CAPE Technologies

High Performance Immunoassay Kits

Recommended Equipment Purchase List (EL-001)

The following list contains only the equipment to be provided by the user for performing the immunoassay portion of the analysis. For a list of the equipment necessary for sample preparation prior to the immunoassay analysis, consult the appropriate Application Note.

1. Pocket Colorimeter II (preferred)

This is a simple battery powered reader which is set up for the reading wavelength (450 nm) used in CAPE Technologies kits. The reader is fitted with an adapter which is custom made for the size tube (12x75 mm) used in CAPE Technologies kits. Tubes are read directly, removing the need to transfer liquids to a cuvet or microplate for reading. Output is an LCD display; data must be recorded by hand. Power is supplied by 4 on-board AAA batteries. Performance is equal to or superior to the alternative reader in 1A below.

Source: Available from CAPE Technolgoies
Model: Hach Pocket Col orimeter II
Contact: CAPE Technologies, 207-741-2995 or info@cape-tech.com

1A. Portable Differential Photometer (alternative to 1)

This is a portable dedicated tube reader designed specifically for both the reading wavelength (450 nm, interference filter) and the tube size (12x75 mm) used in this kit. Tubes are read directly, removing the need to transfer liquids to a cuvet or microplate for reading. Output is an LCD display; data must be recorded by hand. Power is supplied by an on-board NiCd battery; an AC adapter is included (both 110 and 220 V are available). This reader can be used all day on battery power after charging overnight. All EPA Method 4025 validation work and Superfund Field Demonstration work performed at CAPE Technologies used this reader.

Source: Artel, Inc., Westbrook ME
Model: DP
Contact: Phone 888-406-3463 or 207-854-0860; fax 207-854-0867; email info@artel-usa.com
Note: Delivery will take 4 weeks after placing an order (call or email to inquire).

1B. Other readers (alternative to 1)

It is possible, though not recommended, to read the endpoint of CAPE Technologies immunoassays using instruments other than the two above. These can include a wide variety of spectrophotometers capable of reading at 450 nm. In most cases, the liquid must be transferred for reading in a cuvet designed for that instrument. However, it is NOT acceptable to transfer the liquid to a microplate for reading. Significant variation in path length (the liquid level within the microwell) can occur, contributing large errors associated solely with the vertical path reading process.

2. Positive Displacement Micropipettors (preferred)

The preferred pipettors for handling samples and spikes are shown at right. Both are adjustable positive displacement micropipettors which use disposable glass capillaries. The volume ranges of these two pipettors are from 2 to 10 µL and 20 to 100 µL. The volumes required for the immunoassay and sample preparation range from 5 to 100 µL for spiking solutions, standards, and samples. The 10 µL model (lower) has a highly polished stainless steel shaft and is easily cleaned. The 100 µL model (upper) uses a larger diameter capillary which seals against a fluoropolymer tip, which is easily replaced if damaged. The larger size is used for sample delivery in the immunoassay. The smaller size is used for delivering spiking solutions to samples and other low volume measurements. These pipettors function like Hamilton syringes, but with two important advantages. They allow the user to easily preset the delivery volume for rapid pipetting that is both accurate and precise. They also have easily removable disposable capillaries to avoid contamination from high level samples and standards.

For pipetting of samples during final loading of the immunoassay tubes, it is possible to use the 100 µL model in the same fashion as an HPLC/GC autosampler. The same capillary is used for successive samples, but only after rinsing several (3 to 5) times with methanol to avoid carryover. This increases pipetting speed and also decreases the need for replacement capillaries. Replacement of contaminated capillaries and verification that carryover does not occur are the responsibility of the analyst and remain a crucial component of normal QC/QA.

Pipettor external dimensions are also very important. The 100 µL size is used for recovery of sample after evaporation (step I5/J7 of the DF1 Kit Insert [IN-DF1] and the PCB1 Kit Insert [IN-PCB1]) and must be able to reach to the bottom of the tubes (such as 16x125 mm) which are used for sample evaporation. The digital version of this pipettor (called a Digital Microdispenser) has a wider body which prevents the capillary from reaching the bottom of 16x125 mm tubes and is therefore not acceptable.

Source: Fisher Scientific (Made by Drummond Scientific as Dialamatic Microdispenser)
100 µL Model (essential): Drummond # 3-000-275, Fisher # 21-170-15D
10 µL Model (strongly recommended): Drummond # 3-000-210, Fisher # 21-170-15A
These can also be purchased from CAPE Technologies
Includes spare parts, repair and calibration tools, and one pack of capillaries.

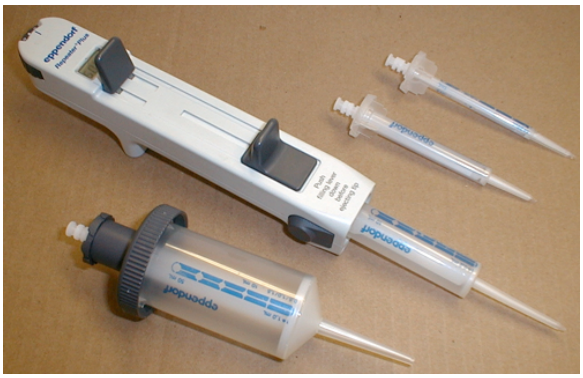
Distributor list and other information available at (http://www.drummondsci.com/products/pd_02.html).

Additional disposable capillaries:
100 µL Model uses Drummond # 3-000-275G or Fisher # 21-169F
10 µL Model uses Drummond # 3-000-210G or Fisher # 21-169A

Hamilton syringes can also be used, but require more extensive rinsing than disposable capillary pipettors to avoid cross-contamination. A digital alternative to the Dialamatic Microdispenser is available from Drummond at about twice the cost. They are called Digital Microdispensers and the 10 and 100 µL sizes, respectively, are Drummond numbers 3-000-510 and 3-000-575. These pipettors use the same capillaries as the Dialamatics. However, the note above regarding pipetor dimensions must also be carefully observed.

3. Eppendorf Repeater Plus Pipettor (preferred)

This is an adjustable positive displacement repeating pipettor which uses disposable polypropylene tips. Delivery varies from 1 µL to 10 mL per stroke, depending on tip and pipettor setting. The tips used in the immunoassay are the 50 mL size for delivering 1 mL/tube wash solution and the 10 mL size for delivering 0.5 mL/tube of all other reagents. Sample preparation may also use 1.0 mL tips or other sizes for smaller delivery volumes. This pipettor automatically senses the tip size and displays the volume to be delivered. When volume setting or tips are changed, the pipettor displays the new volume to be delivered.



Source: Fisher Scientific (Made by Eppendorf for Brinkmann, distributed by Fisher and others)
Model: Eppendorf Repeater Plus, Brinkmann # 22-26-02-01, Fisher # 21-380-9
Distributor list and other information available at the Brinkmann web site (http://www.brinkmann.com/)

Note 1: The assortment pack of polypropylene tips includes 5 each of 9 sizes (Brinkmann # 022266624, Fisher # 21-381-116). Although these tips are intended to be disposable, they can actually be reused many times before their performance deteriorates.

Note 2: To use the 50 mL tips, it is necessary to also have a non-disposable adapter. One of these is supplied in the assortment pack in Note 1. Extras (Brinkmann # 2226-6705, Fisher # 21-381-100) can be purchased individually; at least one extra is recommended.

3A. Other Positive Displacement Repeating Pipettors (alternative to 3)

Numerous other companies manufacture and sell similar repeating pipettors. The volumes which are most frequently used in the immunoassay are 0.5 mL and 1 mL per stroke. Any pipettor which can repeatedly deliver accurate and precise aliquots of 0.5 and 1.0 mL can be used.

Source: Various distributors
Model: Eppendorf Repeater, Oxford, LabSystems, BrandTech, and others