

## Department of Plant Agriculture, University of Guelph

### Standard Operating Procedures for Using Ethanol (Ethyl Alcohol 95%) at Laminar Flow Benches

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**Revised: August 29 2002**

**Reviewed by Env Health and Safety 15 August 2002**

**Effective: Immediately**

#### **Applicable Legislation:**

Occupational Health and Safety Act (OHSA), R.S.O. 1990, Sections 27 (2) (a), 27 (2) (c).

**Intent:** To outline safe handling procedures of ethanol when working at laminar flow benches, and outline potential hazards and first aid measures should incidences occur.

#### **Definitions:**

Ethanol	A chemical used as a general purpose organic solvent, disinfectant and reagent.
Laminar flow bench	Workstations that create a sterile environment suitable for working with microorganisms. Air passes through a 1.0" (2.5cm) fiberglass prefilter. The blower/motor unit moves the air through a zero-probed, HEPA filter rated at 99.99% efficient for 0.3 micron particulates. The HEPA filtered air is then directed horizontally across the work surface. Positive pressure, unidirectional laminar airflow prevents any inflow of room air contaminants onto the work surface.
Qualified person	A person who, in respect of a specific duty, is qualified by knowledge, training and experience to perform the duty safely and properly.

#### **Requirements of OHSA, Section 27 (2) (a) and Section 27 (2) (c)**

27.(2) (a) A supervisor shall advise a worker of the existence of any potential or actual danger to the health or safety of the worker of which the supervisor is aware.

27. (2) (c) Take every precaution reasonable in the circumstances for the protection of a worker.

## Potential Hazards

**WARNING!!!: Ethanol is extremely flammable and poses a serious risk of fire, and thus burns to persons, when used in conjunction with alcohol burners at laminar flow benches.**

### **Inhalation:**

High vapor concentrations may cause a burning sensation in the throat and nose, stinging and watering in the eyes. At concentrations which cause irritation; dizziness, faintness, drowsiness, nausea and vomiting may occur.

### **Ingestion:**

May cause dizziness, faintness, drowsiness, decreased awareness and responsiveness, euphoria, abdominal discomfort, nausea, vomiting, staggering gait, lack of coordination and coma.

### **Eye Contact:**

Severe eye irritant. Vapors can irritate eyes. Eye damage from contact with liquid is reversible and proper treatment will result in healing with in a few days. Damage is usually mild to moderate conjunctivitis, seen mainly as redness of the conjunctiva.

### **Chronic Exposure:**

Long term repeated oral exposure to ethanol may result in the development of progressive liver injury with fibrosis.

### **Aggravation of Pre-existing Conditions:**

Repeated exposure to ethanol may exacerbate liver injury produced from other causes.

### **Other effects of overexposure:**

Repeated ingestion of ethanol by pregnant mothers has been shown to adversely affect the central nervous system of the fetus, producing a collection of effects which together constitute the fetal alcohol syndrome.

## Description of Procedures

1. All persons shall consult the Material Safety and Data Sheet and SOP on ethanol before working with the chemical. It is the responsibility of the employer to make sure inexperienced persons have read and understood the MSDS and SOP on ethanol usage at the laminar flow bench before they do any work.
2. All persons shall wear personal protective equipment such as lab coat and gloves when working with ethanol at the laminar flow bench.
3. All persons shall only use ethanol (when used in conjunction with ignition sources such as alcohol burners) at laminar flow benches in **locations deemed appropriate by their supervisor.**
4. All persons are to make sure that all materials used to wipe up ethanol at the flow bench (paper towel, cloths etc) have been removed from the bench before the alcohol burner (or other ignition sources) is lit.
5. Persons using ethanol in conjunction with ignition sources at laminar flow benches, shall make themselves aware of the location of fire extinguishers, fire blankets, safety showers, safety kits and any other safely/fire fighting equipment. If unsure of the location, all persons are to ask their supervisor of location before doing any work.
6. Ethanol used at laminar flow benches is to be contained in approved flammable solvent containers with flame arrestors. These may be:

Red plastic containers with spring loaded closures and flame arrestors

Ethanol squirt bottles with ball-bearing in the tip

7. Ethanol is to be transported in appropriate containers. These may be 4L plastic jugs with sealed lid or other containers with sealed lids.
8. Beakers containing ethanol used to sterilize petri plate spreaders shall contain no more than a 100ml of ethanol in them. Also these beakers are to have a lid on them when used at the laminar flow bench.
9. Ethanol is NOT to be stored in any container other those stated, including regular "squirt" bottles and spray bottles.
10. Equipment requiring ethanol as a fuel (e.g. alcohol lamps) shall be filled in a well ventilated area away from ignition sources.
11. ETHANOL VAPOR CAN REACT WITH IGNITION SOURCES CAUSING A "FLASH BACK" BACK TO THE CONTAINER CAUSING AN EXPLOSION. **NEVER ATEMPT TO RE-FILL ANYTHING WITH ETHANOL AT THE FLOWBENCH IF THE ALCOHOL LAMP IS BURNING.** EXTINGUISH THE LAMP AND REMOVE ANY OTHER SOURCES OF IGNITION BEFORE RE-FILLING CONTAINERS.
12. Once finished at the laminar flow bench all persons are to make sure that all alcohol wiped surfaces (such as the bench to sterilize it) have dried and that any waste material (such as paper towels) containing ethanol are disposed of and not left on the bench.

## **Waste Management and Environmental Responsibility**

### **Waste disposal procedures**

1. Solid waste containing ethanol (such as paper towels, rags etc) are to be disposed of into waste bins. These waste bins should be away from any ignition source.
2. Ethanol is **NOT** to be disposed of by pouring it down the sink. Persons who wish to dispose of ethanol are to fill out a "Request for Sharps and Waste/Surplus Chemical Disposal" form Environmental Health and Safety, ext. 3282.

### **Handling and Storage Requirements**

Large quantities of ethanol are to be stored in approved flammable solvent cabinet, away from heat, sparks and flames. Smaller quantities of ethanol are to be stored in containers outlined above in the description of procedures section. Keep containers closed when not in use. Use with adequate ventilation. Avoid contact with eyes and skin. Avoid breathing vapors and wash exposed skin thoroughly after handling. Take precautions to prevent static electricity buildup when transferring contents.

### **Contingency Plan and Reporting**

**All accidents and spills will require persons involved to fill out an "incident report" after the situation has been contained.**

## **Accident response**

### **Fires**

Small fires should be extinguished immediately by using water, fire extinguishers or fire blankets. Persons should only attempt to extinguish fires if they feel safe in doing so. If safety is in question persons are to dial Ext 2000.

For large fires persons are to activate the nearest wall mounted fire alarm, evacuate the building (not using the elevator) and dial Ext 2000.

### **Other accidents**

If a person is caught on fire, they should immediately seek the safety shower or wrap themselves in a fire blanket. Once fire is put out, if the individual is injured they are to get immediate medical attention by using the first aid kit or by dialing extension 2000. If there are other persons in the area when someone catches fire they are to act immediately by using the fire extinguisher, wrapping the person in a fire blanket or other means to put out the fire. If the individual is injured administer first aid and dial Ext 2000. For first aid measures for specific accidents involving ethanol, consult the Material Safety Data Sheet for ethanol.

### **Spill clean up**

All labs should have a spill kit available. Contain spilled material. Provide adequate ventilation and protective equipment. Remove sources of heat, sparks or flame. Clean up immediately using paper towels or other absorbent material.

### **References:**

Material Safety Data Sheets: Fisher Scientific  
Occupational Health and Safety Act (OHSA)