

HNP Mikrosysteme GmbH  
Bleicherufer 25  
19053 Schwerin (Germany)

**Contact person**  
Dörte Hoffmann  
T +49 385 52190-352  
doerte.hoffmann@  
hnp-mikrosysteme.de

## Dosing of highly viscous material for microencapsulation

September 2021: Microencapsulation is becoming increasingly important in pharmaceutical, cosmetics, food and agricultural industries. New dosage forms are emerging, the efficacy and tolerability of active substances is increasing, and the range of applications for approved substances is growing. Precise metering techniques in the low-volume range are a necessary prerequisite for the production and processing of APIs. Metering pumps by HNP Mikrosysteme are a suitable technical solution.

Active pharmaceutical ingredients (APIs) are the pharmacologically active substances of a drug. These are compounds such as natural substances, semi-synthetic products, synthetically produced or genetically and biotechnologically modified pharmaceuticals and cosmetics. The production of these APIs is demanding. The substances, which range from aqueous to oily, need to be processed gently.

Microencapsulation is a suitable process to protect these active substances from early release and to preserve bioactivity. The capsules consist of polymeric or inorganic materials. Depending on permeability and degradability, the active substances are gradually released. Continuous release makes drug therapies much better tolerated with fewer side effects.

The capsule material usually has a viscosity of over 10,000 mPas. The volume flow rate is in the range of a few microliters per minute up to 140 ml/min. The precision of the delivery is essential for the quality of the capsules with tolerances  $\pm 1$  %. Micro annular gear pumps by HNP Mikrosysteme are well suited for this demanding task. Due to the high viscosity, high-performance pumps such as m zr-6305 and m zr-11508 are used. Both pumps can be heated or additionally equipped with a gearbox, for small quantities. Depending on the production process, dosing of the coating material can also be considered instead of continuous delivery.

Capsule band sealing is another method of production. To seal the two capsule halves, a liquid quantity in the microliter range is sprayed on in advance. The APIs can also be dosed with pumps from the high-performance series or alternatively, with hermetic inert pumps from HNP Mikrosysteme. The content of a capsule is usually between 0.2 and 1 ml. In cosmetics and food production, the quantities are particularly small. Spheres or pearls are used here. Hermetic inert pumps such as m zr-7255 are also used in production processes for active pharmaceutical ingredients.

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## HNP Mikrosysteme

HNP Mikrosysteme GmbH, located in Germany, develops, manufactures, markets pumps and systems worldwide which deliver small amounts of liquids fast and accurately. Beside several applications in plant engineering, chemical and pharmaceutical processing, mzp-pumps are used in the field of life science and analytical instrumentation.



Picture 1: *hnpm\_encapsulation\_2pumps\_ohg.jpg* (Source HNP Mikrosysteme)  
Precise pumps by HNPM operate in microencapsulation processes



Picture 2: *hnpm\_encapsulation\_2pumps\_mhg.jpg* (Source HNP Mikrosysteme)

### Note to the editors:

If you need to shorten the company name "HNP Mikrosysteme", please use the term "**HNPM**".