CPLabSafety™
Formerly California Pacific Lab Safety

Does Your Open Waste Container Make You Fume?

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CPLabSafety™
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Safety ECOLOGICAL Funnel™

Products for a safer, healthier, and more productive work environment!

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"Evaporation is a Major Problem In Laboratories"

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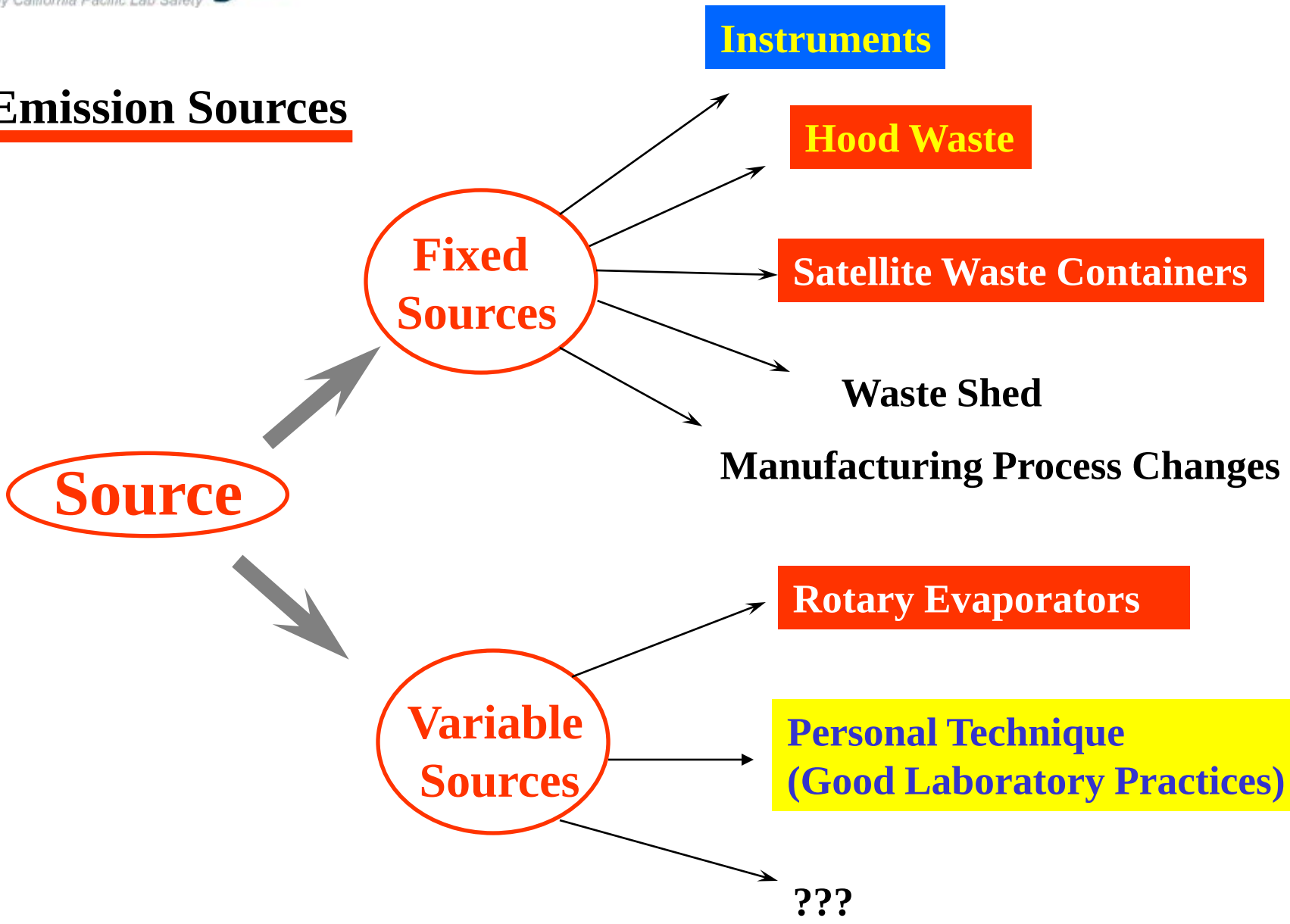
Emission Sources



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Typical solvents used in the laboratory

Solvents	TWA(ppm)	IDLH (ppm)
Dichloromethane	25	500
Acetonitrile	40	4,000
Acetone	700	20,000
Ether	400	19,000
THF	200	20,000
DMF	10	3,500
Hexane	50	5,000
Heptane	85	5,000
Pyridine	5	3,600
Trimethylmine	10	NA
Triethylamine	10	1,000
Ethylacetate	400	10,000

TWA - Time Weighted Average (can be exposed to in 8 hour period)
IDLH - Immediately Dangerous to Life or Health Concentrations
PPM – Parts Per Million

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Risks & Benefits

- Reduce laboratory odor
- Reduce ozone depleting solvents emission
- Reduce employee & public exposure to potentially hazardous chemicals
- Reduce incidents of chronic exposure
- Reduce accidental fires
- Mitigate future liabilities
- Stop open waste containers - It is the law - $5000 penalty per incident
- Save money by improving productivity and health and safety

Instrument Emission

- **HPLC**
- **DNA Synthesizer**
- **Protein Sequencer**
- **Protein Synthesizer**
- **MPLC**
- **Gas Chromatograph**

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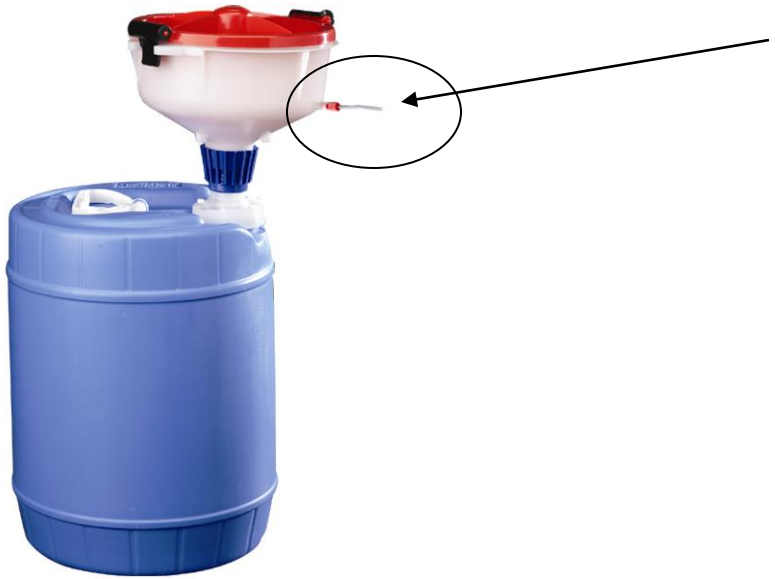
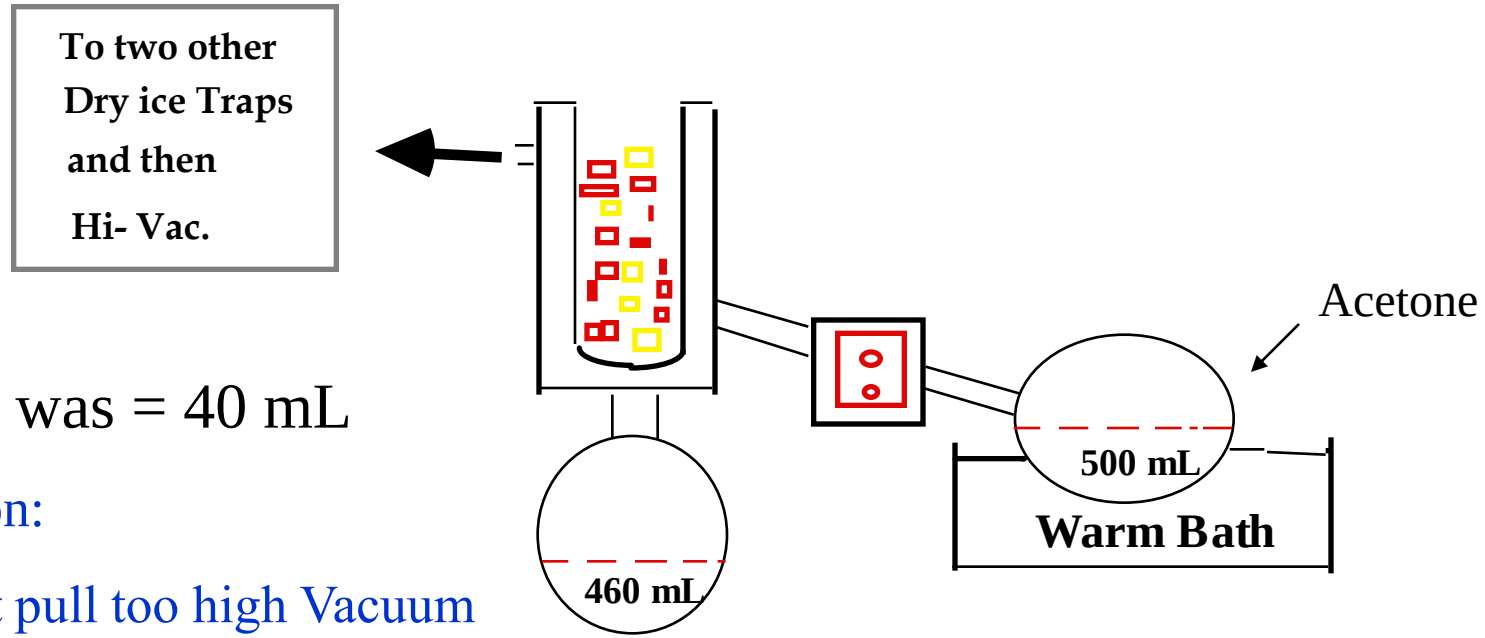
Preliminary Emission Study

	Instrument		
Instr.	Loss	Time	Emission/Hr
waste	in (mL)	(Hr)	(mL)
390Z	380	168	2.26
394 DNA Syn	160	114	1.40
490A seq.	40	114	0.35
431A Syn	115	114	1.01
			5
Average loss per Inst. /day =			30



HPLC Waste Stream

Rotary Evaporator



Loss was = 40 mL

Lesson:

Don’t pull too high Vacuum

Good Laboratory Practices (GLP)

- **Proper use of the rotary evaporator**
- **Beaker, Flask or Erlenmyer in the hood**
- **Pressure transfer of liquids where possible.**

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Open Beaker in the Fume Hood

150 mL of solvent in a 250 mL capacity beaker sitting in a hood at ~ 700 CFM (100 LFM)

Solvent	Loss /Hour	Loss / Day
CH_2Cl_2	20 mL	480 mL
t-$BuOCH_3$	25 mL	600 mL
ACN	10 mL	240 mL
Acetone	25 mL	600 mL

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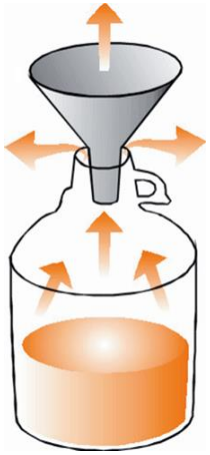
Common Waste Container

Evaporation



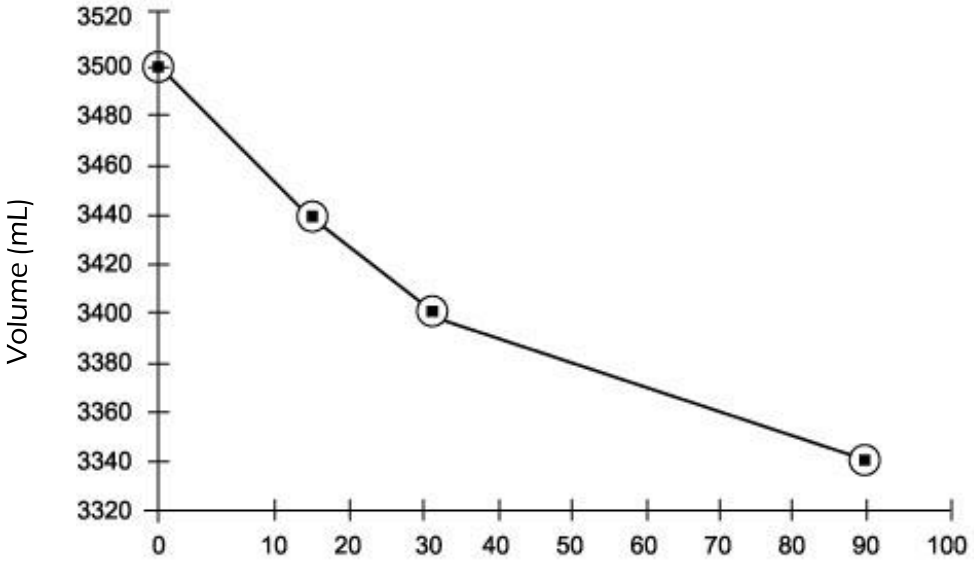
Problem

No Evaporation

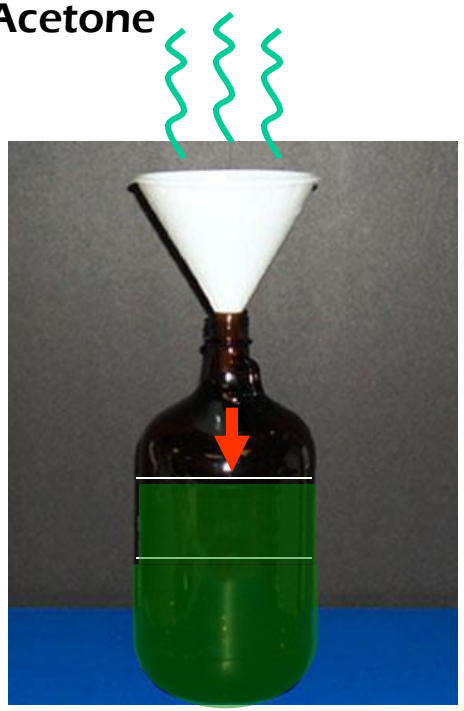
Solution

Solvent evaporation rate

4 Liter bottle containing 1 Liter THF, and 1Liter Acetone and 1.5 Liter DCM



Hours left open with a funnel in a hood



Common Waste Container

Results showing rate of evaporation of a mixture of solvents contained in a uncapped 4 Liter bottle using a common funnel. All measurements were done in a hood, open at 100 FLM.

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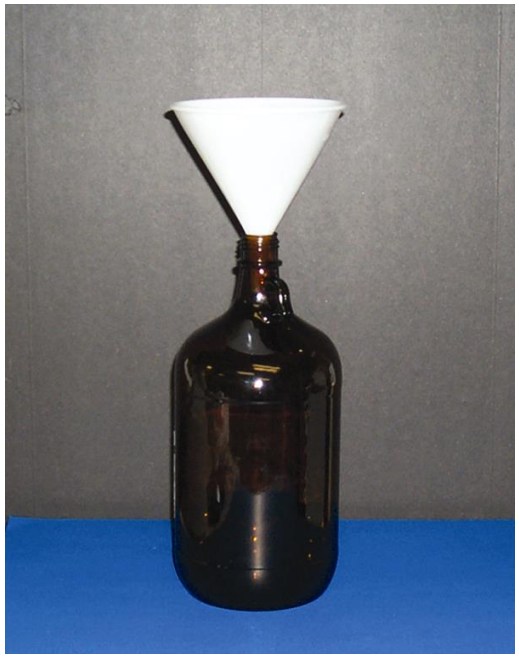
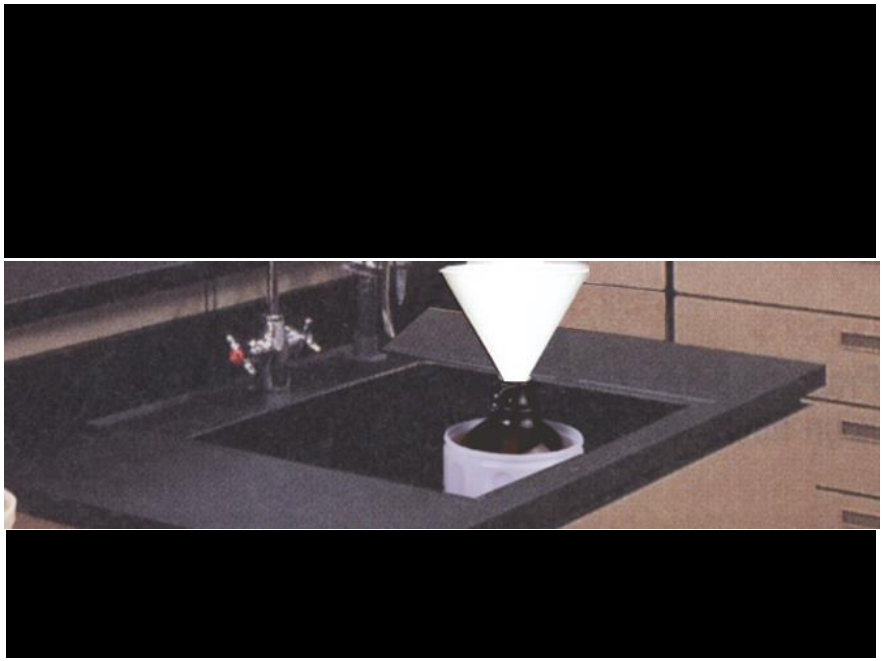
Hood / Satellite Waste Containers

Problem





Common Waste Container

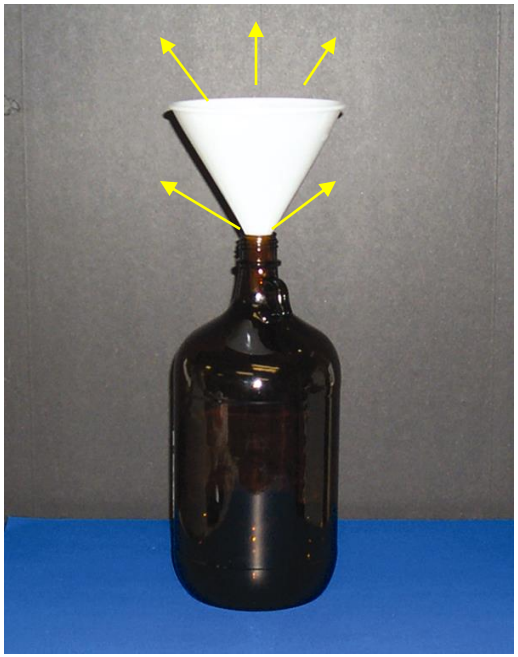
Loss of Solvents Per Year

93 Hours ====> ~ 160 mL
(1.7 mL / Hr)

8760 Hours in 1 year

Assuming this will be true throughout the year, then our loss per 4 Liter bottle will be : 15,070 mL (15 Liters)

Problem



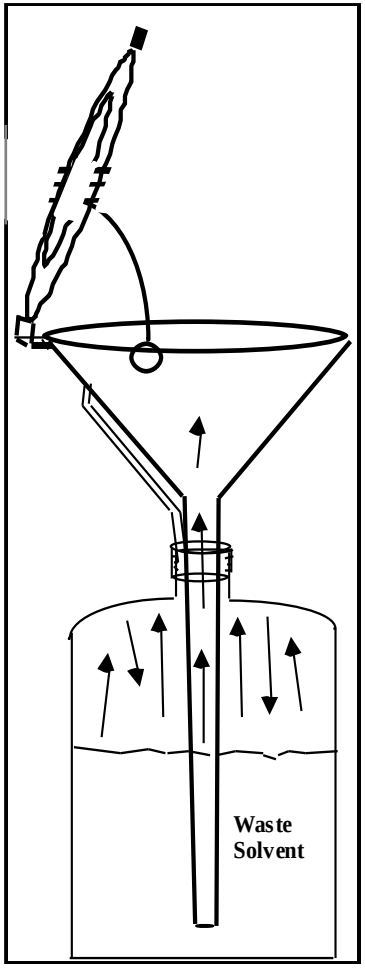
Common Practice

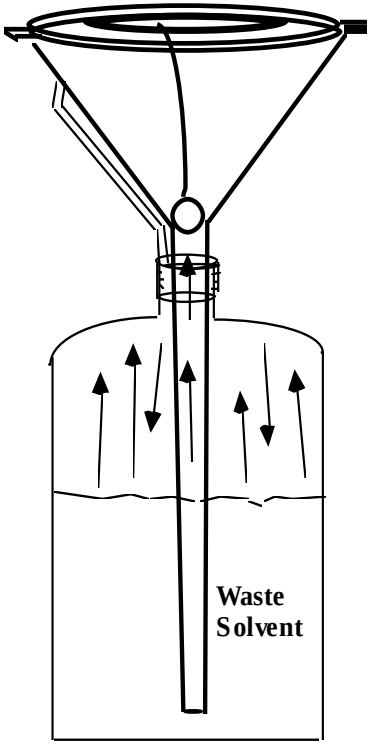
Solution : No Evaporation

Solution

"Fume Hoods should not be used as a means for disposal of volatile chemicals" United States EPA

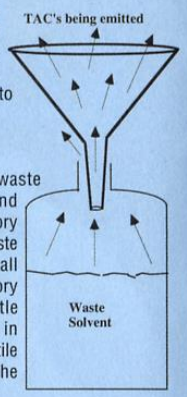
1st Generation Products





Stop Needless Emission of Toxic Air Contaminants (TACs) With Ecological Funnel and Ecological Waste Container!

The Eco. Funnel and Container is a new product designed to prevent volatile toxic air contaminants from evaporating into the laboratory work environment and eventually, through the fume hood system of a laboratory, into the open atmosphere.



Problem:

Typically a simple funnel is used in pouring waste solvent (Dichloromethane, Acetone, Ether and others) into a waste bottle or carboy. A laboratory personnel must place the funnel on top of the waste bottle during the rinsing and dumping of small quantities of solvent. In most cases the laboratory personnel leave the funnel on top of the bottle permanently during the day, hence resulting in significant emission due to evaporation of volatile compounds from the bottle or a carboy into the laboratory environment or the fume hood.

The system currently used in most laboratories has serious disadvantages :

1) The solvent in the carboy is exposed and open to the atmosphere via the funnel. Thus the volatile solvent evaporates into and contaminates the atmosphere of the hood and eventually the air outside of the lab.
2) Since it takes days or weeks to fill the carboy with solvent, a considerable amount of solvent evaporates into the atmosphere during usage time.
3) A worker may forget to cap off the bottle frequently during the day, or even at the end of the day, resulting in significant TAC emission.

Resulting Emission

At first look, it may seem that the contamination of the atmosphere from such sources may not be large enough to be important or significant. However, exact measurements have proven to the contrary. For example, an 8 liter carboy filled with 8 liters of dichloromethane will emit 500 mL (1.5 lb) of this solvent into the atmosphere within 5 days.

This emission will vary depending on the type of solvents (VOC's) which are used. The fume hood face velocity can also affect the evaporation rate. However, for a typical fume hood at 700 CFM (cubic foot per minutes) and a typical waste bottle containing a mixture of : 1000 mL tetrahydrofuran (bp. 67°C), 1000 mL acetone (bp. 56°C), and 1500 mL of dichloromethane (bp. 40°C) the emission rates were :

Container	8 Hours (lb)	Projected in 1 yr. (lb)
4 Liter bottle w/ regular funnel	0.09 lb. Emission	33 lb. Emission

The Solution

Exposure to these atmospheric contaminants and their release into the ecosystem represents an unfortunate reality with the use of standard funnels. We are pleased to offer a solution to this problem which allows laboratory personnel to use a funnel for their transfers, with the difference being that the funnel easily closes, thereby preventing the release of VOCs into the laboratory and into the atmosphere. It is a simple concept, but one which we believe will be easy to implement and make the laboratory a safer place and more inviting to work while safeguarding the surrounding environments.

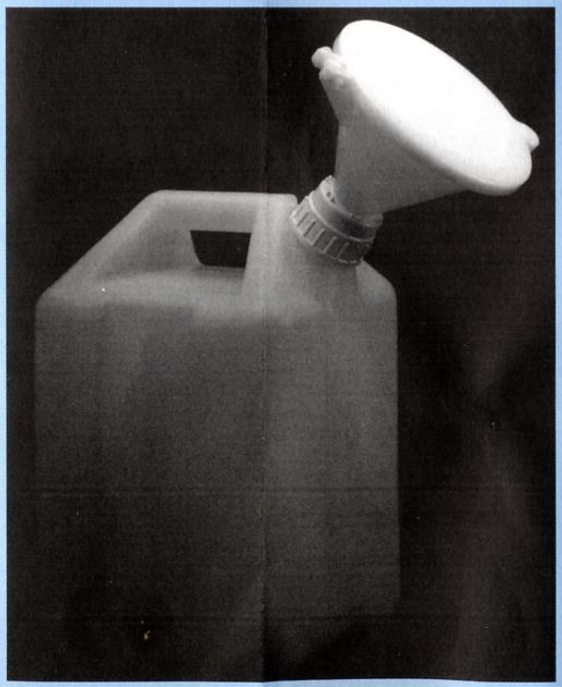
THE ECO FUNNEL AND ECO WASTE CONTAINER SYSTEM

We have designed and patented a new funnel which has a lid connected to a shut-off ball which double seals the system. Also the stem is longer and sealed to the cap in order to prevent the emission from the side of the stem, thereby preventing the release of VOCs into the atmosphere through open funnel systems.

ECO. FUNNEL AND CONTAINER EMISSION TEST COMPARION

Under the same conditions as were described above for the standard funnel, evaporation of the solvent mixture from the container using the Eco. Funnel and Container was tested with no detectable loss through evaporation. Zero emission compared to 33 lb/ year, quite an improvement! These results are tabulated below.

Container	8 Hours (lb)	Projected in 1 yr (lb)
Eco. Container	0.00 lb. Emission	0.00lb. Emission



Advantages of Eco. Funnel :

- The Eco. Funnel remains on the carboy during the usage time until it is full. Exposure of chemists to these solvents is dramatically and conveniently reduced.
- Exposure of personnel working on the roof top also will be dramatically reduced.
- Eco Funnel is easy to use thereby increasing chemists productivity.
- Eco Funnel and container will enhance the quality of the workplace and reduce complaints of odors or exposure.
- Yes, Eco. Funnel and Container will also minimize your fume hood's emission. This reduction in emission could avoid present and future liabilities with the proposed new and more stringent regulations.

LAW AND REGULATIONS

The proposed new regulations will cover university laboratories, research institutes, Biotech Co's, and small or large pharmaceutical companies or any other facilities using volatile substances. Good Laboratory Management practices dealing with volatile organic substances. Regulation 2 Rule 1. Responsible Laboratory Management Practices: "For the purpose of meeting the laboratory exemption of section 2-1-113.2.12, Responsible laboratory management practices include all of the following measures for minimizing the emission of toxic air contaminants :

224.1 Open container procedures involving materials that contain volatile toxic air contaminants (TACs) shall be avoided where feasible.
224.2 Open container storage of volatile hazardous chemical waste shall be avoided.
224.3 Training for laboratory employees handling hazardous materials shall include information about minimizing the emissions of volatile TACs. These employees shall be directed to avoid open containers procedures involving volatile TACs where feasible, and to avoid open container storage of hazardous chemical waste.
224.6 Evaporation of any hazardous chemical waste containing TACs as a means of disposal shall be expressly forbidden."

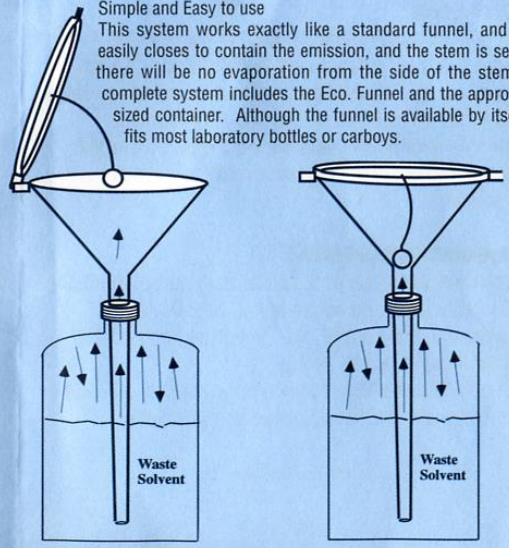
Source: Bay Area Air Quality Management District March 3, 1995

Are Eco. Funnel & Eco. Containers chemically resistant ?

All parts of the Eco. Containers are made from durable and chemically resistant High Density Polyethylene (HDPE) or High Density Polypropylene (HDPP). This material withstands common laboratory solvents, acids and bases.

Simple and Easy to use

This system works exactly like a standard funnel, and the lid easily closes to contain the emission, and the stem is sealed so there will be no evaporation from the side of the stems. The complete system includes the Eco. Funnel and the appropriately sized container. Although the funnel is available by itself, and fits most laboratory bottles or carboys.



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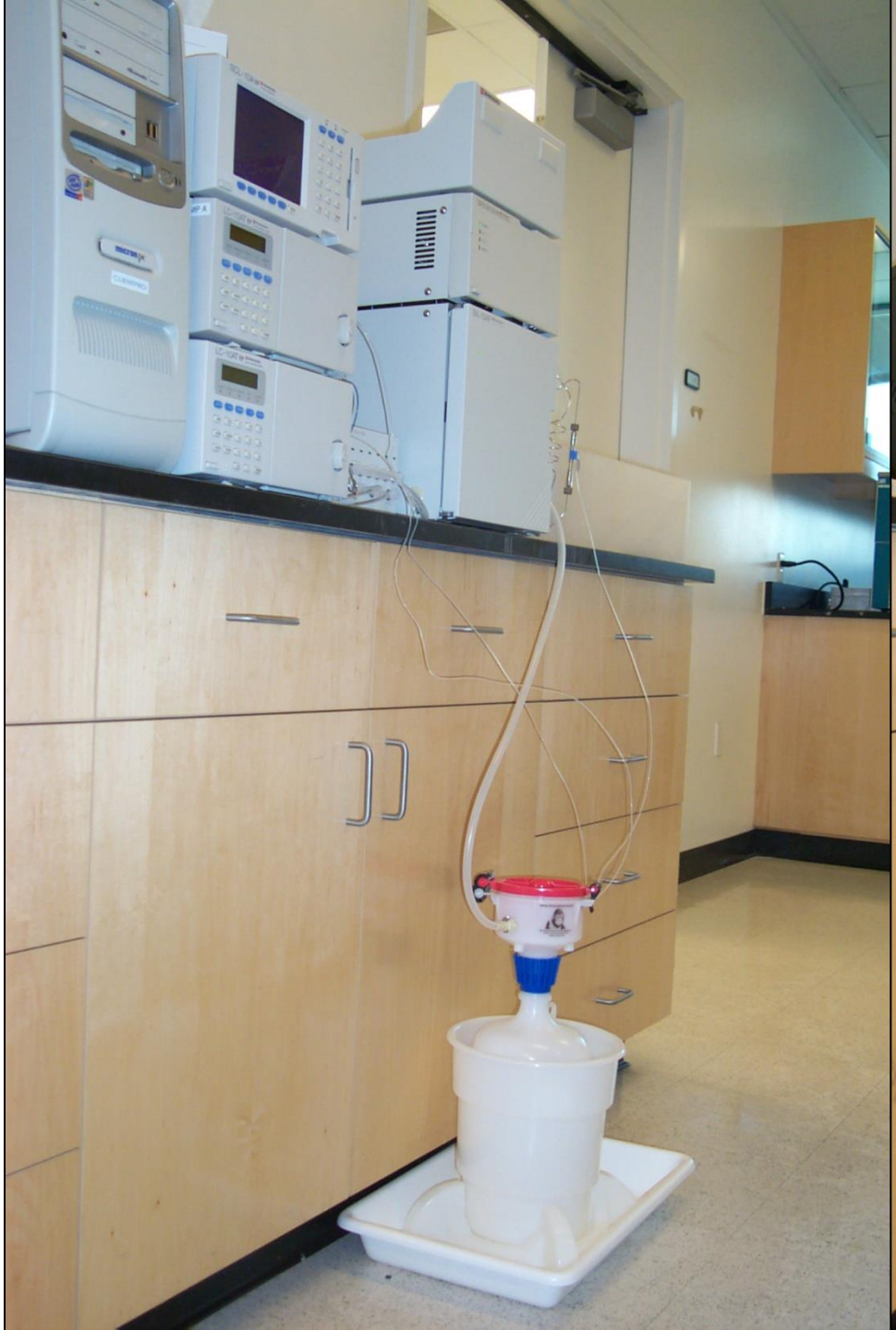
Safety ECOLOGICAL Funnel™

EF-3004C-System

Laboratory safety is everyone's business. Safety **ECOLOGICAL** Funnel is an essential piece of laboratory equipment. Safety **ECO** Funnel reduces the exposure of scientists to toxic and hazardous waste generated in the lab. Every laboratory uses chemicals. Every chemist needs Safety **ECO** Funnel!



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Safety ECOLOGICAL Funnel™

EF-8-FS-70-System

Safety **ECO** Funnel is a cost saving alternative to EPA, OSHA and fire department fines and penalties.
Safety **ECO** Funnel solves the open waste container problem. Federal EPA regulation EPA 40 CFR Sec. 264.173 "Management of Containers" states, "A container holding hazardous waste must always be closed during storage, except when it is necessary to add or remove waste".
Safety **ECO** Funnel's "easy use" lid means no more open waste containers.

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EF-4-38-System

Safety ECOLOGICAL Funnel™

Safety **ECO** Funnel is recognized as a state-of-the-art safety product by environmental health and safety officers. In fact, Safety **ECO** Funnel is widely used by pharmaceutical, biotech, academic, and government laboratories. Harvard University recommends the use of Safety **ECO** Funnel on their Environmental Health & Safety website.

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Safety ECOLOGICAL Funnel™

EF-8-Justrite-B2-System

Gloves? Check. Goggles? Check. Lab coat? Check. Why take chances? Be smart. Protect your lungs and your health. Safety **ECO** Funnel prevents emission of 99% of volatile waste solvents in the lab. It is designed to create a safer, healthier, and more productive work environment. Safety **ECO** Funnel? Check!


FLAMMABLE
KEEP FIRE AWAY
JUSTRITE

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EF-8-Justrite-B5-System

Safety ECOLOGICAL Funnel™

We have over 80 different Safety **ECO** Funnel Systems to meet your health and safety needs. Please call us at: 1-888-322-5722 or go to our website at:

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ECO Funnel Features

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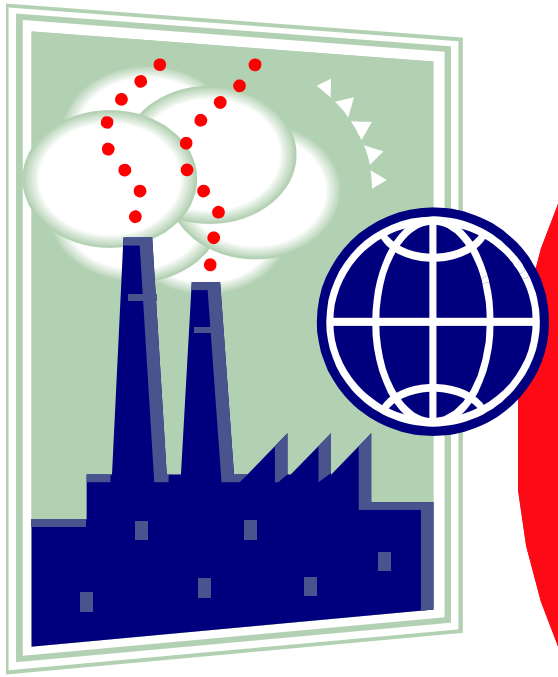
Laws & Regulations

- Occupational Health and Safety (OSHA)
- Environmental Protection Agency (EPA)
- Fire Marshalls – Fire Departments
- Company wide concern for personnel exposure and health

Fire Safety

Environmental Safety



Personal Safety

- Cancer
- Respiratory Diseases

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Environmental Safety

ECO
Funnel

Personal Safety

Fire Safety

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Safety ECOLOGICAL Funnel Features and Benefit

- Safety ECO Funnel solves "the open waste container problem".
- Safety ECO Funnel prevents emission of 99.9% of volatile waste solvents, acids, and bases in the laboratory (Reduce Fire Hazard)
- Safety ECO Funnel is a cost effective alternative to EPA, OSHA and Fire Department fines and penalties.
- Significantly reduces chemical evaporation and environmental pollution of toxic and hazardous compounds in the laboratory.
- Unique patented product meets most local, state and federal safety requirements and regulations.

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Safety ECOLOGICAL Funnel Features and Benefits

- Improves laboratory safety and reduces fire hazard.
- Safety **ECO** Funnel is reusable and has an average cost of approximately $0.08 per day assuming a four-year product use.
- Safety **ECO** Funnel protects laboratory scientists from exposure to toxic and "fat soluble" compounds such as Dichloromethane, Hexane, Heptane, Acetonitrile, Disulfides etc.
- Safety **ECO** Funnel is recognized as a state of the art product in laboratory safety by environmental health and safety officers and industry professionals.
- Safety **ECO** Funnel is widely used by Pharmaceutical, Biotech, Academic and Government laboratories.

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CP Lab Safety™
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Safety ECOLOGICAL Funnel™

SAFE, EFFECTIVE & ECONOMICAL

Please contact CP Lab Safety with questions concerning product information or technical specifications of **Safety ECOLOGICAL Funnel.**