Chemical Safety

By Charles Lewton-Brain

Chemical safety begins with education. A shop should have a binder that identifies the chemicals on hand (e.g., sulfuric acid, plating solutions) as well as the chemicals found in specific products. (The bleach contained in certain cleansers, for instance, when mixed with ammonia forms chlorine gas—a killer of dozens of people annually in the U.S.) This binder should remain within reach of all shop employees.

A Safety Data Sheet (SDS) should be included for each chemical listed. You also might want to include a chemical profile sheet. Each profile should include the following information:

- ✓ The chemical's name.
- ✓ Common synonyms (one chemical can have many different names).
- ✓ The purpose of each substance and how it should be used.
- ✓ The toxic effects.
- ✓ The ventilation and protective equipment required.
- ✓ Possible substitute solutions that are less toxic.
- ✓ The quantity of the chemical on hand in the shop.
- ✓ Where and how the substance is stored.
- ✓ The required disposal procedures.
- ✓ The manufacturer's name and contact information.

The binder should also include step-by-step emergency plans in case of fires, medical emergencies, or chemical spills; local police, fire, and rescue contact information; and the local regulations for chemical storage. (Check with your fire department for guidelines; sometimes flammables are heavily regulated.)

Accidents just as often result from improper storage procedures. To prevent such occurrences, make sure you keep your chemicals in a space that's well ventilated, cool, and not subject to direct sunlight (like a window that faces the sun at a certain time of day). Store liquids and solids in separate areas, preferably under lock and key, and do not keep any chemical in a corridor or in a heavily traveled aisle.

You should also make sure that incompatible chemicals, such as acids and cyanides, aren't stored side by side; if they ever leaked into each other, lethal hydrogen cyanide gas could be released. Store acids separately from the other chemicals and preferably some distance from each other (especially nitric acid). Also, keep flammable solvents in a proper fireproof cabinet, according to the local regulations. Safety cans should be used for flammable liquids in the work area.

Just as important as where a chemical is stored, though, is how it's stored. I always recommend the following guidelines:

- ✓ Keep the chemicals in tightly closed, unbreakable containers, the ones they came in if possible. (Tupperware products are also among those

most recommended.) Never use containers that could be mistaken for those in which you store food or beverages.

- ✓ Have the chemicals at a height that puts them within easy reach; the best is just below eye level.
- ✓ Store the chemicals in considered amounts; try to have just enough on hand to last several months.
- ✓ Get rid of any chemicals you do not use or need.

I also always recommend that the mixing or transfer of chemicals in the storage area be forbidden, and that all containers be returned to their storage spaces immediately after use. Finally, a spill kit should always be on hand, because the one thing to remember with chemicals is to always expect the unexpected.

Chemical Checklist

Your shop may contain some of or all the chemicals listed below. Each should all have an SDS available for review.

Polishing and cleaning products:

- ✓ brighteners
- ✓ descalers
- ✓ polishing compounds
- ✓ burnishing compounds
- ✓ ultrasonic cleaning solutions
- ✓ tumbler additives, conditioners
- ✓ denatured alcohol
- ✓ tumbler additives, cleaners

Casting products:

- ✓ investment compounds
- ✓ cleaners to remove investment pump oil
- ✓ flushing oil

Soldering products:

- ✓ pickle
- ✓ flux
- ✓ anti-firescale coatings
- ✓ boric acid
- ✓ potassium hydroxide pellets
- ✓ methyl-ethyl ketone
- ✓ methanol

Electroplating solutions:

- ✓ plating bath additives
- ✓ pre-plate solutions
- ✓ oxidizers
- ✓ acid activators
- ✓ tarnish removers
- ✓ coatings to prevent tarnish
- ✓ electrolyte solutions

Other products:

- ✓ epoxy
- ✓ adhesives
- ✓ epoxy solvents
- ✓ hardeners
- ✓ shellac
- ✓ etching products (including hydrofluoric acid)

Use the worksheet on the following page to maintain a running inventory of all chemicals in the shop.

Chemical Inventory Worksheet

Date: _____ **Name of Person Who Conducted Inventory:** _____

Name of chemical	MSDS available?	List each work area in which chemical is used	CAS #