

## RX2000 rapid kinetics spectrometer accessory Product Information

**The RX2000 can extend the capability of your UV-Vis spectrometer and fluorimeter to enable stopped-flow rapid reaction kinetics measurements to be made.**

This high performance, cost effective accessory enables reactions to be studied that are at least a thousand fold faster than those accessible manually.

The RX2000 is easily the most accomplished device of its type, making use of the latest advances in stopped-flow design, combined with the simplicity, robustness and reliability of high quality instrument engineering. In one

action the RX2000 mixes two reactants, fills a sample cell, stops the flow and simultaneously provides an output trigger. The dual pathlength micro-volume cell employs the latest silica fusion technology to give the highest possible optical efficiency and specification. All crucial sample flow circuit surfaces are biocompatible and chemically inert.



*RX2000 Rapid Kinetics Accessory, with RX/DA Pneumatic Drive (shown in insert)*

The **RX2000** comprises; drive unit, thermostatted umbilical and micro-cell with integral mixer. The drive unit includes; distributing valves and drive syringes mounted in a thermostatted housing, temperature sensor with digital display, stop syringe/adjustable drive volume assembly and anti bounce trigger circuitry. The umbilical between the drive unit and the cell is flexible and is designed to reach into a spectrometer sample compartment. Suitable for use with all UV-Vis spectrometers and fluorimeters.

## Key Features

- **Short Dead Time.** The dead time of the RX2000 is only 8ms, as determined by the protocol of Tonomura et al (*Anal. Biochem* **84**, p370-383, 1978). This enables first order reaction rates over  $200\text{s}^{-1}$  to be measured.
- **Total Thermostatting.** Uniquely, the entire flow circuit of the RX2000 is thermostated (including drive syringes). In addition to providing reliable temperature equilibration, this also has the added benefit of aiding in the rigorous exclusion of oxygen from the entire sample when undertaking anaerobic work.
- **Chemical resistant materials.** Carefully selected materials are used throughout to protect the instrument from aggressive chemical spillage.
- **Wide temperature range.** High performance syringes with canted seals are used exclusively, providing reliable operation over a wide temperature range.
- **Large ratio mixing capability.** The drive syringes can be readily substituted to allow mixing ratios from 1:1 to 1:10.
- **Universal compatibility.** The RX2000 can be fitted in seconds without tools to ANY spectrometer that can accommodate a standard 1cm rectangular cell.
- **Exceptional Sample Economy.** The prime volume of the RX2000 is only 260 $\mu\text{l}$  per reagent (with the standard umbilical length of 60cm) and the subsequent volume per shot is only 100 $\mu\text{l}$ . Other lengths of umbilical can be supplied on request.
- **Adjustable Drive Volume.** The volume required per determination can be altered by adjusting the position of the stopping block/trigger mechanism. This flexibility is of particular importance when performing large ratio asymmetric mixing experiments, and when eliminating air bubbles from the flow circuit.
- **Armoured Umbilical.** The 60cm umbilical is armoured to prevent damage. The observation cell can therefore be positioned through tight turns without constricting the flow of the thermostatt fluid.
- **Triggering.** The RX2000 is provided with the following popular triggering configurations, TTL, open collector and switch contact. The trigger output is accessed by a standard 5 pin DIN socket.
- **Digital Temperature Display.** This integral feature, fitted as standard, indicates the sample temperature in the cell to within  $0.1^{\circ}\text{C}$ .

### Specifications

<b>Dead Time:</b>	8ms
<b>Optical Pathlengths:</b>	2mm and 10mm for absorbance/fluorescence/circular dichroism
<b>Widow Sizes:</b>	30mm <sup>2</sup> and 6mm <sup>2</sup> for fluorescence detection
<b>Cell Material:</b>	Spectrosil
<b>Beam Height:</b>	15mm from base of cuvette (other beam heights supplied on request)
<b>Min. Vol./Shot/Reagent:</b>	120 $\mu\text{l}$
<b>Prime Volume:</b>	260 $\mu\text{l}$ with standard 60cm umbilical (other lengths available on request)
<b>Syringe Volume:</b>	2.5ml with canted seals as standard
<b>Ratio mixing:</b>	Up to 10:1 by using different sized syringes
<b>Temperature Range:</b>	0– 60 $^{\circ}\text{C}$ . Digital temperature display
<b>Triggering:</b>	Anti-bounce, TTL, open-collector and switch-contact
<b>Flow Circuit:</b>	Biocompatible and chemically inert
<b>Construction:</b>	Constructed from chemically resistant materials throughout
<b>Anaerobic Facilities:</b>	An anaerobic accessory (RX/AA) is available to facilitate rigorous exclusion of oxygen
<b>Drive System:</b>	Manually or pneumatically driven (optional accessory RX/DA)
<b>Ease of use:</b>	Simple, portable and self-contained. Fits in seconds with no adapters

## Key Benefits

- **Complete Thermostating (flow circuit and drive syringes)**
- **Lower Volume Requirement**
- **Good Anaerobic Capability**
- **Robust Construction**
- **Digital Temperature Display**
- **Independent Assessment by Spectrometer Manufacturers**

•**Complete Thermostating (flow circuit and drive syringes)**. The RX2000 mixing accessory provides total thermostating. It has a thermostatable water bath around the drive syringes and hence the ENTIRE flow-circuit, including the drive syringes, is thermostatable. This ensures that reagents in the cuvette will be at the correct temperature. Rapid-mixing accessories that do not have a thermostat bath only thermostat the flow lines in the umbilical. This means that each time a rapid-mix drive is performed, the temperature of the reagents in these flow-lines is compromised.

•**Lower Volume Requirement**. The volume of the flow tubing between the drive syringe and the cell is 260ul (for the standard 60cm umbilical – shorter umbilical lengths can be fitted on request). This is far lower than for rapid-mixing units which do not have a thermostat chamber.

•**Good Anaerobic Capability**. Because the entire flow circuit is thermostatable and the drive syringes are not exposed to the surroundings, the RX2000 is highly suitable for anaerobic work. Rapid-mixing units which do not have a thermostat chamber are not suitable for anaerobic work because the syringes and flow-circuit cannot be isolated from the surroundings other than by mounting the entire unit in a glove box or in a glove bag; this is expensive and extremely cumbersome to use.

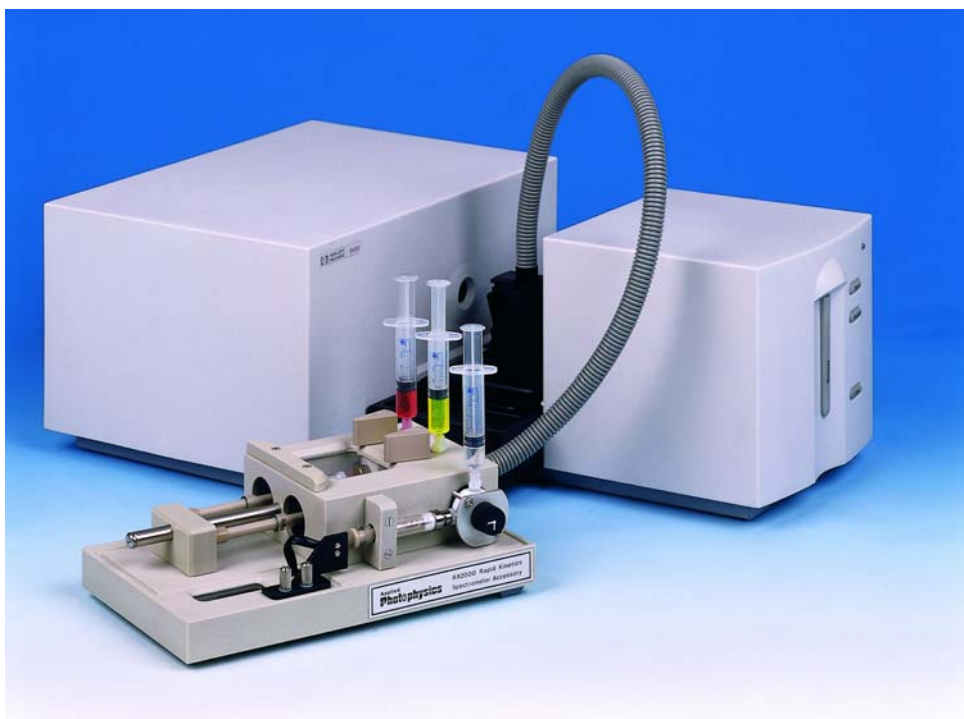
•**Robust Construction**. We strongly recommend that the build quality of the RX2000 is compared with other rapid accessories. The superior quality of the RX2000 will be evident from a comparison of good resolution images of the products (see below for images of the RX2000). The thermostat bath on the RX2000 also serves to protect the drive syringes from accidental damage and chemical spillage.

•**Digital Temperature Display**. A temperature probe is fitted inside the thermostat bath of the RX2000, and a digital temperature display is provided as standard.

•**Independent Assessment by Spectrometer Manufacturers**. Two spectrometer manufacturers; Agilent Technologies and Varian Inc (now part of Agilent Technologies), directly compared the RX2000 with other spectrometer accessories and both found the Applied Photophysics RX2000 to be the superior instrument in terms of capabilities, performance and build quality.



*RX2000 interfaced with a Thermo Evolution 300 spectrometer (Photo: courtesy of Thermo Electron)*



*RX2000 interfaced with a Agilent HP 8453 spectrometer*

For more information about the **RX2000** or other Applied Photophysics products visit our website at [www.photophysics.com/products](http://www.photophysics.com/products) or email us at [sales@photophysics.com](mailto:sales@photophysics.com)