



AVIT
AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY



VINAYAKA MISSION'S
RESEARCH FOUNDATION
(Deemed to be University under section 3 of the UGC Act 1956)



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DEPARTMENT OF CHEMISTRY

STANDARD OPERATING PROCEDURE

Name of the Lab./facility	Bio organic Chemistry and Chemical Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the Heating mantle
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the heating mantle in the Bio organic chemistry laboratory, Vinayaka Missions' Research foundation
Responsibility	Faculty i/c of the facility - Biotechnology

STANDARD OPERATING PROCEDURE FOR HEATING MANTLE

- Switch ON the Power button
- Set up flask and condenser as required.
- Connect hose to tap and turn on to give a gentle flow of water
- Switch on heating mantle and set to required temperature setting. Monitor temperature. Do not use a mercury thermometer.
- Place HOT warning sign near the heating mantle.
- Monitor system during heating procedure.
- When procedure complete, carefully remove glassware, using heat proof gloves.

Switch off heating mantle and leave HOT warning sign in place until everything is cool.

PRECAUTIONS TO BE FOLLOWED

- Know where the nearest firefighting equipment
- Know the emergency phone number 33#
- Refer to the SDS for any chemicals being used
- Place a HOT warning sign at the heating mantle
- Read and understand the procedure
- Check that the equipment is electrically compliant

HOD – H & S



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DEPARTMENT OF CHEMISTRY

Name of the Lab./facility	Bio organic Chemistry and Chemical Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the Fumehood
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Fumehood in the Bio organic chemistry laboratory, Vinayaka missions' Research foundation
Responsibility	Faculty i/c of the facility- Biotechnology

STANDARD OPERATING PROCEDURE FOR FUMEHOOD

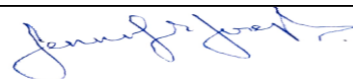
- A chemical fume hood must be used for any chemical procedures that have the potential of creating:
 - ✓ Airborne chemical concentrations that might approach Permissible Exposure Limits (PELs) for an Occupational Safety and Health Administration (OSHA) regulated substance. These substances include carcinogens, mutagens, teratogens, and other toxics.
 - ✓ Flammable/combustible vapors approaching one tenth the lower explosive limit (LEL). The LEL is the minimum concentration (percent by volume) of the fuel (vapor) in air at which a flame is propagated when an ignition source is present.
 - ✓ Explosion or fire hazards.
 - ✓ Odors that are annoying to personnel within the laboratory or adjacent laboratory/office units.
- Vertical fume hood sashes can be used in three positions: 1) closed, 2) the operating height (or half open), and 3) the set-up position (or fully open).
- Hoods must be closed when unattended.
- The sash opening must be positioned no higher than the operating height (or half open) when the hood is being used with chemicals present or when chemical manipulations are performed. Place the sash in front of the face to protect the persons breathing zone near the nose and mouth from chemical contaminants released within the fume hood. When working with hazardous chemicals, the hood sash should always be positioned so that it acts as a protective barrier between laboratory personnel and the chemicals.
- The set-up position (fully open) is only used to place equipment in the hood when no chemicals are present. Do not fully open the sash when chemicals are present.
- Sliding horizontal sash panels are used with one panel placed in front of the face and arms reaching

around the sides to perform manipulations.

- Sliding horizontal sash panels are used with one panel placed in front of the face and arms reaching around the sides to perform manipulations. Do not slide the panels laterally exposing the face to the interior of the hood with chemicals present.
- Hood baffles or slots should be positioned properly if available. The top baffle/slot should be opened when chemicals with a vapor density of less than 1 (lighter than air) are used. The bottom baffle/slot (if available) should be opened when chemicals with vapor densities greater than 1 (heavier than air) are used.
- Chemicals and equipment (apparatus, instruments, etc.) should be placed at least 6 inches (15 cm) from the front edge of the hood.
- Equipment should be placed in the center of the working surface in the hood.
- Do not place materials at the front of the working surface because it will block the slot under the air foil sill at the front. Do not place materials at the back of the working surface because it will block airflow to the lower slot under the baffle in the back. Separate and elevate equipment by using blocks or lab jacks to ensure that air can flow easily around and under the equipment.
- Chemical fume hoods must be kept clean and free from unnecessary items and debris at all times. Solid material (paper, tissue, aluminum foil, etc.) must be kept from obstructing the rear baffles and from entering the exhaust ducts of the hood.
- Minimize the amount of bottles, beakers and equipment used and stored inside the hood because these items interfere with the airflow across the work surface of the hood.

PRECAUTIONS TO BE FOLLOWED

- Chemicals should not be stored in a hood because they will likely become involved if there is an accidental spill, fire or explosion in the hood, thus creating a more serious problem.
- Fume hoods are not flammable cabinets and do not offer fire protection for materials stored inside.
- Sliding horizontal sash windows must not be removed from the hood sash.
- Laboratory personnel must not extend their head inside the hood when operations are in progress.
- The hood must not be used for waste disposal (evaporation).
- Hoods must be monitored by the user to ensure that air is moving into the hood. A small piece of thread, yarn can be taped to the hood sash as a visual indicator that the hood is pulling air. Any hoods that are not working properly must be taken out of service and reported to Facility Services/Physical Plant (FS/PP) and University Environmental Health and Safety for your respective campus.



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DEPARTMENT OF CHEMISTRY

STANDARD OPERATING PROCEDURE

Name of the Lab./facility	Bio organic Chemistry and Chemical Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the Oil Bath
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Oil Bath in the Bio organic chemistry laboratory, Vinayaka missions' Research foundation
Responsibility	Faculty i/c of the facility - Biotechnology

STANDARD OPERATING PROCEDURE FOR OIL BATH

- Do not leave an operating sand or oil bath unattended unless it is equipped with a high-temperature shutoff and with a warning label.
- Know the flash point of the material when using oil baths. Consult the chemical manufacturer's technical information prior to use. NEVER heat a bath fluid above its flash point. Watch for smoking of the oil; oil that is smoking is too hot and may burst into flames at any moment. If an oil bath starts to produce smoke, turn off the heat immediately.
- Baths should be mounted on a laboratory jack that can be lowered easily without danger of the bath tipping over to cool the bath in an emergency. Equipment should be clamped high enough above a hot plate or oil bath that if the reaction begins to overheat, the heater can be lowered immediately and replaced with a cooling bath without having to readjust the clamps holding the equipment setup.
- Place equipment in a central location in the fume hood such that an uncontrolled fire does not melt the rubber seal surrounding the inspection ports located at the sides of the fume hood.
- When using hot oil or sand for heating, mount the baths in such a way that they cannot be overturned or that water cannot fall into an oil or sand bath causing hazardous splattering.
- Oil expands in volume when heated. Do not overfill.
- Secondary containment for oil baths must be used to contain any possible spills
- All oil baths must be labeled with the name of the oil and its maximum safe working temperature: "Hot Mineral (Silicone) Oil" "Do not allow the temperature to exceed ____ deg C"
- Store the oil or sand for reuse in a covered secondary container that is labeled with the name and

maximum safe working temperature

PRECAUTIONS TO BE FOLLOWED

- All unattended operations must have prior approval from the Principal Investigator, Lab Manager, or Lab Supervisor
- Provide for containment of materials in the event of spills or failures.
- Label all containers and process equipment with the name of the material and special hazards.
- Post the contact name and number of the person performing the experiment on the lab door
- Keep lab lights on.
- Appropriate gloves, safety glasses and lab coats must be worn when handling chemicals, containers, apparatus, and heating equipment

A handwritten signature in blue ink, appearing to read 'Jennifer J. [unclear]', is positioned above the title 'HOD - H & S'.

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DEPARTMENT OF CHEMISTRY

STANDARD OPERATING PROCEDURE

Name of the Lab./facility	Bio organic Chemistry and Chemical Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the Magnetic Stirrer
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Magnetic Stirrer in the Bio organic chemistry laboratory, Vinayaka missions' Research foundation
Responsibility	Faculty i/c of the facility - Biotechnology

STANDARD OPERATING PROCEDURE FOR MAGNETIC STIRRER

- Place the magnetic stirrer on a stable well-levelled surface.
- Place the stir bar at the bottom of a glass container.
- Fill the glass container with the liquid to be stirred.
- Plug the mains cable into a suitably earthed socket.
- Check that the speed control knob is completely turned anticlockwise.
- Place the glass container on the centre of the magnetic stirrer.
- Press the On/Off switch to turn the magnetic stirrer On. The switch will light green.
- Adjust the speed control knob to a low stirring rate.
- Continue to adjust the speed control knob until the desired stirring speed is achieved.
- Wait until the liquid is properly mixed.
- Completely turn the speed control knob anticlockwise.
- Press the On/Off switch to turn the magnetic stirrer Off
- Manipulate another stir bar from the outside of the glass container to remove the immersed stir bar

PRECAUTIONS TO BE FOLLOWED

- Thoroughly wash the stir bar with distilled water after each application.
- Store stir bars in pairs to maintain their magnetic strength and increase their life span.

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DEPARTMENT OF CHEMISTRY

STANDARD OPERATING PROCEDURE

Name of the Lab./facility	Bio organic Chemistry and Chemical Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the Vacuum Pump
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Vacuum Pump in the Bio organic chemistry laboratory, Vinayaka missions' Research foundation
Responsibility	Faculty i/c of the facility - Biotechnology

STANDARD OPERATING PROCEDURE FOR VACUUM PUMP

- Make sure pump has an up to date PAT certificate
- Check that the pump oil-level is between the MAX and MIN marks on the bezel of the oil-level sight-glass; if it is not, DO NOT USE.
- Ensure that vessel to be evacuated is appropriately set up. **If unsure ALWAYS ASK.** Never set up a new vacuum system (especial glass) on your own unless experienced.
- Ideally use a suitable inlet-valve to isolate the pump from your vacuum system, important:
 - if you need to allow the pump to warm up before you pump condensable vapours,
 - if you need to maintain vacuum when the pump is switched off.
- Avoid high levels of heat input to the pump from the process gases.
- Ensure that any heating of the pump body will not affect any other equipment or cause a danger to others.
- Make sure that the exhaust pipeline is either vented to a safe location or filtered. Also ensure that it cannot become blocked. **Check expiry date on filter, if it has expired DO NOT USE.**
- Make sure pump is on a firm, level platform and it is located so that the oil-level sight-glass is

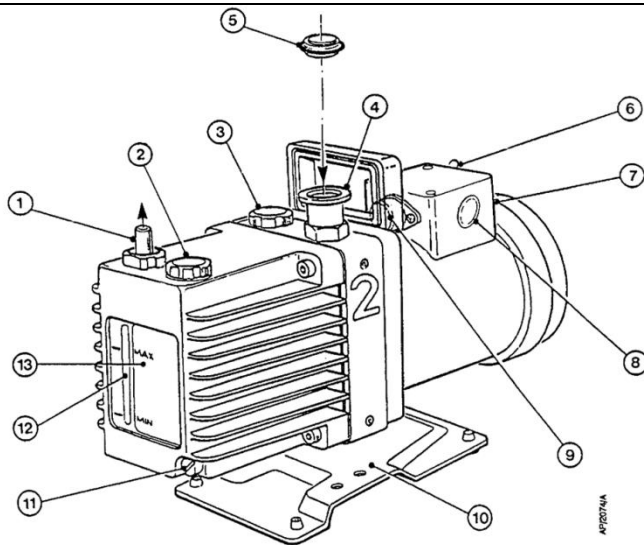
Replace oil

Oil should be change minimum once a year unless pump is used heavily or for very dirty work.

- Allow the pump to cool to a safe temperature before you start maintenance work.
- Ensure that the pump is decontaminated before maintenance and that you take adequate precautions to

protect people from the effects of dangerous substances if contamination has occurred – this may include an additional risk assessment.

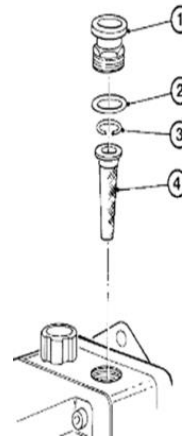
- Operate the pump for approximately ten minutes to warm the oil, then switch off the pump. (This lowers the viscosity of the oil and allows the oil to be drained from the pump more easily).
- Isolate the pump from your electrical supply and disconnect it from your vacuum system.
- Remove the oil filler-plug (1).
- Place a suitable block under the pump-motor to tilt the pump and place a suitable container under the oil drain-plug (gravity drain). **CAUTION-HEAVY.**
- Remove the oil drain-plug and allow the oil to drain into the container. Oil should be disposed of through chemical waste disposal route.
- If oil is very dirty (water can be seen as “threads” in oil container).
 - Refit the oil drain-plug and pour clean oil into the pump (up to MIN level).
 - Reconnect the pump to the electrical supply and operate the pump for about 5 to 10 minutes.
 - Disconnect the pump from the electrical supply, remove the oil drain-plug and allow the oil to drain out of the pump.
 - Repeat this step until the oil reservoir is clean
- Refit the oil drain-plug pour clean oil into the filler hole until the oil-level reaches the halfway level on the bezel of the oil sight-glass (12). This is normally sufficient for laboratory use. Heavier use may require filling to MAX.
- Allow a few minutes for the oil to drain into the pump. If necessary, add more oil.
- Refit the oil filler-plug.
- Place gloved hand over inlet (4) and startup vacuum pump (see above).
- Check that the oil-level in the sight-glass drops slightly (by 3 to 5 mm) after start-up. This shows that the pump has primed with oil.
- If the pump fails to prime, operate the pump with the inlet open to atmosphere for approximately 30 seconds. Then isolate the inlet and check that the oil-level drops by 3 to 5 mm.
- If the pump is working reconnect to the vacuum system.



1. Outlet nozzle
2. Oil filler-plug
3. Gas-ballast control
4. Inlet-port (adaptor flange)
5. Centering-ring and 'O' ring (supplied)
6. Inlet-On/Off switch
7. Motor terminal box
8. Cable-gland
9. Overload reset button
10. Baseplate
11. Oil drain-plug (gravity drain)
12. Oil sight-glass
13. Pump identification label

Inspect and clean inlet-filter

- 1) Unscrew the inlet adaptor (1) and remove the 'O' ring (2), circlip (3) and inlet-filter (4).
- 2) Wash the filter in a suitable cleaning solution. Allow the filter to dry.
- 3) Refit the inlet-filter (4), circlip (3), 'O' ring (2) and inlet adaptor (1).



Jennifer

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DEPARTMENT OF CHEMISTRY

STANDARD OPERATING PROCEDURE

Name of the Lab./facility	Bio organic Chemistry and Chemical Engineering Lab
Purpose	To describe the procedure for the operation and maintenance of the Muffle Furnace
Scope	This Standard Operating Procedure (SOP) applies to the staff and students using the Muffle Furnace in the Bio organic chemistry laboratory, Vinayaka missions' Research foundation
Responsibility	Faculty i/c of the facility - Biotechnology

STANDARD OPERATING PROCEDURE FOR MUFFLE FURNACE

- Connect the power supply.
- Switch "ON" the main power supply and instrument mains.

Temperature setting

- Press SET POINT (x/w) key to set the required temperature.
- Press ↑ to increase the temperature and ↓ to reduce the temperature
- The temp. Sensor will maintain the set temp which is indicated by the blinking of set temp on the display screen.
- The duration of time can also be adjusted using the time adjustment knob 6. After use,
- SWITCH OFF the power supply.

Cleaning

- Wipe the surface, walls, top, bottom and trays of the oven with dry lint free cloth on daily basis so that there will be no dust particles in the oven.
- Wipe all the parts and outer surface of the Oven with wet lint free cloth soaked in purified water, on weekly basis and fill the weekly cleaning record.



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