



3D screen printing technology

3D screen printing is one of the proprietary additive manufacturing technologies. The fully automated technology adds another dimension to conventional screen printing and offers a high degree of variability in material selection. Generally, material is only added where structures are to be built up. The individual layers can vary from 10 to 100 µm, while the thickness of the walls can reach between 50 µm and several centimetres.

The 3D screen printing technology offers the possibility to adapt the geometry, internal architecture and size to the customer-specific wishes and requirements. In addition, the possibility of discontinuous distribution of active pharmaceutical ingredients within a given dosage form gives the advantage of high flexibility in terms of dosing and adaptation of drug release profiles.

A major advantage of screen printing is the associated potential for mass customisation. This makes the simultaneous build-up of thousands of units per screen possible. The ratio of screen size to unit size plays a decisive role in terms of the number of units printed simultaneously. This criterion also distinguishes screen printing from other 3D technologies where capacity is limited by the number of buttons present.

Laxxon Medical's 3D screen printing technology uses a screen mesh to transfer a semi-solid paste containing API onto a plate. The manufacturing process can be divided into two phases: in the first phase, the printing paste must first be prepared and the design and selection of the screen must be determined. In addition, suitable squeegees and printing plates must be selected and used.

The 3D printing process, as the second phase, involves various operations starting with the application of the printing paste selected in phase one onto the printing screen. With the help of a squeegee, the paste is then pulled over the screen until all meshes are filled with it. Another squeegee ensures that the paste is pushed through the meshes of the screen and thus reaches the printing plate. Areas that are to be left out are made impermeable to the paste. The screen is then lifted and the printing plate is moved from the printing station to a curing station to allow the layer to dry. The method of drying varies and depends on the materials used. Once the layer has dried, the printing plate moves back to the printing station where the next cycle is initiated. To do this, the printing plate must first be adjusted in height so as not to damage the first layer while the second layer is applied. This cycle is repeated until the desired geometry is achieved.

With 3D screen printing technology, it is possible to produce tablets with different - active and inactive - layers. This structure makes it possible to release several doses of a drug at different times. Depending on the tablet design, size, use of material and internal structure, several drugs can be layered on top of each other, combined in one tablet and optimised in their ideal kinetics.

INNOVATIVE TECHNOLOGICAL APPROACH

- ◇ **Company:**
Laxxon Medical
- ◇ **Technology:**
SPID® technology
- ◇ **Advantages:**
high printing speed

Simple mass adjustment

High variability in the choice of materials

Improved bioavailability
- ◇ **Website:**
<https://www.laxxonmedical.com/>

Opportunities how SPID technology can improve drug delivery

1. Reduction of unwanted side effects
2. Improving patient compliance
3. Mass production (up to 1.5 million units per day) of tablets, films, implants, transdermal patches with novel drug formulations, etc

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