



# μSFM

## Micro-Volume Stopped-Flow

- 100  $\mu$ l stock solution
- 10 shots
- 1 ms dead time

Get the most from  
your precious sample





# 100 $\mu\text{l}$ is all you need... for 10 shots!



The  $\mu\text{SFM}$  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  $\mu\text{SFM}$  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  $\mu\text{SFM}$  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  $\mu\text{l}$  of precious samples at each experiment.

The user only needs to pump the precious sample in an vial directly using the  $\mu\text{SFM}$  precision syringe. The syringe is then installed and locked into the  $\mu\text{SFM}$  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  $\mu\text{SFM}$  positions the top of driving syringes as close as possible to the mixer so the priming volume is minimized.

With a stock of 100  $\mu\text{l}$ , user has enough solution to do 10 replicates, with 200  $\mu\text{l}$  of stock number of usable shots is 23 !



## Easy coupling

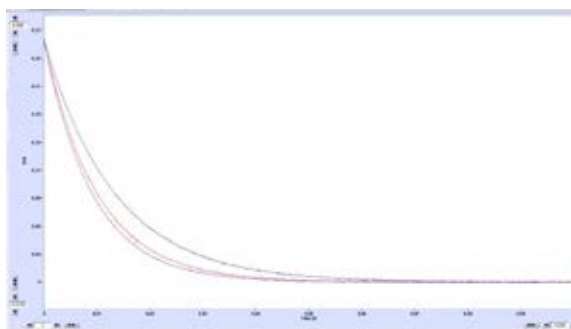
The  $\mu$ SFM observation head is similar to the one used in all our stopped-flow models and is compatible with all our spectrometers. Our MOS-200 and MOS-200/M are perfect for all rapid reactions as they offer absorbance, fluorescence and  $90^\circ$  light scattering capabilities. The observation 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  $\mu$ SFM 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  $\mu$ SFM is the ideal instrument for single mixing experiments with moderate rate constant (below  $150 \text{ s}^{-1}$ ).

## Concentration dependence studies



24 shots, 3 concentrations from a 300  $\mu\text{l}$  stock

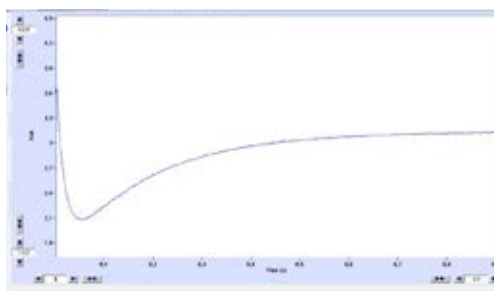
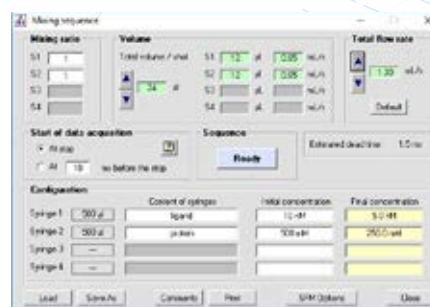
Concentration dependence studies can be done easily with a precious sample thanks to the design of the  $\mu$ SFM, just by loading different concentrations of reagents in the syringe opposite the one containing the precious sample.

After a few replicates the opposite syringe can be removed safely from the  $\mu$ SFM 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  $\mu\text{l}$  of precious sample it is possible to test 3 concentrations doing 8 replicates at each concentration, with 24 total experiments !

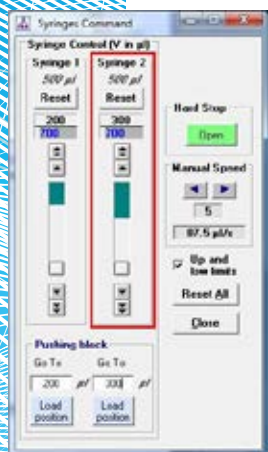
## Refolding / unfolding studies

$\mu$ SFM can do 1:9 mixing ratio. Refolding/unfolding experiments are possible when reaction is over after 5-6 s.

With only 50  $\mu\text{l}$  of stock solution the user has enough material to prime the instrument and to collect 9 valuable shots. Only 3  $\mu\text{l}$  of precious sample are used for each shot and without compromising on sensitivity !



Lysozyme refolding starting from 50  $\mu\text{l}$  stock



## User-friendly software

Bio-Kine software is included with the  $\mu$ SFM 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 of 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  $\mu$ SFM 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  $\mu$ SFM 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 $\mu$ l
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 $\mu$ l
Minimum volume per shot (total)	24 $\mu$ l
Minimum injection volume	3 $\mu$ l

#### Observation head

Number of detection windows	3
Cuvette light path	0,8 mm
Cuvette volume	2-3 $\mu$ l
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  $\mu$ SFM. A PC is required in addition for controlling the  $\mu$ SFM, with a Pentium IV, and windows XP, 7, 8 or 10.**