# µSFM

## Micro-Volume Stopped-Flow

- 100 µl stock solution
- 10 shots
- 1 ms dead time

Get **the most** from your **precious sample**

BioLogic
Science Instruments

# 100 µl is all you need...
# for 10 shots!

The µSFM stopped-flow is the latest mixing system from Bio-Logic R&D. The advanced design is based on decades of research and innovation and on the increasing need for micro-volume operations.

The µSFM joins our widely recognized micro-volume quench-flow instrument (QFM-4000) and strengthens Bio-Logic's position as the micro-volume leader for rapid kinetics studies.

The µSFM is a two syringe stopped-flow system. Each syringe is driven by an independent stepping motor so the mixing ratio can be freely changed in Bio-Kine software from 1:1 to 1:9. The combination of high precision motors with precision of micro-volumes glass syringes allows the user to inject a few µl of precious samples at each experiment.

The user only needs to pump the precious sample in an vial directly using the µSFM precision syringe. The syringe is then installed and locked into the µSFM body.

Mixing is achieved in a micro-volume Berger Ball mixer which provides turbulent mixing conditions in the widest range of flow conditions. The cuvette has a 0,8 mm light path and can be used for absorbance, fluorescence or 90° light scattering measurements.

## Micro volume operation

Samples are getting more and more precious for many stopped-flow users.

To minimize sample consumption it is important to reduce both priming volume and the volume per experiment.
Priming volume is the minimum volume to load into the system so you can start collecting data.

The µSFM positions the top of driving syringes as close as possible to the mixer so the priming volume is minimized.

With a stock of 100 µl, user has enough solution to do 10 replicates, with 200 µl of stock number of usable shots is 23 !

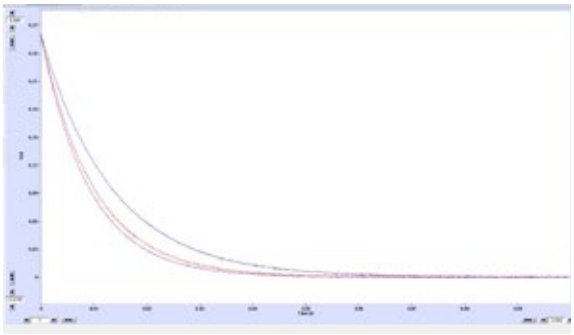
## Easy coupling

The µSFM observation head is similar to the one used in all our stopped-flow models and is compatible with all our spectrometers. Our MOS-200 and MOS-200/M are perfect for all rapid reactions as they offer absorbance, fluorescence and 90° light scattering capabilities. The observation head is linked to the monochromator using a fiber optics and the photomultiplier tube is attached directly to the observation head. With external coupling options the µSFM may be compatible with other systems.

## No compromise on Dead time

Independent stepper motors drive gives the user full control over flow velocity. With this control dead times to 1 ms can be obtained. Measurement of short dead time are enhanced by the responsive stop mechanism and a pre-trigger. The µSFM is the ideal instrument for single mixing experiments with moderate rate constant (below 150 $s^{-1}$).

## Concentration dependence studies

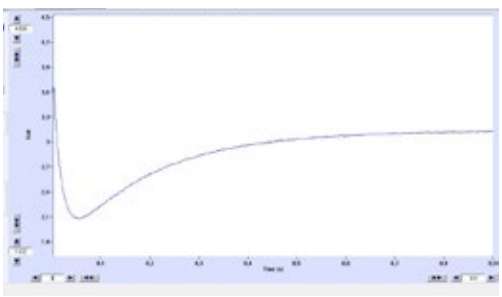


24 shots, 3 concentrations from a 300 µl stock

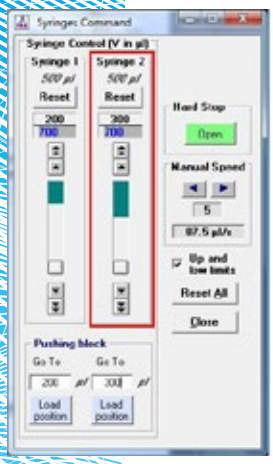
Concentration dependence studies can be done easily with a precious sample thanks to the design of the µSFM, just by loading different concentrations of reagents in the syringe opposite the one containing the precious sample.
After a few replicates the opposite syringe can be removed safely from the µSFM body without interfering with the precious sample. There is no cross contamination or need to reprime the flow circuit! In the example below with 300 µl of precious sample it is possible to test 3 concentrations doing 8 replicates at each concentration, with 24 total experiments !

## Refolding / unfolding studies

µSFM can do 1:9 mixing ratio. Refolding/unfolding experiments are possible when reaction is over after 5-6 s.
With only 50 µl of stock solution the user has enough material to prime the instrument and to collect 9 valuable shots. Only 3 µl of precious sample are used for each shot and without compromising on sensitivity !



Lysozyme refolding starting from 50 µl stock




# User-friendly software

Bio-Kine software is included with the µSFM for system control, data collection, and analysis.
The user sets the mixing ratio, the volume of samples and the flow rate of the injection. Color coded windows display calculated values and alert the user to out if range conditions. Estimated dead time is indicated in the mixing sequence window. Programming a mixing sequence is very intuitive so a new user can be operational in minutes.
Handling glass syringe and small volumes is made easier by using automatic loading functions in Bio-Kine. The user indicates how much sample was loaded in the syringe. The pushing blocks of the µSFM moves to the corresponding position, and a fine adjustment can be made from the driving unit not to lose a single drop of precious solution.

# Temperature control

The driving syringes, the mixer and the cuvette are temperature controlled by a circulating water. They are connected to the same circuit to temperature gradients created when different circuits are used for syringe and cuvette.
The syringes can be removed from the µSFM without stopping the water bath circulator. This allows the user to reload the syringe within a few seconds, reinstall them and continue a series of experiments.
An optional temperature probe is available for installation on the cuvette. It provides temperature readout in Bio-Kine software with 0.1 °C precision.

## SPECIFICATIONS

| Drive mechanism: independent stepping motors | |
|---|---|
| Number of syringes | 2 |
| Syringe type | glass, 500 µl |
| Number of mixers | 1 |
| Mixer type | micro Berger Ball |
| Stop mechanism | electrovalve |
| **Sample Consumption** | |
| Mixing ratio | fully variable from 1:1 to 1:9 |
| Maximum flow rate | 1.8 ml/s |
| Priming volume | 24 µl |
| Minium volume per shot (total) | 24 µl |
| Minimum injection volume | 3 µl |
| **Observation head** | |
| Number of detection windows | 3 |
| Cuvette light path | 0.8 mm |
| Cuvette volume | 2-3 µl |
| Minimum dead time | 1 ms |
| Material | PEEK, FFKM (full solvent compatibility) |

| Synchronization with detection | |
|---|---|
| Trigger | fully programmable; 5V TTL trigger in/ out available |
| Optical coupling | fiber optics or direct attachment |
| **Temperature control** | |
| Temperature range | 0 to +50 °C |
| Temperature control | water bath circulator (optional) |
| Temperature probe | optional PT100 allows direct reading of temperature in Bio-Kine |
| **General** | |
| Dimensions | 200 x140 x 640 mm |
| Weight | 9 kg |
| Communication | USB |
| Power | 110 V - 220 V |

**Note**
**Bio-Kine software and a USB connected hardware interface is included with the µSFM. A PC is required in addition for controlling the µSFM, with a Pentium IV, and windows XP, 7, 8 or 10.**

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