SAFE OPERATING PROCEDURE

General			
Dept:	Biology	Date:	Nov 9, 2022
Procedure:	Use of ethanol	Revision #:	1
Principle Investigator:	Kim Cuddington	PI Phone:	Ext 33669
PI Signature:	X		

*Complete and submit an incident report for all incident and near-misses

1.0 Procedure Summary

This is the procedure for using the ethanol, often used for procedures involving sterile transfer of organism (e.g., ethanol burner), and sterilization of surfaces.

2.0 Risks

This safe operating procedure was developed in response to the risk assessment completed under the University of Waterloo's Risk Assessment Program.

Physical Properties: Absolute ethyl ethanol (ethanol) is a clear, colourless, very mobile **flammable liquid** with a pleasant odour and a burning taste, and has a **FLASH POINT OF 9-11°C**.

Specific hazards include:

FIRE: 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. In case of **inhalation**, move person to fresh air and seek medical attention.

Ingestion: May cause dizziness, faintness, drowsiness, decreased awareness and responsiveness, euphoria, abdominal discomfort, nausea, vomiting, staggering gait, lack of coordination and coma. In case of **ingestion**, immediately seek medical attention and follow instructions on MSDS.

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.
In case of **eye contact**, flush eyes with copious amounts of water at an emergency eyewash station for at least 15 minutes and seek medical attention.

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.

3.0 Training

Prior to completing this task, the following training must be completed and documented.

Training Type	**Training Details**
Online Training	*1.* Lab Safety (SO1010) *2.* Employee Safety Orientation (SO1001) *3.* WHIMIS 2005 (SO2017) *4.* Chemical Waste Segregation (SO2070)
Document Review	Ethanol MSDS and this SOP
Practical Training	One-on-One training with Kim Cuddington, or Debora Andrade-Pereira, or Amihan Bularan. This training consists of: 1. A physical orientation to the lab in B2 241, including an orientation to the location of fire extinguishers, emergency call numbers, fire alarms, and telephone numbers 2. Observation of trained staff completing the procedure 3. Completing the procedure under close supervision 4. Completing the procedure with supervision

4.0 Tools and Equipment Required

Sealable containers of appropriate size. A funnel as needed.
Spill materials: Paper towels or adsorbent materials such as spill control pillows

5.0 Personal Protective Equipment

Lab coat and close-toed shoes are mandatory for all lab work! Wear chemical safety goggles, nitrile or butyl gloves, and a fully-buttoned lab coat.

PPE Type	PPE Storage Location	When it is Worn
Safety glasses	*Left size of cabinet with first aid kit*	*During pouring of ethanol*
Nitrile or butyl gloves	*Left size of cabinet with first aid kit*	*During pouring of ethanol*

6.0 Start-Up Procedure

1. Before you begin don PPE and note relevant safety features: Wear an all cotton or fire-retardant lab coat as the basic personal protective item of clothing. Wear safety glasses and gloves. Know the procedure in case of fire. Know the location of the nearest fire alarm pull station. Know the location and use of fire extinguishers. Know the location and use of the Solvent Spill Kit.
2. Ensure you are going to complete the procedure of pouring ethanol from a larger container into a smaller container in an open, well-ventilated area (e.g., in the main lab, on the metal apron of the sink)
3. Ensure there are no open flames or flammable material in the area where you will work
4. Retrieve the ethanol container from the flammable storage cabinet (near the large metal sink)
5. Transfer the ethanol container to the location where it is to be used. This area should be away from shelving, chemicals and equipment and not cluttered with Class A flammable material such as paper, books and cardboard.

7.0 Operating Procedure

1. **DO NOT attempt to decant directly from a large size container (e.g., 4L) into a very small container (e.g., 250 ml or less), since spills are likely**
2. Decant into an appropriate sized container, and cap.

8.0 Shut-Down Procedure

1. Cap the storage container and return the bottle or can to the flammable storage cabinet
2. Wash hands after removing gloves.
3. Ethanol may not be disposed of by pouring into drains or by allowing it to evaporate into the air.
4. Unused ethanol which is no longer needed should be left in the original containers and stored in the flammable storage cabinet (as long as the total quantity is less than 4L)
5. Used ethanol may be accumulated in a specific labelled waste container in the immediate work area until the container is full or the work is complete. The container must be stored appropriately during accumulation with the cap on, separated from incompatible materials. Once the container is full, follow procedures for hazardous waste disposal.

9.0 In case of spills

1. **Large Spill**: If a very large amount of ethanol is spilled (e.g., 4L), immediately evacuate, secure area and call the safety office and emergency services

2. **Small Spill**: If a small amount of ethanol is spilled (it can be cleaned up in 10 minutes or less) and you have been appropriately trained to clean it up, you may do so. Trained personnel should wear at the minimum nitrile or butyl gloves, safety glasses, and a fully-buttoned lab coat. Clean-up materials (e.g. paper towels) should be placed in an approved container with a lid.

10.0 Procedure Review

This procedure shall be reviewed annually by the author to ensure it reflects the most current conditions.

11.0 Sign-Off

By signing the sheet below, you acknowledge that you have:

1. Completed the necessary training as per the Training section described above including review of the process specific risk assessment
2. You have completed practical training and had the opportunity to ask questions

Name (Print)	Signature	Date

12.0 Record of Revisions

Date	Author/Editor	Change	Version
Date	Name	▪ NEW	V**1**