

## Abstract

# 3D screen printing for advanced pharmaceutical manufacturing

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3D screen printing is a cutting-edge additive manufacturing technology [1], [2] that enables the production of pharmaceutical dosage forms with unprecedented internal complexity at industrially relevant throughput. It allows the fabrication of diverse shapes and sizes [2], while the release characteristics of active pharmaceutical ingredients can be precisely controlled through the definition of internal architecture, geometry, and carrier materials. Unlike conventional manufacturing approaches, 3D screen printing enables the spatial separation of drug substances into distinct internal compartments within a single dosage form, facilitating differential multi-drug release with high precision. Importantly, this process operates without exposure to high temperatures or pressure, thereby preserving drug stability and expanding the design space for complex formulations. The SPID (Screen Printing Innovative Dosage) technology platform enables a wide spectrum of formulation strategies, ranging from immediate and extended release to more advanced designs such as multilayer tableting, sequential and zero-order release systems, enteric compartments, and tablet-in-tablet configurations (Figure 1). Furthermore, the platform offers significant potential for innovative approaches, including microtablet-based systems and oral delivery of GLP-1 therapeutics.

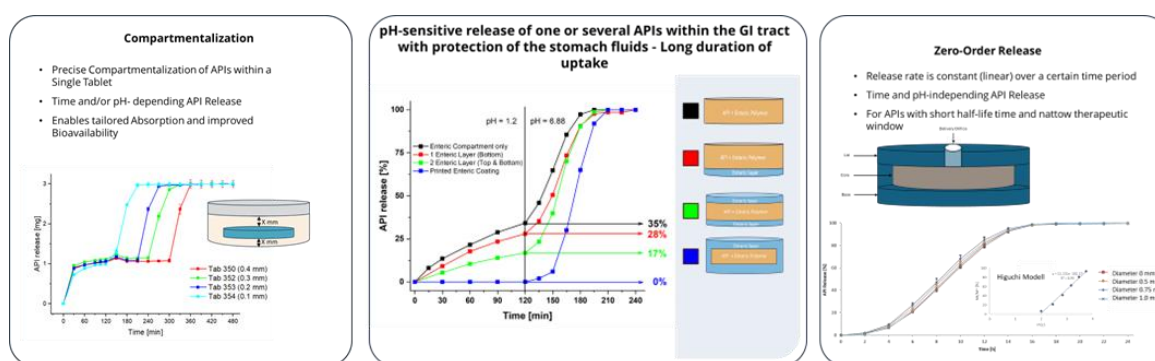


Figure 1. Formulation and tablet design examples of SPID® (Screen Printing Innovative Dosage) technology platform. Left: Tablet. In a Tablet, middle: enteric compartments and/or printed “coatings” and right: Zero-Order release.

## AUTHOR'S STATEMENT

Conflict of interest: Marcel Enke is employee of Laxxon Medical GmbH. Informed consent: Informed consent has been obtained from all individuals included in this study.

## REFERENCES

- [1] M. Enke *et al.*, “3D screen printing technology enables fabrication of oral drug dosage forms with freely tailorable release profiles,” *Int. J. Pharm.*, vol. 642, Jul. 2023, doi: 10.1016/j.ijpharm.2023.123101.
- [2] D. Moldenhauer *et al.*, “3D screen printing – An innovative technology for large-scale manufacturing of pharmaceutical dosage forms,” *Int. J. Pharm.*, vol. 592, Jan. 2021, doi: 10.1016/j.ijpharm.2020.120096.