

Potting under vacuum or atmosphere?

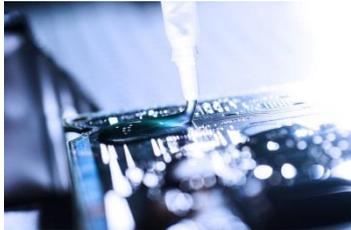
Working shoulder to shoulder with material manufacturers and integrators early helps to prevent mistakes in the potting application.

From „Smart Home“ to the development of new energy concepts up to autonomous driving – trends like these make it clear, what a central role efficient electronics play today. The growing demand for electronic components and increasing or changing demands throughout all industries also pose new challenges to metering and dispensing technologies.

Potting under vacuum or atmospheric conditions? This question about the correct procedure concerns many users, among others i.e. electronics manufacturers, who pot more and more complex parts and components for a huge variety of products. Against the actual requirements of product and process, a decision on the procedure is often made under the assumption: „Potting under atmosphere = affordable and easy“and „Potting under vacuum = expensive and difficult“. But that’s a thing of the past. The way to the correct method, however, requires the clarification of a number of factors.

In some cases there is no alternative to vacuum potting

Generally both potting methods have justification today. Because of the efficiency of modern metering and dispensing technology many different dispensing tasks can nowadays be realized with the required reliability and quality under atmospheric pressure.



For many processes dispensing under atmosphere remains the process of choice.

For parts such as coils and transformers, parts with small gaps or undercuts requiring void-free results, potting under vacuum cannot be replaced by any other process.

The question about guidelines which process to use is difficult, since many aspects have to be considered when potting. For safety-relevant and highly functional components users prefer to play it safe by potting under vacuum. Due to the complexity and the high cost for the operator, components in aircraft and wind turbines cannot be replaced on a regular basis. This can be solved with the right potting method because a dispensing process tailored to the application has a direct influence on the life span of the respective parts. Irregularities in the potting process however often lead to premature failure. In addition it should be considered that not every potting material is suitable for being processed under vacuum. To connect with the material manufacturers and the equipment manufacturer at a very early planning stage pays off!

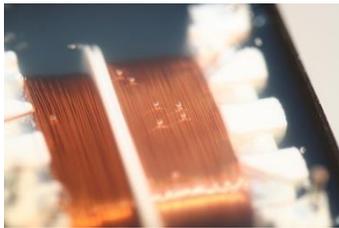
Focus is on the component’s requirements

Different criteria determine which process is the right one. Most important surely are the component’s requirements and the importance of the role of product. Furthermore, the aspect of the product design, the potting geometry, and the degree of automation needs to be considered. Once the decision for a process is made, the user’s focus when selecting the systems and equipment should be that they are future-proof and a secure investment. Many electronics manufacturers don’t

know today which parts with what requirements they are going to produce tomorrow. This means that their production technology has to be able to adapt to those changes quickly and worldwide. A modular concept that allows a simple up-and down scaling of the systems based on the requirements for is a safe choice for users.

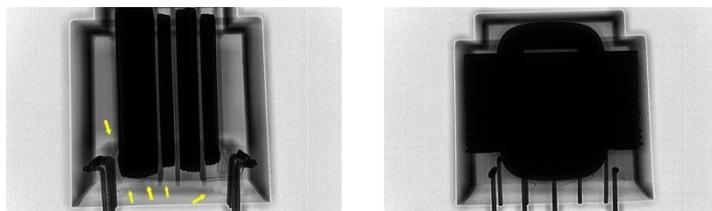
Vacuum potting – reliable and at the same time economic

Vacuum potting is often determined by the requirement for long-term reliability of parts and components, the importance to safety and the increasing miniaturization. Furthermore parts are becoming technically and geometrically ever smaller and more complex. Wound materials such as transformers, engines, or ignition coils have narrow gaps which require to be potted without voids.



Small traces of air appear in the fine gaps of the coil. This is the reason why it is advisable to pot wound materials under vacuum.

Here vacuum potting is most often the only option. Only a bubble-free material preparation, a stable vacuum and the precise positioning of the work piece during the entire dispensing process can deliver the required quality here.



*Left: Component potted under atmospheric conditions shows entrapped air
Right: Component potted correctly under vacuum without entrapped air*

That vacuum potting is expensive is not true anymore today. For one, this method is used for a reason where a high performance of parts and components is required. Compared to potting under atmosphere it justifies the slightly higher price for that specific requirement. Furthermore, there are more economic systems available today than there were before. Systems like the Scheugenpflug LeanVDS



The LeanVDS (here with material preparation and transfer unit A310) allows for a cost effective entry into vacuum potting on a small foot print

an evolution of the proven VDS-System, that can be customized to meet the respective requirements. Because of its small footprint this line of equipment is especially suited for laboratories, prototype development and small scale production. Users are offered the opportunity to pot small batches with a technically optimized system under vacuum.

Systems for any requirement and for any budget

Dispensing processes under vacuum are not difficult (anymore) to manage nor expensive. The development here has improved significantly. For many applications vacuum potting is the process of choice governed by the high demands for the product. For lesser product quality, powerful atmospheric metering and dispensing solutions are available. The decision is best made with consideration of all factors and in dialog with system and material partners. Regardless of which system is chosen – powerful and reliable systems are available for all requirements and for any budget.

Pictures: Scheugenpflug Inc.