Jewelry & Glass Safety Manual

Poison Control: 1-800-222-1222

HACC Security/Emergency number: 780-2568
HACC Department of Environmental Health and Safety 221.1300 x:1567

If the emergency is life threatening call 911, or ask a professor or secretary to call.

Chemicals enter the body through the skin, inhalation and ingestion. Smoking increases the hazards of respiratory reactions.

Art materials may be:

Toxic, cause physical injury via breathing (inhalation), eating (ingestion), or by skin contact & absorption
Caustic, may burn you on contact
Irritant, cause skin, eye, mucous membrane inflammation or pain
Flammable, can ignite or be set on fire
Explosive, may explode when exposed to heat, pressure or shock

GENERAL PRECAUTIONS:

Do not eat or drink close to work area (to prevent accidental ingestion).
Familiarize yourself with substances that are hazardous.
Clean hands thoroughly after working using baby oil, soap and water, or a non-toxic hand cleaner such as GoJo.
Keep work area clean and organized.
Ask your doctor if you are taking medication or are pregnant about what precautions you should be taking.
Identify location of fire extinguishers, first aid box and eye wash stations (ask your professor if need be).
Notify your professor about any health condition or medication that may affect you in the classroom.

Material Safety Data Sheets (MSDS) are available at https://myhacc.hacc.edu/cp/home/displaylogin or contact the Department of Environmental Health and Safety at 221.1300 x:1567.

Jewelry supply sources:
Rio Grande: http://www.yourriogrande.com/downloads/msds.htm
Reactive Metal Studio: phone or email to get product information

Glass supply sources: Olympic Color Rods: www.glasscolor.com

JEWELRY

All HACC students may use copper, zinc, bronze alloys and plastics. The fumes from these materials may cause flu-like symptoms several hours after exposure (zinc shakes, welders fume fever). There are no known long term effects. Pickling compounds and mold materials, wax, solvents and degreasers, grinding and buffing and etching compounds are all used and may have various hazards. Silver and gold is less often used and has no serious hazards. Metals or chemicals that may not be a hazard when inert, may produce fumes or other hazards when they are heated or come into contact with each other. When heat is applied to metal it cause fumes to be emitted and when metal is cut, dust and particles are created. Solvents and cleaners may be caustic and have toxic fumes. Cutting, soldering, etching, casting, electroplating, pickling, lampworking, annealing, cleaning and polishing are all different jewelry processes involving sharp tools, various chemicals and high temperatures.
Always use tools for the purposes they are intended for. Use ear plugs with long exposure to noisy machines or hammering. Get instruction on how to use the drill press, sheet metal shear, rolling mill and other tools.

Quick Overview of Hazards

Silver soldering - Cadmium fumes, fluoride
Pickling Baths - Acids, sulfur oxides
Gold Reclaiming - Mercury, lead, cyanide
Lost Wax Casting - Investment- silica; Wax burnout - wax fumes, carbon monoxide; Crucible Furnace - carbon monoxide, metal fumes; Metal Pouring - fumes, infrared radiation, burns

PRECAUTIONS

- Protect skin and eyes by wearing gloves, aprons and goggles when handling acids, caustics, solvents and other chemicals and when buffing. Note location of eye wash station.
- Work with adequate ventilation, using an exhaust fan, or fume hood, or similar set up when appropriate.
- Choose the safest materials. When possible avoid fluoride fluxes, patinas containing sulfides, and cleaners containing cyanide (not used at HACC).
- Follow directions carefully. If you haven't been trained on a certain process or piece of equipment DO NOT use it.
- Never mix different kinds of fluxes, cleaners or patinas.
- Remove all residue from degreasing before soldering or heating metal to avoid the release of highly toxic gases.
- Be aware of electrical hazards.
- Be aware of fire hazards. Do not work near flammable materials with an open flame. Do not wear loose clothing, tie back hair.

Store solvents, degreasers, colorants, mold materials, buffing compounds and pickling materials in closed, flame proof storage lockers.

Note location of fire extinguishers and other safety equipment such as first aid and eye wash station.

Cleaning and Degreasing

HAZARDS

Grinding and buffing compounds may cause silicosis and lung allergies.

Some equipment moves at a high speed. Don't wear loose clothing, or jewelry while operating. Tie hair out of the way.

Solvents used for cleaning and degreasing are liable to be toxic.

Acids and ammonias produce fumes that irritates the respiratory system.

Hydroxides are corrosive to skin and eyes.

Sparex, a milder acidic solution is less toxic but still may cause skin and eye damage on contact and emits irritating sulphur dixoide on contact with hot metal.

Etching, Patinas and Colorants

HAZARDS

Hot Pickle baths may cause burns.

Chemical exposure to ferric chloride and ferric nitrate occurs when etching metal.

Liver of sulfur, used to darken metal releases highly toxic hydrogen sulfide gas, identified by the rotten egg smell. MSDS sheets may *not* contain information about chemical reactions that occur when sulfides react with metal. Use caution.

Colorants vary widely in toxicity, but assume all are capable of heavy-metal poisoning.

Reactive metals are prepared with Multi-Etch which produces ferric chloride and ferric nitrate, moderately toxic.

Anodizing

HAZARDS

Electric shock may occur when anodizing metals

Soldering

HAZARDS

Fluxes are complex chemical compounds and may be very toxic, all will release toxic fumes when heated. Fluxes can be organized into the following groups: Acid, Borax, Fluoride, Organic and Rosin. Acid fluxes are the safest and fluorides the most toxic. Take precautions when using fluoride flux.

Burns from chemicals or open fire or hot metals

Fire is a hazard in the jewelry studio. Certain chemicals are highly flammable

Do not use cadmium solders or beryllium, found in super easy solder, both cause acute and chronic lung disease.

Compressed gas: acetylene canisters are used in the HACC jewelry studio. They are flammable and can explode since they are under pressure. Roll canisters instead of dragging. Protect against dropping. Do not tamper with safety valves. Use in an upright position. Store away from combustible materials.

Casting

HAZARDS

Kilns may emit fumes, make sure of adequate ventilation.

Mold materials (plaster, sand, talc) contain silica which causes silicosis (scarring of the lungs); may also contain asbestos which causes cancer.

Argon gas is used with vacuum casting. It is inert, colorless and tasteless; if it builds up in an enclosed space it can asphyxiate those in the area.

Centrifuge casting machine spins at high speed, wear eye protection when using.

Glass Bead Making (Lampworking)

HAZARDS

See section under Glassblowing for more information

Propane gas is used as a fuel. It is highly flammable and may explode.

Oxygen (from oxygen concentrators) is used with propane to fuel torches. Oxygen alone is not flammable, ordinary combustible materials will burn violently or even explode in the presence of oxygen.

Liquid glass can cause burns.

GLASS BLOWING

Glassblowing involves various processes HACC which may include batching (making your own glass, generally not done at HACC), firing, melting, working, annealing, slumping and fusing. HACC generally uses scrap glass (cullet) in the shop. All glass contains silica and flint as well as other chemicals. Colorants may be added to molten glass. Common colorants are oxides or cabonates of chromium, copper, cobalt and manganese. Kilns and ovens may reach extremely high temperatures (2,500-3,000 degrees F). Advanced processes, such as metallic decorating or mirroring, are generally not in use, refer to *Artist Beware* if attempting.

Quick Overview of Hazards

Students should be aware that glassblowing requires much physical stamina. It involves the need for focused attention while doing physically demanding work in a high temperature environment.

Batch Process - Lead, silica, arsenic, other metals (only cullet used at HACC)
Furnaces - Heat, infrared radiation, burns
Coloring - Metal fumes
Etching - Hydrofluoric acid, fluoride salts
Sandblasting - Silica

PRECAUTIONS

Always work in pairs in the glass shop (no one is allowed to work alone).
Locate the first aid kit and have a procedure for treating burns. Burn gel is in the first aid kit.
Use cullet to avoid exposure to toxic chemicals.
Use an exhaust hood above the kiln.
Do not eat or drink in the work area.
Wear appropriate clothing, including closed toe shoes and tie hair back, when working and when cleaning.
Wear approved eye protection (UV and particle protection).
Take frequent rest breaks from kiln area in a cool environment and drink lots of fluids to replace water loss.
Use fire brick instead of refractory ceramics fibers for insulation where possible.
Add colorants to molten glass under canopy exhaust.
People with health problems should avoid glassblowing. Pregnant women should consult their doctor.
Get instruction on grinding and polishing machines before using.

HAZARDS

Gas fired kilns give off carbon monoxide which is highly toxic.
Heat stress.
Burns from molten and hot glass and kilns and tools.
Fire - clothing and hair may catch on fire.
Infrared radiation from molten glass may cause skin damage similar to sun burn. It may also cause chronic inflammation to the eye lid or lens.
There is a fire hazard with electrical and gas components.
Insulating components made from refractory ceramics fibers are probable carcinogens.
Chronic inhalation of silica can cause silicosis and lung cancer.
Highly toxic chemicals used in glassblowing: arsenic oxide, antimony oxide, sodium cyanide.
Metal colorants that are carcinogens: Cadmium, chromium, nickel and uranium
Corrosives: Potassium carbonate, sodium carbonate and lime.
Moderately toxic by ingestion: potassium bitartrate and sodium potassium tartrate.

Other Resources

The Artist's Complete Health and Safety Guide, Monona Rossol, Allworth Press, NY (available in the studio and the McCormick Library)
Artist Beware, Michael McCann, The Lyons Press, NY (Available in the studio and the McCormick Library)
Health Hazards Manual for Artists, Michael McCann, The Lyons Press, NY (available in McCormick Library) and online at http://www.uic.edu/sph/glakes/harts/HARTS_library/index.htm
Making Art Safely, Merle Sanforfer, Deborah Curtiss and Jack Snyder, Van Nostrand Reinhold, NY (available in McCormick Library)
New Jersey Department of Health website provides organized lists on hazardous substances, similar to MSDS, possibly easier to understand - http://nj.gov/health/eoh/rtkweb/index.shtml

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