# SAFE OPERATING PROCEDURE

| **General** | | | |
|---|---|---|---|
| Dept: | Biology | Date: | Oct 19, 2022 |
| Procedure: | Use of an ethanol burner | 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 burner, often used for procedures involving sterile transfer of organism. The SOP for ethanol should also be referenced.

## 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.

The process specific risk assessment can be found here:
*https://drive.google.com/file/d/1vrH4Ownrr0ldW7COfKcQpoXOAqJS4gCj/view?usp=sharing*

Specific hazards include:

**Ethanol:**

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**.

**Toxic Properties**: Absolute ethyl ethanol absorbed, inhaled or ingested may cause nausea, vomiting, flushing, mental excitement or depression, drowsiness, impaired perception, in coordination, stupor and death.

**Ethanol burner:**

This open flame device is a potential hazard and should be used with care and respect for health and safety.

Alcohol burners produce small amounts of carbon monoxide and other toxic combustion by-products. Use only in a well-ventilated area.

## 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)<br>*2.* Employee Safety Orientation (SO1001)<br>*3.* WHIMIS 2005 (SO2017)<br>*4.* Chemical Waste Segregation (SO2070) |
| Document Review | Review of risk assessment, ethanol MSDS, SOP for ethanol, and this SOP |
| Practical Training | One-on-One training with Kim Cuddington, or Debora Andrade-Pereira, or Amihan Bularan. This training consists of:<br>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<br>2. Observation of trained staff completing the procedure<br>3. Completing the procedure under close supervision<br>4. Completing the procedure with supervision |

## 4.0 Tools and Equipment Required

**Ethanol burner:**
The wick-type alcohol lamp has a glass body with aluminum cap and aluminum snuffer cover. The hexagonal shape is designed to help reduce the risk of fuel spillage and fire if the lamp is knocked over while in use.

The metal wickless burner has a metal body, and completely seals so that ethanol may not leak out.

## 5.0 Personal Protective Equipment

Lab coat and close-toed shoes are mandatory for all lab work!

| PPE Type | PPE Storage Location | When it is Worn |
|---|---|---|
| *Safety glasses* | *Left size of cabinet with first aid kit* | *During pouring of ethanol and use of alcohol burner flammable solvents* |

## 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. 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. Locate alcohol burner in the flammable storage cabinet beside the large metal sink.
3. If using the glass burner with a wick:
    a. Inspect the lamp before each use to make sure there are no cracks, chips or defects in the glass body. Do not use a cracked or defective lamp as it may cause fire or injury.
    b. If necessary, assemble your lamp by removing the wick from the glass body (a bent paperclip will do this easily) and inserting it through the hole in the cap.
    c. Adjust the fiber wick so it protrudes about 3/8" from the top of the metal cap. Spread out the wick fibers at the top.
4. If using the metal, wickless burner:
    a. Note the heat shield may be packed inside the burner tank. This shield must be removed before filling the tank with alcohol.
    b. Remove the black rubber stopper from the copper torch.
    c. Remove the top of the tank by turning it counter-clockwise.
    d. 4. Fill the tank approximately 2⁄3 full with ethyl alcohol.
5. Fill the alcohol burner with ethanol in an open, well-ventilated area. **DO NOT overfill the burner by attempting to decant directly from a large size solvent container** into the burner reservoir. If necessary transfer the ethanol to a small beaker first. Fill the burner to between 2/3 full, using a funnel of appropriate size. Do not attempt to fill near any open flame.
6. Cap the source of the fuel and return the bottle or can to the flammable storage cabinet before lighting the alcohol burner.
7. If using the metal, wickless burner:
    a. Replace the top and secure it by turning clockwise. Tighten as much as possible
    b. Verify that the top is completely sealed against the tank by turning the filled burner on its side and rotating it so the liquid is in contact with the seal. If alcohol leaks out of the unit, then the seal is not sufficient. Retighten as necessary.
8. Transfer the filled and cupped burner 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. Before lighting the burner keep long hair tied back and lab coat cuffs rolled up.
2. Use the lamp only in an upright position.
3. **DO NOT attempt to light the burner from another lit burner or carry a lit burner to another location.**
9. If using the metal, wickless burner: Allow the burner to sit at least five minutes after filling so that the alcohol vapors can move up into the copper torch.
4. Light the burner at the safe, well-ventilated location only using matches or a butane safety lighter
5. After lighting the lamp, in a few minutes the flame should be burning steadily and cleanly.

6. If using the metal, wickless burner: Place the heat shield on the top of the burner to direct the flame and heat upward.
7. The burner, cap and snuffer cover can get hot during use and can cause burns. **DO NOT touch any part of the burner with your hands while it is lit.**
8. If using the glass burner with a wick: If the flame keeps going out or the wick is burning up, the wick is too tight in the metal cap. Put out the flame, wait for the burner to cool, and then remove the wick. Pull some of the fibers out of the wick and then insert the wick back into the metal cap. (This should only be necessary if replacement wicks are tight fitting.)
9. **DO NOT attempt to refill or top-up a lit burner!**
10. Avoid working over the burner flame
11. Take care not to contact the invisible flame.

## 8.0 Shut-Down Procedure

1. Extinguish the burner flame with the burner cup.
2. **DO NOT touch any part of the burner with your hands until the burner fully cools.**
3. If using the metal, wickless burner: Once cooled, reinsert the rubber stopper into the copper torch to reduce the evaporation of the alcohol
4. When not in use, store the cupped and cooled burner in the flammable storage cabinet.
5. There should be no solvent waste from the ethanol burner.

## 9.0 Procedure Review

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

## 10.0 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 |
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## 11.0 Record of Revisions

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