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**IMPORTANT!**

Advanced Troubleshooting

## PROPER HARDWARE SELECTION AND MAINTENANCE IS YOUR KEY TO EXTRACTION SUCCESS

The use of extraction hardware equipped with narrow bore tubing solvent guides combined with a small vacuum pump is not recommended with our Detectabuse or Multi-Prep methods that require vacuum drying.

When this type of setup is used, the volume of vacuum or pressure induced air that can be passed through each column is severely restricted and the resultant airflow is insufficient to properly dry the columns. The incomplete removal of aqueous residue usually results in pigmented eluates and/or inconsistent recoveries. The condition is not easy to detect because the vacuum gauge may indicate that a proper vacuum level (5-7"GV-65 column: 12" Detectabuse-R column) has been achieved.

We recommend that you use the 5.5 cfm Gast Pump (or equivalent) that we list in our Price List for each workstation. It is also important that the pump tubing and connectors be of the same I.D. as the pump and hardware hose nipple.

**There are two direct ways to determine if proper vacuum is achieved without depending upon a vacuum gauge reading, which is often inaccurate:**

1. Place your gloved hand on top of a column after turning on the vacuum pump and feel for a strong suction (glove will pop when you pull it off column). If the suction is weak (easy to remove hand) then drying is inadequate.
2. After turning on the vacuum pump and checking to see that all unused holes are plugged or covered with tape, the column mounting plate should be held in place by the vacuum and not separate from the vacuum box when lifted. If the column mounting plate does not immediately pull down against the vacuum box, we suggest pushing down on each side of the plate to help seat the gasket. If the plate is still not pulled down against the vacuum box it almost always means that the vacuum source is inadequate.

**Possible reasons for poor vacuum:**

1. Fittings are not air tight.
2. The filter housing can is corroded and punctured.
3. The vacuum is restricted by use of improper tubing or connectors.
4. The vacuum tubing is too soft and collapses under vacuum.
5. The pump needs maintenance due to wear or contamination of the rotary head. Refer to Pump insert for more details.

### **Carryover Contamination.**

Most forensic laboratories use disposables whenever possible in order to avoid the errors caused by "carryover" contamination. Workstations that use stopcocks to control flow rate and narrow bore tubing to guide the elution solvent into collection tubes counteract the advantage of using disposables. If the solvents "guides" have not been scrupulously cleaned before each use, carryover from previously run samples could easily be serious source of error.

The fact that none of the Detectabuse procedures require the adjustment of individual column flow rates with stopcocks enables us to position the luer tip of the column directly through the Multi-Prep column mounting plate. With this design the column eluate passes directly to waste or into the collection tube without contacting any portion of the hardware. This design is not only forensically correct; it also eliminates the aforementioned flow rate problems.

**One last comment about hardware** – The Multi Prep workstation does not require the use of a supplemental trap to protect the pump if the waste pan is emptied after each run and the vacuum line is connected to the hose nipple on the column mounting plate. The stopcock should, of course, be in the closed position on the waste pan drain tube. Extraction systems, which draw the vacuum from the bottom of the workstation, require a trap between the pump and workstation to prevent liquids from being drawn into the pump. These traps are often a weak link in the system. The hose fittings often leak, lowering the achievable vacuum level. We have also found that these traps were often set up for use with a small vacuum pump. The vacuum hose, which was adequate for the small pump, often collapses under the high vacuum achieved by our 1/3 H.P. pump.