



High Performance Immunoassay Kits

Sample Preparation Equipment List (EL-002)

This list contains equipment that may be required for sample preparation and must be provided by the user. No cost estimates or manufacturer information are given here. To understand the following comments completely, read the kit insert IN-DF1 first. For a list of the equipment actually required for preparation of your samples prior to the immunoassay analysis, consult the appropriate Application Note.

1. Chemical fume hood

A solvent exchange step is required to go from non-aqueous systems used in sample preparation to a methanol-based system for the immunoassay procedure. For health and safety reasons, this step should be performed in a chemical fume hood. In addition, CAPE Technologies sample preparation protocols often use materials that require a fume hood for safe use.

This item is essential to all applications.



2. Sample evaporation system

The solvent exchange step noted above can be done easily with both a heat source and clean gas supply. For health and safety reasons, this step should be performed in a chemical fume hood. In addition, CAPE Technologies sample preparation protocols often use solvents and other materials that require a fume hood for safe use. The temperatures specified in CAPE Technologies Application Notes range up to 75°C. for evaporating toluene. Heat can be applied to the samples by either water bath or dry block heater. Nitrogen is preferred, but clean compressed air can also be used.

It is critical that the gas source be oil free to avoid contamination of the sample.

This item is essential to all applications.



3. Benchtop centrifuge

Centrifugation is required after solvent exchange to concentrate the non-volatile portion of the keeper residue in the bottom of the sample evaporation tube. This is required for complete and consistent recovery of the sample. Because this viscous residue must be dissolved in 120 µL or less of methanol, it is impractical to accomplish this by rinsing the tube with volatile solvents. In addition, some sample preparation protocols require separation after either extraction or liquid phase oxidative cleanup. The centrifuge buckets should be able to hold vials 97 x 28 mm for extraction, vials 68 x 20 mm or smaller for oxidation, and tubes 16 x 125 mm or smaller for solvent exchange. The maximum force required is 1-2000 x g. A timer is helpful, but not required.

This item is essential to all applications.



4. Vortex mixer

The final sample preparation step for all applications is the addition of methanol to the keeper residue in the solvent exchange tube. It is crucial to mix vigorously for several seconds to dissolve all of the viscous keeper residue in the added methanol. Any mixer similar to the one at right will be adequate for this task.

This item is essential to all applications.



5. Top loading balance, 0.1 g

Soils and other solid samples are generally weighed to the nearest 0.1 g. Any balance is acceptable, but top loaders are most convenient. A removable pan is helpful for cleanup. The far right balance is battery powered, inexpensive, and has been used successfully for several years by analysts performing environmental immunoassay tests.

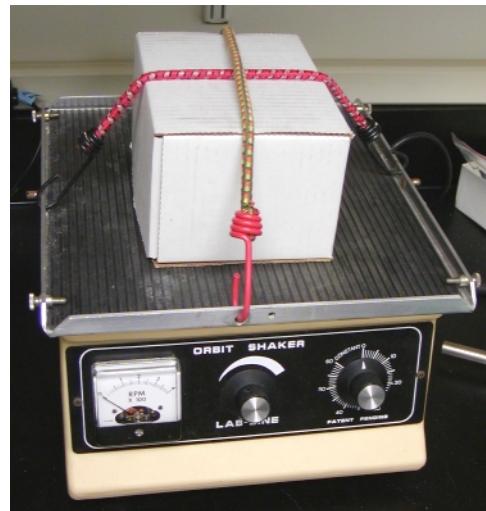
This item is not needed for every application.



6. Orbital Platform Shaker

Extractions of solid samples and liquid phase oxidative cleanup steps require this type of shaker. Because mixing times may be 1 hour or more, shaking by hand is not a practical substitute. Vials of many different sizes can be packed in a box padded tightly with soft foam and held down by elastic cords. When agitation by platform shaker is specified, it is generally vigorous, such as 350 revolutions per minute, and requires vials to lay flat on their sides. A stable location on a skid-proof surface is essential. A platform of 25 x 30 cm (approx. size of shaker at right) is more than adequate in size.

This item is not needed for every application.



7. Vacuum pump

A small diaphragm vacuum pump like the one at right is preferred for starting solvent flow through the coupled column cleanup system contained in Sample Preparation Kits labeled SP2 and higher. The column assembly is plugged at the bottom, attached to the SP3 pressure manifold, loaded with solvent, and the headspace is depressurized using the pump. When the system is returned to ambient pressure, the solvent is drawn rapidly down through the columns. This procedure is quick and easy and virtually eliminates air bubbles in the columns. For obvious safety reasons, the pump must be isolated from the solvents used in the sample preparation system by locating it outside the hood and venting the exhaust back into the hood.

This item is not needed for every application.



8. Large capacity centrifuge

A larger centrifuge like the one at right is useful for preparation of certain types of samples in some applications. The sample can be extracted by shaking in bottles such as those in the picture (125 or 250 mL) and the supernatant extract separated by centrifugation. This is most likely to be used for very low level analysis where sample size is larger than can be handled in 40 mL vials and the small centrifuge in 3 above.

This item is not needed for every application.



9. Sample rotator

A variable speed sample rotator like the one at right is useful for preparation of certain types of samples in some applications. It provides a less aggressive mixing alternative to the orbital platform shaker in 6 above. Samples which might result in stable emulsions when shaken vigorously can be mixed effectively, but much more gently using a sample rotator. This alternative is especially important for tissue and food samples undergoing acid hydrolysis and solvent extraction.

This item is not needed for every application.



10. Bottletop dispenser

The repeated pipetting required for column cleanup and other sample preparation procedures can be done easily with an adjustable bottletop dispenser. Teflon, glass, and stainless steel construction maintains the solvent purity required for ultratrace analysis. The dispenser pictured at right has been fitted with a length (approx. 0.5 m) of FEP teflon tubing so that the solvent can be dispensed at some distance away from the bottle. The dispensing end of the tubing is fitted with a piece of 16 g stainless steel tubing approx. 6-7 cm long. This allows insertion of the tubing through the stopcocks of the SP3-ST pressure manifold, so that solvent is delivered directly into the column headspace without coming in contact with the manifold hardware.

This item is not needed for every application.



11. Air compressor

A small oil-free air compressor can be used for both pressurization of manifolds during extract cleanup and for air streams during sample evaporation. The configuration shown at right uses a multi-step approach to minimize impurities, including diaphragm pump (behind blue box), a large Drie-Rite moisture trap (upper left), and smaller downstream filters (not shown) for final removal of moisture and oil. The preferred operating pressure for sample evaporation and column pressurization is typically around 0.5 bar (7psi), as shown on the gauge in the photo inset.

Oil based pumps should be avoided because of their potential for adding non-volatile oils to samples during their preparation.

If a compressed air system is not available, a compressed gas cylinder (typically nitrogen, but possibly also air) can be used for manifold pressurization and sample evaporation.

This item is needed for most, but not every application.

