MAJOR PROGRAM POINTS

"LABORATORY HOODS"

Part of the "LABORATORY SAFETY SERIES"

Quality Safety and Health Products, for Today...and Tomorrow

Outline of Major Points Covered in the "Laboratory Hoods" Course

The following outline summarizes the major points of information presented in the course on "Laboratory Hoods". The outline can be used to survey the course before taking it on a computer, as well as to review the course when a computer is not available.

- **Many of the materials we work with give off hazardous contaminants.**
  - Fumes.
  - Mists.
  - Vapors.
  - Particulates.
  - Aerosols.

- **To minimize exposure to these materials we must take special precautions.**
  - This often means working within a "hood".

- **We can look at how hoods function by using the "chemical exhaust hood" as an example. They:**
  - Prevent contaminants within the hood from entering the "breathing zone".
  - Create a protective barrier by pulling air into and through the hood.

- **The hood's "inward" airflow keeps hazards from escaping.**
  - Captured contaminants are filtered, diluted and exhausted through a duct system.

- **Hoods can also provide protection from "physical" threats**.

- **The sash protects workers from hazards such as:**
  - Chemical splashes.
  - Sprays.
  - Fires.
  - Minor explosions.

- **You should pull the sash down as far as possible when you are working.**
  - But keep it at a comfortable level.

- **When working within a hood, personal protective equipment is still required. This can include:**
  - Safety eyewear.
  - Lab coats.
  - Gloves.
  - Other protection if necessary.

- **To make sure that they are operating safely, hoods are thoroughly tested in several situations.**
  - When they are first installed.
  - Whenever a change is made in the lab's ventilation system.
  - Periodically throughout the year.

- **There are specific steps to follow to determine if a hood is operating correctly.**

- **Air circulation around the hood ("crossdraft") should be checked first.**
  - Measure it six inches from the front of the hood.
  - It should not be greater than 20 linear feet per minute.

- **Next, a smoke tube should be used to make sure airflow within the hood is correct.**
  - Smoke should head for the ventilation ducts.

- **The rate of air coming through the face of the hood ("face velocity") should be measured next. To do this:**
  - Open the sash.
  - Use instruments such as "anemometers" or "velometers" to get measurements.
  - Don't use sheets of tissue or other paper as a substitute.

- **Measuring this "face velocity" requires great precision.**
  - The hood face is divided into a grid pattern.
  - The air velocity is measured in each quadrant.
  - Values for specific points can vary +/- 25%.
  - But no measurement should be below 60 feet per minute.

- **The face velocity is also compared to the crossdraft.**
  - The crossdraft should never be greater than 20% of the face velocity.

- **If problems are apparent, several things will need to be checked or adjusted, including:**
  - Interior hood baffles.
  - Laboratory ventilation systems.

- **Checking for turbulence within a hood is also important.**
  - Use "smoke patterns" for this purpose.

- **If excessive turbulence is seen (or smoke is not captured) a number of things should be checked, including the:**
  - Location of equipment within the hood.
  - Hood's face velocity.
  - Location of air-input ports.
  - Physical location of the hood itself.
  - Volume of air coming into the hood.

- **If you suspect a hood isn't performing properly, talk to your supervisor about possible retesting.**

- **Laboratory hoods must also be used correctly to be effective.**
  - Maintain proper airflow within the hood.
  - Perform experiments at least six inches inside the hood.
  - Elevate equipment (especially large pieces) if necessary.

- **Hoods should not be used as storage cabinets.**
  - Overloading restricts the airflow.
  - This can result in dangerous build-up of hazardous vapors.
  - Chemicals stored in hoods can make an emergency or fire worse.
  - If you are not actively working with a material in the hood, put it away.

- **You should take steps to prevent contaminated air in hoods from entering the laboratory**.
  - Keep the sash closed as much as possible.
  - Pay attention to air monitors.

- **Checking face velocity of a hood regularly is important.**
  - Average velocities range from 80-100 linear feet per minute.
  - Higher velocities of about 125 linear feet per minute may be required for some experiments.
  - However, higher velocities can create turbulence and should not exceed 150 linear feet per minute.

- **It is also important to exercise caution around hoods.**
  - The airflow must not be disturbed.
  - Even velocities of 100 linear feet per minute can be overcome by rapid movements in front of the hood.

- **Solid objects should be kept from entering a hood's exhaust ducts, so they don't:**
  - Lodge in a duct or fan.
  - Adversely affect airflow.

- **Never place your head inside an exhaust hood.**
  - This disrupts airflow.
  - You risk being overcome by potentially hazardous fumes/vapors.
  - If a hood needs adjusting, consult your supervisor.

- **"Biohazard hoods" are different from exhaust hoods.**
  - They are designed to capture exotic and infectious particulates.
  - Most often they are used with clinical specimens or body fluids.

- **The main feature of biohazard hoods is their filtering system.**
  - It captures and removes hazardous aerosols before they can be recirculated or exhausted.
  - The most effective filtering system is the "high efficiency particulate air" (HEPA) filter.

- **HEPA filters have unique characteristics. They:**
  - Are disposable, dry-type filters.
  - Are constructed of "boron silicate" microfibers.
  - Can capture particles as small as 0.3 of a micron with 99.9% success rates.

- **Remember, HEPA filters do not guard against hazardous gases.**
  - If the substances you are working with give off both particle and gases, talk to your supervisor about the proper hood to use.

- **There are other specialized hoods for work involving specific materials, including:**
  - Perchloric acids.
  - Radioisotopes.

- **"Perchloric acid hoods" have unique characteristics and uses.**
  - They incorporate a "wash-down" capability.
  - This prevents dangerous build-up of reactive residues.
  - But never use these hoods with organic materials (it can cause explosive reactions).

- **A "radioisotope hood" should be used when working with radioactive material. It:**
  - Is impermeable to such materials.
  - Will minimize dangerous exposure.

- **No matter what sort of hood you are using, and what precautions you take, things can still go wrong.**
  - It is important to be prepared for accidents.
  - Spills need to be dealt with immediately.
  - Follow your facility's cleanup procedures.
  - Soak up spills with absorbent materials.
  - Dispose of resulting residues properly.

- **Small fires can also occur in hoods.**
  - If possible, put out fires with extinguishers or through suffocation.
  - If they are uncontrollable, close the sash and evacuate the area.
  - Sound alarms and call for assistance, if needed.

- **Ventilation failures can also occur with hoods. They:**
  - Can be caused by malfunctions in electrical lines.
  - May result in the release of harmful fumes, vapors or particles.

- **So you need to know your facility's Emergency Plan.**
  - It will help prepare you for equipment failure or other problems.
  - Consult your supervisor to obtain a copy.

*** * * SUMMARY * * ***

- **Remember to be careful when using laboratory hoods.**

- **Hoods are used because materials are hazardous.**

- **Maximize your hood's ventilation.**

- **Keep experiments six inches inside the hood.**

- **Keep hood sashes down as far as possible.**

- **You will be safe if you choose the right hood for the job. But you must work with the hood correctly.**