



September 2012 Safety Topic of the Month

HPLC Safety

High performance liquid chromatography, also known as high pressure liquid chromatography (HPLC) is an analytical technique used to separate, identify, quantify, and purify individual components of a mixture. The technique is very common in biological and chemical research. Organic solvents such as acetonitrile, methanol, methylene chloride, trifluoroacetic acid, chloroform, hexane, and ethyl acetate are commonly used in this process. These solvents are flammable, toxic and carcinogenic and need to be managed safely. The solvents are typically drawn into the unit from the original container and the empty containers are then reused to collect solvent waste.

In analytical laboratories, it is common practice to “seal” bottles of HPLC solvents with aluminum foil or parafilm or to leave them completely open. This results in exposures to lab workers of hazardous solvent vapors. In addition, hazardous waste regulations require that containers of hazardous waste be kept closed and sealed except when adding or removing waste. Table 1 shows examples of waste collection practices that are not in compliance with hazardous waste regulations.

In use HPLC solvent bottles and waste containers must be kept closed and sealed. Options include purchasing specially designed caps for that purpose. For waste containers, caps can be purchased that allow for venting through either a vent line that can be directed to an exhaust hood or a filtration system. Examples are shown in Table 2 and links to websites for typical products are provided below. Existing caps can also be modified as shown in Table 3.

Discussion Topics

- 1) Review HPLC solvent management practices. Inspect HPLC waste bottles. The bottles need to be properly labeled as hazardous waste and must have closed caps. See Table 2 and Table 3 for options. In use solvent bottles should also have closed caps.
- 2) Verify that exhaust from venting the solvent containers is either discharged into an exhaust hood (directly or with tubing) or is captured by a solvent filtration system.
- 3) Review options for reducing solvent exposures such as minimizing the amount of solvent in use. Purchase the smallest container feasible. Store flammable solvent containers that are not in use in a flammable chemical storage cabinet.

Table 1: Improper HPLC Waste Collection Practices





Open Waste	Open Waste	Foil	Parafilm®
			

Table 2: Proper HPLC Waste Collection Options for Purchase

Safety Cans	Ported (no threads) Cap	Four Port (threaded) Cap	Solvent Bottle Cap
			

Table 3: Proper HPLC Waste Collection with Modified Caps

Exhaust Filtered	Two Line Carboy	Two Line Glass 4 L	Exhaust Filtered
			

References

Purdue University Radiological and Environmental Management Website -
<http://www.purdue.edu/rem/hmm/hplcwaste.htm>

AppliChem SafetyFirst Caps -
http://www.applichem.com/fileadmin/Application_Notes/Applications_No10_SafetyFirst_Caps_100628.pdf

Omnifit Solvent Safety Bottle Caps –
http://www.omnifit.com/cart/store/comersus_listOneCategory.asp?idCategory=346

Vaplock Closed Systems - <http://www.vaplock.com/index.html>