EICHROM'S VACUUM BOX SYSTEM (VBS)

(SETUP AND OPERATING INSTRUCTIONS)

1. SCOPE

1.1. This procedure provides setup and operation instructions for the vacuum box system, 'VBS'. It is a general guide and is designed to acquaint you with the use of the vacuum box system. For specific instructions on performing a method for the determination of radionuclides, please refer to the appropriate Eichrom method, for example ACW03 VBS. Check with Eichrom and our web site, http://www.eichrom.com/eichrom for methods with the 'VBS' suffix.

1.2. This method does not address all aspects of safety, quality control, calibration or instrument set-up. However, enough detail is given for a trained radiochemist to achieve accurate and precise results for the analysis of the analyte(s) from the appropriate matrix, when incorporating the appropriate agency or laboratory safety, quality and laboratory control standards.

2. APPARATUS

- Cartridge reservoirs, 10mL Cartridge Reservoir, Part: AR-25-RV10 or 20mL Cartridge Reservoir, Part: AR-25-RV20, these come 25 to the package
- Eichrom resin cartridge, prepackaged cartridge
- Eichrom vacuum box system, Part: AR-24-BOX (24 hole box) or AR-12-BOX (12 hole box)
- Inner centrifuge tube rack, (included with AR-24-BOX and AR-12-BOX), the rack accommodates twenty-four or twelve 50mL centrifuge tubes
- Inner liner (optional), Part: AR-24-LINER for 24 hole box or AR-12-LINER for 12 hole box
- Inner tubes (replaces white inner tips) - Eichrom Part: AR-1000-TUBE-PE, 1000 per package
- Pump suggested, dry pump with 115 V, 60 Hz Fisher Part: 01-092-25 (or equivalent) or house vacuum
- Stop watch or timer
- Vacuum gauge, (included with AR-24-BOX and AR-12-BOX), this includes a valve for controlling vacuum

- Vacuum manifold plugs- (included with AR-24-BOX and AR-12-BOX), 50 per bag
- Yellow outer tips, (Eichrom Part: AR-1000-OT), these come 1000 to the package

3. SETUP OF VACUUM BOX

3.1. Place the vacuum box tube rack (with 50 mL centrifuge tubes) into the vacuum box. When it is not necessary to collect the eluate from each cartridge separately, the optional vacuum box inner liner may be used.

3.2. Screw the vacuum gauge into the hole located on the side of the box, near the bottom.

3.3. Place the lid on the box and adjust it if required to assure a proper fit.

3.4. Take 12 or 24 yellow outer tips and fit them into the openings on the lid.

3.5. Take 12 or 24 inner tubes and place them into the yellow tips. The tubes cannot be used alone as they will not form an adequate seal with the box holes.

3.6. For each sample solution, fit a resin cartridge into a tube.

3.7. Connect Cartridge Reservoir to each cartridge top.

IMPORTANT: The unused openings on the vacuum box must be sealed. Vacuum manifold plugs should be used to plug unused tubes to achieve good seal during the operation of the box. 50 plugs are supplied with every vacuum box supplied from Eichrom. Additional plugs can be requested from Eichrom, TRISKEM or distributor for a nominal or no charge. Alternatively, unused holes on the vacuum box can be sealed using scotch tape affixed directly to the vacuum box lid.

3.8. Attach the vacuum gauge to the vacuum source (pump or house vacuum).

3.9. Add preconditioning solution into each resin cartridge. (see appropriate method for volume and concentration).

3.10. Turn the vacuum on. (If the vacuum has been running, adjust the vacuum pressure to zero first using the valve located on the vacuum gauge).

3.11. Slowly raise the vacuum pressure to achieve **1-2 mL/minute** flow rate (This can be accomplished by manipulating the valve on the vacuum gauge and/or any main valve associated with the vacuum source. A stopwatch can be used to adjust the flow rate during this step.

IMPORTANT: For best results the flow rate for the load and strip solutions should be adjusted to 1-2 mL/minute. For the rinse solutions, up to 3 mL/minute can be used, unless specified in the procedure.

NOTES:

1) **SOME SOLUTIONS MAY FLOW STEADILY WHILE OTHERS MAY TAKE LITTLE MORE TIME TO PASS THROUGH THE CARTRIDGES. AFTER THE SOLUTION HAS PASSED THROUGH THE FASTER FLOWING CARTRIDGES, THE VACUUM CAN BE INCREASED FOR THE ONES WHICH ARE SLOW FLOWING.**

2) **IT IS PERFECTLY FINE TO LET THE CARTRIDGES GO 'DRY' BETWEEN THE ADDITIONS OF NEW REAGENTS AND WHILE SLOWER CARTRIDGES COMPLETE EACH ELUTION STEP. HOWEVER, IT IS NOT RECOMMENDED TO STOP PART WAY THROUGH A SEPARATION PROCEDURE FOR EXTENDED PERIODS OF TIME (OVERNIGHT). STOPPING IN THE MIDDLE OF A PROCEDURE MAY ADVERSELY AFFECT ANALYTE RECOVERY AND PURITY.**

3) **IN THE CASE OF 2-3 CARTRIDGES IN TANDEM, EXTRA VACUUM PRESSURE WILL BE REQUIRED TO ACHIEVE REQUIRED FLOW RATES. THE VACUUM BOX HAS BEEN TESTED AND IS SAFE TO OPERATE UP TO 30 INCHES OF HG. FOR MOST APPLICATIONS, THE BOX NEED NOT EXCEED 10 INCHES HG VAC. BECAUSE OF SAMPLE VARIABLES, IT IS RECOMMENDED THAT THE ACTUAL OBSERVED FLOW RATE OF YOUR SAMPLE BE USED TO ADJUST THE VACUUM, NOT THE GAUGE READING.**