traditional incandescent light bulbs, it is essential that protective encapsulations have a high temperature resistance. It is thereby possible to cover a wide range of different applications and operating conditions

The potting application of LEDs with the automated Formed In-Place process on the low pressure mixing and dosing machine provides protection of sensitive LED lighting against harmful influences. Which kind of potting system is used depends on the specific sealing requirements for and the exact usage of the part. Specification and properties of the potting material should be discussed at best already in the construction stage of LED housings or other component applications.

Three-component dispensing cell Smart-L / DM 403 with thin layer degassing



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