

Standard Operating Procedure –#COE-SOP-0001

Chemical Fume Hood Operation

Facility: NMSU College of Engineering Laboratories

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Scope: This SOP describes training for features, operation and maintenance of Air Master System Chemical Fume Hoods

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Introduction:

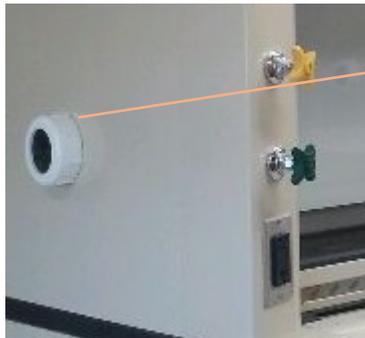
This procedure describes the operation and maintenance of Air Master System Fume Hoods, installed in Jett Hall during 2017. The hoods are in three (3) configurations: full height bench, counter-top bench and walk-in (see photos below).



Standard Operating Procedure Details:

1. Equipment Features and Descriptions:

- a. General: These hoods are similar construction and are designed for maximum sash height during operation of 18 inches.
- b. Seals: Seals on the exterior side of the full height bench and walk-in style hoods allow for compressed gas lines, electrical cables etc. to be passed through into the workspace without impeding the sash operation.



Hood Seal

- c. Presence Sensor: A motion sensor is installed on all styles and detects the human presence directly in front of the hood. When the motion sensor does not detect human presence it automatically reduces the airflow draw of the hood to minimum settings.

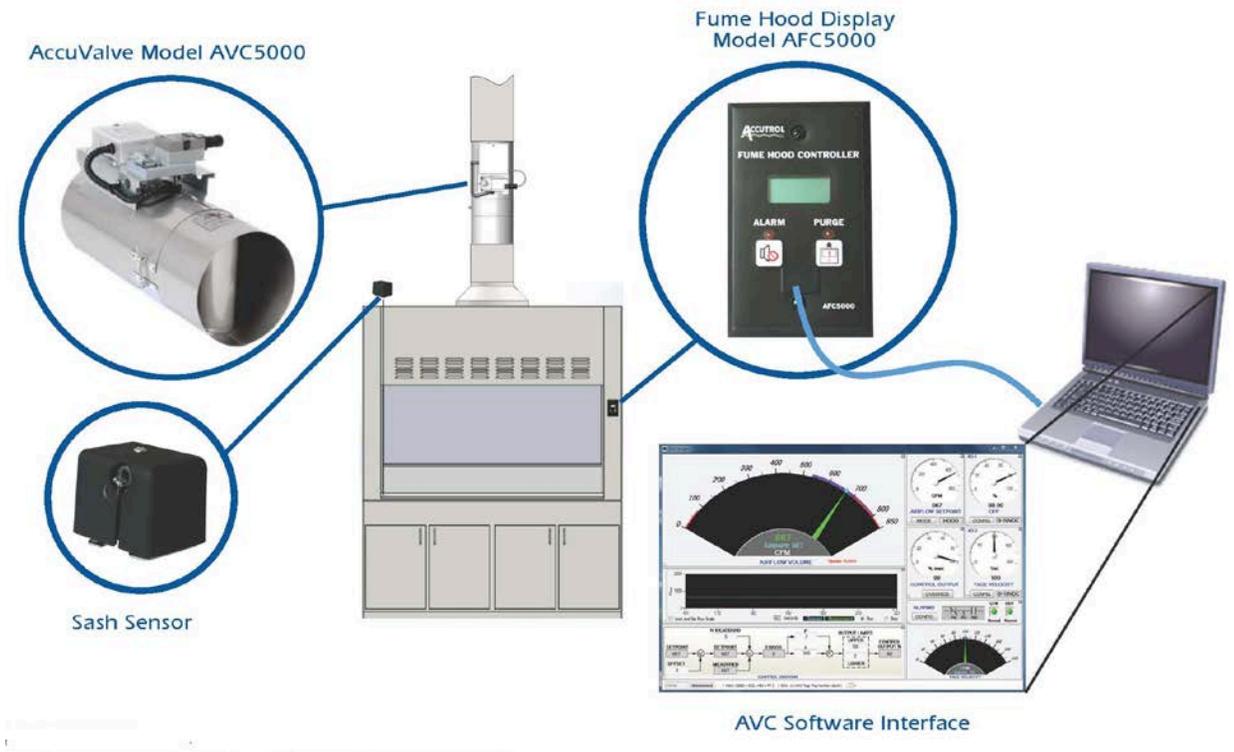


- d. Accutrol Fume Hood Controller: An integrated system of damper control, alarms and controller optimizes fume hood face velocity based upon open sash area. The system monitors alarms and will reduce airflow upon lack of human presence as well as close the dampers in the event of a fire.

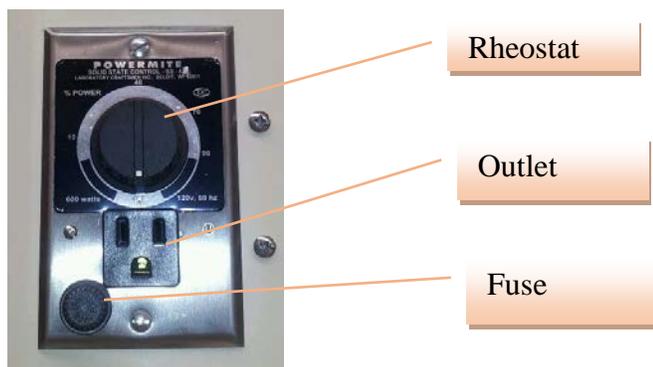


Silence Alarm

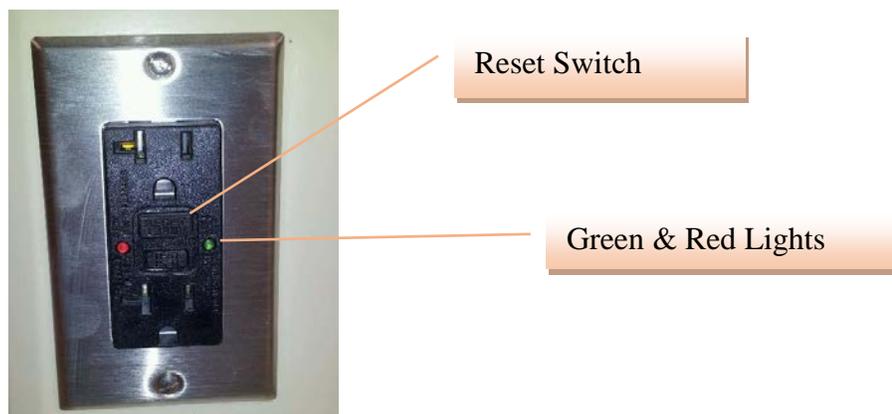
INTEGRATED FUME HOOD CONTROL SYSTEM



- e. **Power Mite Controller:** Used to control THERMOWELL heating mantles or other resistive heating circuits (hot plates, heat tapes, water baths, etc). Available in solid-state or proportional on/off models. All models are fused (without circuit breakers). Calibrated in terms of percent power level from 5 to 90% (i.e. when knob is set at 50% power level, 83 volts are delivered if the line voltage is 117). Offers a wider range of control than proportional on/off type. In addition to resistive heating circuits, may be used to control incandescent lamps, room fans, stirring motors. 60 Hz..



- f. **Ground Fault Circuit Interrupter (GFCI) Outlet** – This outlet looks different because it has a small electrical breaker build in. It has a green light, a red light and a reset switch which can trip if the outlet senses a deviation in current. It is important to note that a ground fault is an unintentional electrical path between the power source and grounded surface. This device compares the amount of current going with the amount returning. If the target value deviates by (0.005 – 0.006 amperes). The circuit is quickly broken (~25 milliseconds). Designed to operate before electricity has a chance to affect your hard beat.



- g. Light Switch – A toggle switch is provided to turn on/off the interior hood lights. This will be found in various places depending on the configuration of the hood.



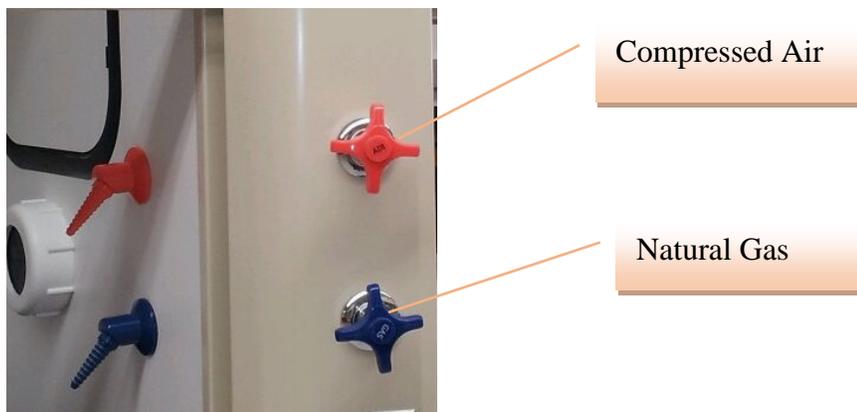
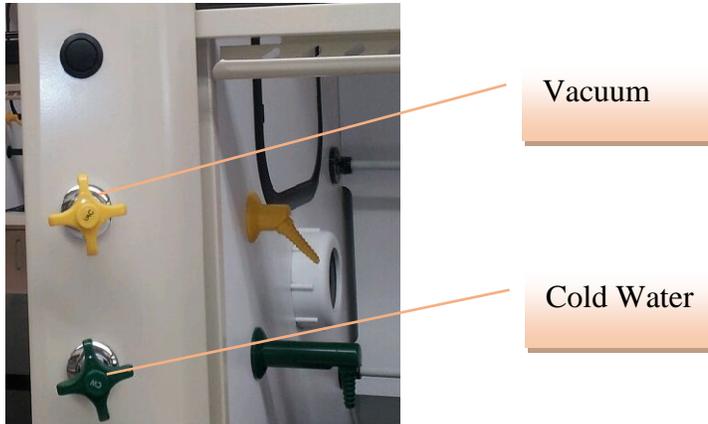
Light Switch

- h. Sash Height Override – Allows sash to be opened wider than 18 inches for moving large equipment into or out of the hood. Should never be left in this position except for equipment changes. If you leave the hood open wider than 18 inches for more than a couple of minutes an audible alarm will sound.



Sash Height Stop Release

- i. Utilities – All hoods are provided with Vacuum, Cold Water, and Natural Gas. Others are also provide with Compressed Air. Connections to these should be made with suitable tubing, and clamps as necessary. This tubing must be capable withstanding the pressure provided and not allow tubing to break free which could cause damage or injury. Always open the supply knobs slowly until the desired flowrate is achieved.



- j. Support Bench for Walk-In Hood – These benches can be configured two ways to allow flexibility to support experimental work, horizontal or vertical. To change configurations, the bench top needs to be un-screwed, keeping careful account of the hardware. The base will be turned upright and the top re-attached using the original hardware. Never use this bench, in either configuration, without the mounting hardware securely in place.



Horizontal Configuration



Vertical Configuration

k. Other Lab Safety Equipment:

- i. Airflow Monitor – Airflow monitors are located at the outside the specialized labs throughout Jett Hall. These indicate the amount of negative flow into the space and give alarms if the parameters of this condition are not met. Please notify your lab manager, COE Safety or Department Administrative Assistant if an alarm condition is occurring so this problem can be addressed.



- ii. Eyewash and Safety Shower – Eyewash and Safety shower units are provide in laboratory spaces throughout Jett Hall. Some of these units have an alarm system that will flash and produce an audible sound when activated and others do not. If you are exposed to chemical or physical conditions that require you utilize an eyewash or safety shower, always contact your lab supervisor, COE Safety or your Department Administrative Assistant with the details of this incident. Also call 911 in the event of an exposure so that someone will come to help you.



The *eyewash unit* is activated by pulling open the door. The water will begin to flow automatically from the nozzles so you can flush your eyes. This water can also be used to wash exposure to hands. Be sure to hold your eyelids open and flush eyes for at least 15 minutes.

The *safety shower unit* is activated by pulling the handle next to the eye wash station. This shower should be used for exposures to chemicals and physical conditions. Be sure to remove all affected clothing and rinse for at least 15 minutes.



- iii. Fire Extinguisher: For use in fighting small fires where the individual feels comfortable doing so. Always keep your back to the door so you have a means of escape. Call 911 with the location and nature of your emergency.



- iv. Personal Protective Equipment: Always wear PPE, as required for the laboratory you are working in. This will generally include safety glasses, closed toe shoes and long pants. Other items may include face shield, darkened/shading lenses for areas with high intensity lasers, ear plugs etc.
- v. Safety Data Sheet Information – SDS documents must be printed and kept in a readily visible binder in the laboratory for all chemicals. This binder must to be audited and maintained up to date at all times.

2. Procedures

a. Operation

i. Sash heights

- a. 18 Inches - During experimental activity the sash opening should be no greater than 18 inches.
- b. Sash Closed - For non-attended conditions the sash should be closed.
- c. Sash Height Override – This override function which allows the hood to open wider than 18 inches should only be used to move equipment or experiments into and out of a hood. At no other time should the sash be left in that position.

ii. Compressed Gas Connections

- a. Compressed gas cylinders must be secured to either the brackets provided on the fume hoods or by clamps attached to tables. All cylinders, empty or full, must be restrained by straps or chains at all times.
- b. Lines from the compressed gas cylinders should be routed through the provided seals on the sides of the hood. This will prevent conflicts with the sash and other equipment or workspace outside the hood.

iii. Utility Connections

- a. Be sure to use appropriate tubing and clamps as necessary to withstand the requirements of any utility (compressed air, cold water, natural gas, or vacuum) when connecting it to your experiment.
- b. Always remember to open the utility valve slowly to prevent over pressure in your tubing.

iv. Electrical Supply:

- a. Ground Fault Circuit Interrupter (GFCI) Outlets are provide on the hood for your use. Each outlet has a green light, a red light and a reset switch. If the outlet has no power, first check if the red light is on, then press and hold the reset switch. While running your experiment, if the outlet repeatedly trips, check whatever you have plugged into the outlet to ensure it is not causing a problem. If nothing obvious is

found discontinue use of the outlet and contact the lab manager, COE safety or your Department Administrative Assistant to request this situation be investigated.

- b. Light Switch – A toggle type switch is provided to turn on/off the interior lights of the hood and found in various locations depending on the hood configuration. Please remember to turn off the light when you are finished for the day.
- c. Power Mite Controller – This is a not a GFCI outlet but is provided with a 4 amp fuse. A rheostat is provided to allow the power to be varied for equipment use. The maximum power with this unit is 600 watts and has been factory calibrated for output at a given percent.
- v. Chemicals and Samples
 - a. All chemical containers must remain closed when not in use. Chemical containers in the hood should be positioned so that spillage cannot occur.
 - b. Samples and secondary chemical containers must all be labeled with the proper name of the material.
 - c. Do not store chemicals or waste in the hood. Put chemicals in proper storage areas, either under the hood or in a storage cabinet. Put wastes into their designated waste containers.
 - d. Housekeeping – Be sure to clean up used rags, gloves, pipets, broken glass etc. and place them in the proper waste containers.
- b. Maintenance
 - i. General: Ensure that all experiments are contained and will not spill, splash or spray inside the hood. Keep the sash closed, or as far down as possible when experiments are running. Never leave an experiment unattended.
 - ii. Housekeeping: Clean up spills, wipe down hood surfaces if splashes and sprays occur. This will prevent corrosion and reduce cross contamination by chemicals.
 - iii. Notify the lab manager, COE Safety or the Department Administrative Assistant if features of the fume hood are not functioning correctly. Things such as lights out, GFCI outlets tripping etc. should be reported so they can be fixed.

- c. Troubleshooting
 - i. If the GFCI outlet does not have power, and the red light is on, press and hold the reset button. The green light should come on. If this does not work, contact the lab manager, COE Safety or the Department Administrative Assistant for assistance.
 - ii. If the Accutrol is alarming
 - 1. Sash is open - you can silence the audible tone by pressing the silent button on the control unit.
 - 2. Due to an evacuation - you can also use the silent button to stop the audible alarm. You should wait for several minutes for the airflow to stabilize and to restart your work.
 - 3. Any other reason for alarm should be reported to the lab manager, COE Safety or Department Administrative Assistant for investigation.
- d. Emergency Situations
 - i. Fire (Drill or Actual)
 - 1. Turn off equipment used in your experiments. Follow the ESP instructions as applicable.
 - 2. Turn off the hood light.
 - 3. Close any compressed and natural gas supplies as appropriate.
 - 4. Close the sash on your hood since the building exhaust will be shut down.
 - ii. Spill
 - 1. Utilize a spill kit or procedures as specified in your ESP