

# A116 - FLOWDOSERING IN FARMACIE

APPLICATION NOTE A116-FP08

## PHARMACEUTICAL DOSING

**A major objective in pharmaceutical research is to investigate the effect of newly developed medicines for human disease prevention and treatment. A way to administer pharmaceutical agents to the brain of lab test species is to use in-situ brain perfusion. To this end, the agents are supplied into a blood vessel, and then enter the brain.**

In order to determine exact conversion rates of the medicines and therefore their influence on the species themselves, reproducible dosing is required. Lack of dosing precision is a typical obstacle for the repeatability of such experiments and may lead to serious problems of result interpretation at later stages of research.

Bronkhorst Coriolis mass flow controllers combined with WADose high pressure pumps allow for a reproducible dosing of very small amounts of pharmaceutical agents in a liquid state.



### Application requirements

The dosing devices should exhibit a very low pulsation at ultra-low flow rates in order not to harm the fragile cell tissue of the test species. The internals of the dosing devices need to be easy to clean and to disinfect. Stable temperature conditions are necessary, as temperature changes will influence the transition rates of the chemical compounds and their biochemical conversion by enzymes.

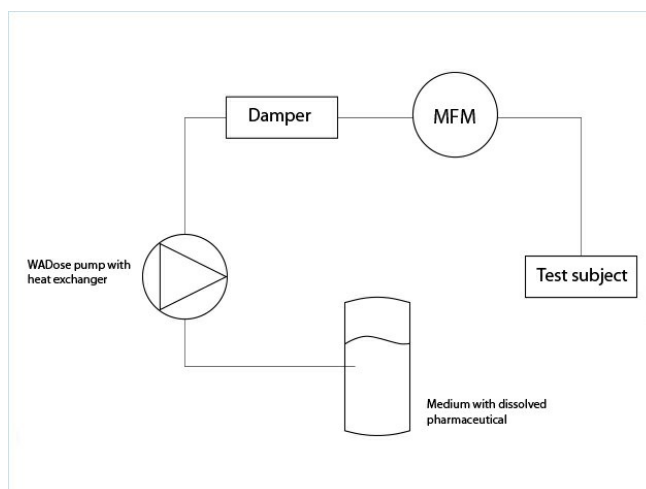
### Important topics

- Enhanced reliability and reproducibility
- Dose very small rates of liquid
- Very low pulsation while pumping, to not harm species' tissue
- Stable temperature

### Process solution

The solution for dosing ultra-low flows of pharmaceutical agents in a liquid state is a combination of a Bronkhorst Coriolis mass flow controller and a WADose HP Lite pump. The mass flow controller controls the pump, and the latter is doing the 'real work' - i.e. builds up the pressure and delivers the flow.

Due to variable fluid properties and small leaks that are present in the pump head, it is difficult for the pump as a stand-alone device to deliver the desired ultra-low flow. In the combined setup, the mass flow controller measures the flow in real-time, and controls the pump by adjusting the flow. Simply 'plug & play' and some configuration work are the only actions that need to be done for the combination to co-operate.



Flow scheme

In order not to harm the species' tissue, the pulsation of the pump is significantly reduced by using a special pulsation damper. Moreover, the temperature of the dosed pharmaceutical agents can be maintained stable with a heat exchanger attached around the pump head.

Typical dosed agents are buffers with a high salt concentration; therefore, the devices' components are subject to harsh conditions. The pumps' important internal components are easy to clean - including an option for seal wash - to avoid contamination, which is essential in a pharmaceutical environment. This also increases the devices' lifetime and minimised possible downtime.

A traditional way to supply these medicines has been by batch-wise dosing them using a simple syringe or syringe pumps. However, those solutions lack of exact control over the actual dose provided during the time, introducing a large uncertainty in the actual dosed amount in the traditional way. Moreover, [WADose high pressure pump](#) improves the throughput of an experiment, as it does not have to be refilled on regular bases. The current solution enhances reproducibility, and excludes errors in the administering to a large extent.

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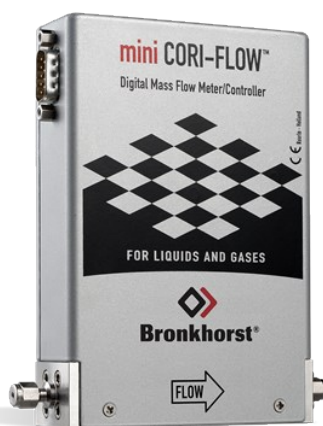
## Recommended Products



MINI CORI-FLOW™ ML120V21

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- Min. flow 0,05...5 g/h
- Max. flow 2...200 g/h
- Drukklasse 5 bar
- Onafhankelijk van vloeistofeigenschappen
- Hoge nauwkeurigheid



MINI CORI-FLOW™ ML120V00

- Min. flow 0,05...5 g/h
- Max. flow 2...200 g/h
- Drukklasse 200 bar
- Onafhankelijk van vloeistofeigenschappen
- Hoge nauwkeurigheid

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