



Safety First

Glass Art Safety Manual

A comprehensive guide for glass artisans

**Whether you are a glass art hobbyist
or a professional glass artist,
it should always be SAFETY FIRST**



Glass Campus

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Introduction

I tried to include everything important to safe work practices in this safety manual and had lots of great help doing it – but there is sure to be things we missed. Help us keep it up to date. We will be routinely updating it. Please let us know if there is anything you think should be changed or added. Creating this manual was a cooperative effort. Help continue upgrading and updating it as a cooperative effort.

***Safety is a working attitude.
Don't do it the easy way - do it the safe way***

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Chapter 1 – Attitude

How well you do anything depends most on your attitude towards doing it.

- How important is work safety to you?
- Are you willing to make the effort to create a safe workplace?
- Will you enforce safe work practices – on yourself as well as others?
- Is work safety a “When I remember” or is it “Always important”?

Think Safe – Plan Safe – Be Safe

Make the Effort

You’ve taken the time to learn how to work with glass. Perhaps you should also take the time to learn to be sure it is always done safely? If you teach, you might also take the time to learn what to do if an accident happens?

- Devise a plan for safety
- Put together a first aid kit.
- Learn some basic first aid.

Embrace Optimism

A pessimist will say,

“Accidents happen. Nothing I can do about it”.

An optimist will say,

“I can prevent accidents from happening if I work at it”.



Chapter 2 – Handling & Storing Glass

Glass is sharp and can cut you. It can cut you a little or it can cut you a lot. It can even cut you enough to kill you. Only fools fail to respect how much damage glass can do. Always take special care when handling glass.

Crab grab

When handling small pieces of glass avoid pressing against the sharp edges. Instead, grab it the way a crab grabs with pinchers.

Gloves

Glass is heavy. If you carry it with bare hands the weight of the glass can cut you by pressing into your flesh. For carrying sheets of glass you should wear gloves or hold a piece of cloth beneath the glass.

Suction Cups

Transporting large sheets of glass can be especially dangerous. You should use glass suction cups designed specially for this. When you use suction cups take special care to clean the glass before attaching them. If the glass is dirty, or has some contaminants, suction cups can release. Wouldn't that be interesting if you were carrying a sheet of glass the size of a sheet of plywood and the suction cups let go and dropped the glass.

Tempered Glass

It takes more to break tempered glass than to break regular glass but when tempered breaks it does it explosively and breaks into small chips about the size of a pencil eraser. It's a myth that these pieces are always safe to handle. You can handle the chips by hand if you do it slowly but using a tool or wearing gloves when handling the chips is a smart practice. You must be especially concerned about it when it first breaks. A percentage of the chips will have razor sharp edges than can inflict serious damage – especially when it blows apart. Tempered glass is hard to break if you hit it on its face but it breaks easily and dramatically if you tap the edge on anything metal or concrete. Wear eye protection when working with tempered glass.

Footwear

If you have glass stored in racks where the glass is within 8 inches (20 cm) of the floor there is a risk of accidentally kicking it. It is a near universal practice in glass shops, and should be in your studio, to ban open toed footwear.

Storage

Take special care when you store glass to keep it pushed back and not protruding where someone can walk into it. Glass is heavy. Be sure any storage shelves you build are strong enough to handle the weight.

Transportation

Glass is strong but brittle. It cracks easily. It cracks more easily when laid flat than when stood on edge vertical. When you store glass or transport it, try to always stand it vertically.



Chapter 3 – Safety Equipment

You have tools and equipment around your studio or shop to make things. You should also have equipment to ensure safety.

Fire Extinguishers

They don't have to be too great big ones. If you have a small shop, a small extinguisher is all you need. Check your fire extinguishers routinely to be sure they are refilled when needed. Place one near anything that might cause a fire. Near where you are running anything that might create a spark or generates heat. You should keep your fire extinguisher upside down and periodically shake it to be sure the chemicals in it are mixed and not settled.

Not all fire extinguishers are for all fires. Different contents are for different kinds of fire.

Water YES for combustible materials like paper and wood.
NOT for flammable materials or electrical fires.

Foam YES for combustible materials and for flammable liquids
NOT for flammable gas, flammable metals or electrical fires.

Dry Powder YES for everything except grease fires.

CO2 YES only for flammable liquids and electrical fires
NOT for combustible materials or for flammable gases or flammable metals.

Fire alarms

Fire alarms are usually only installed in schools or large commercial locations. If you conduct classes using open flame torches fire alarms might be legally mandatory. If you're not sure, check with your local Fire Marshall. If you teach as a guest instructor in a place that has fire alarms, make a point of knowing where they are.

Smoke detectors

These are inexpensive and should be placed anywhere there is any chance of fire. If the ones you use work on batteries, keep a record to schedule routine replacement. Detectors don't work well with dead batteries.

CO detectors

If you're burning natural gas, propane, or any petroleum fuels you should have a CO detector to warn of dangerous levels of carbon monoxide.

Propane detectors

If you burn propane you should have a propane detector to warn of any leaks. We all know propane has a distinctive odour but you could be in a different part of your shop and not notice a leak that has reached a dangerous level ready to combust. A spark in a room filled with propane can level a building.



Chapter 4 – Safety Tools

There are some tools and equipment you might not think are essential but should consider having available in your studio.

Safety Glasses

I'm sure that by now you've been told to wear safety glasses – probably several times. Well, I'm going to tell you again. This is so important, it can not be stressed too much or repeated too many times. Dozens of times I've had to rinse a glass bit out of someone's eye, or wait in the Emergency ward for a doctor to extract something. It gave me a serious respect for how easy it can happen - when someone thinks, "It's just a quick cut, it'll be okay." or, "Just a quick grind to this one piece. I don't need the glasses."

You can buy expensive glasses, or cheap ones – any kind is better than nothing as long as you do wear them. Cheap safety glasses work fine. They just won't last as long as the more expensive brands. Whatever kind you choose, it's a smart idea to get ones that have a bottom that sits against your cheek. When you break glass or grind it, shards can fly up, hit your cheek just under your glasses, bounce off the inside of the glasses, and go straight into your eye. This happens often while grinding, when the glass bits will be travelling fast enough to imbed firmly into your eye. I mentioned this was important didn't I? Well, it's so important, I think I'll say it again. **WEAR SAFETY GLASSES.**

You should have safety glasses for you, and have some for students. Make it a fixed practice to always wear them yourself when working with glass and equally make it a practice to have all your students wear them. If you wear prescription glasses you should buy safety glasses designed to fit over them. Many artisans assume their prescription glasses will function as safety glass. That's not a good idea but it is better than nothing.

Hearing Protection

Loud noises can cause permanent hearing loss. When you're working with anything that produces a lot of noise you should always wear hearing protection. Ear plugs or ear muffs are a small investment to protect your hearing. Buy hearing protection and wear hearing protection. Inexpensive ear muffs work but if you spend more than just a few minutes at a time working with machines that makes loud or high pitched noise you should invest in high quality protection. Some examples of machines likely to cause hearing damage are:

- Sandblasting
- Vacuums
- Wet belt sanders
- Grinding or lap machines
- Saws.

Disposable dust masks

Just as you should always have a quantity of bandaides in your shop, you should also have a supply of disposable masks – for you and for any students. Many of the materials used in glass art produce hazardous dust. Educate yourself on which materials are hazardous and which are just a nuisance. If you're not sure they're safe, assume they aren't and wear a mask.

Respirator

Some materials are so dangerous and so serious you should not rely on a simple dust mask but instead have a fully sealed respirator. An example of that would be sandblasting with sand. It creates super fine silica dust that can get under the edge of a disposable dust mask.

Disposable gloves

Some of the chemicals used in glass art (flux, patina, solvents, etc) are corrosive. You should keep a supply of disposable gloves for working with them.

Work Gloves

You can handle glass without gloves but wearing gloves (especially carrying large sheets) will make it less likely you'll get cut. Using glove is a personal choice. It's not essential. Some artisans like them, others hate them. If you give classes, some students might feel uncomfortable handling glass with their hands. You should have gloves available for them to use. There are gloves available that are specially for working with glass but inexpensive cotton gloves are usually all that's needed. Many artisans like to work with cotton gloves to avoid getting fingerprints on the glass after they've cleaned it.

Bench Brush

Keeping a brush handy so you can sweep glass bits away will greatly reduce how often you get cut or collect glass slivers.

Vacuum

A good shop vac with a HEPA filter will allow you to routinely remove dust. You might consider one of the small battery powered ones for your work table and for cleaning out your kiln.

Paper Towels

Inexpensive and handy for cleaning glass and wiping up spills..

Cloth Rags

Always handy for cleaning up spills where you don't want to use paper towels.



Chapter 5 – First Aid Kit



If you want to invest in one, you can get a first aid kit that will do almost everything short of a heart transplant but unless you expect a need to perform major surgery it's unlikely you need major equipment. But, you will need a basic first aid kit for emergencies. Mark it clearly and place it somewhere easy to see and easy to get at. A minimum kit should include:

Bandaides

Lots of bandaides. You'll use lots of bandaides. Buy the biggest box you can find. You'll need them. I tell students, "If you work with glass you will inevitably cut yourself".

If the sight of blood disturbs you, take up pottery.

In addition to regular bandaides, include some butterfly bandages. They work well to hold a cut together while it heals.

Gauze pads & bandage

You hope you'll never have need for anything more than a bandaide but you should have some bandage material just in case something really serious happens. You should have something to use as a pressure bandage if someone gets a seriously deep cut of is on blood thinners. In an emergency, a small clean towel or sanitary napkin works wells.

Duct tape

You should always have some duct tape. Duct tape fixed everything. One time my son Dane sliced himself badly on a broken piece of glass. Much too big and too deep a cut for bandages. I wrapped it with a towel and tied it on with duct tape. Did the job perfectly to stop the bleeding while we zipped him away to the nearest clinic for stitches. Duct tape is also an effective way to remove glass slivers. If you don't use the duct tape for taping on splints or bandages, you can always use it to repair broken tools. Always have duct tape.

Ichthammol ointment

This is also known as black drawing salve. It's a very effective, non-invasive way of removing splinters. Available over the counter at most pharmacies, this ointment works by softening the skin around the splinter, allowing the body to expel the splinter naturally.

Liquid skin or crazy glue

A very effective to stop bleeding on a small cut. Especially if you want to continue working and don't want blood dripping all over your work.

Q tips

These are great for applying cream or antiseptic.

Tweezers

Always handy for removing splinters. Can also be borrowed to help position stringers and small pieces of glass on one of your projects.

Antiseptic

A small dab of disinfectant can prevent a cut from getting infected. I like isopropyl alcohol. It's a great disinfectant. I can also use it to clean dirty glass and remove residual glue from glass labels.

Burn ointment

If you work with open flames, soldering irons or handle hot glass from a vitrigraph you are likely to burn yourself. Rinse with cold water and have some soothing cream or ointment ready for if that happens.

Box cutter

Sometimes the best way to get a glass sliver out is to cut it out. A scalpel works better but a box cutter or stencil knife can do the job when needed. If you've been using it to sharpen pencils or cut fiber paper, wipe it with antiseptic first.

Disposable gloves

If you need to care for someone that has been cut or burned, there is a double risk of infection. They could have something you can contract from contact with their blood and they can get an infection from something on your hands. You should always have a supply of disposable gloves.

Learn

It isn't enough to just have a first aid kit. Learn how to use it. An essential part of your safety plan should be knowing what is needed for different accidents and knowing how to use the different tools and materials.

Display

Display your first aid kit where it's noticed.

- If it's needed, it should be easy to access.
- A prominently displayed first aid kit reassured everything that one is available.



Chapter 6 – Chemicals

Most glass artisans use some chemicals that could be a serious safety hazard if not handled and stored safely. Be prepared for accidents and have a plan in place if one happens.

Flammables

Any flammable material should be stored well away from anything that produces heat. You should have a fire extinguisher readily available anywhere you have flammable materials. If you can, store flammable materials outdoors and not in your studio.

Solvents

Many solvents are both flammable and corrosive.

Cleaning compounds

Most are harmless but some are flammable. Check the labels. If in doubt, assume the worst.

Paints

Some paints, like latex, are harmless - but others, like enamels, can be flammable.

Acids

If you have any acids in your studio be sure you have on hand neutralizers like powdered chalk or baking soda.

Patina

The patinas used for stained glass give off noxious fumes and are corrosive. Be sure to have adequate ventilation when working with them and have neutralizers handy.

Flux

Flux used for stained glass soldering gives off fumes that are both toxic and corrosive. Take special care to thoroughly ventilate when using it. Also, flux is an acid. As with any acid, you should neutralize it before disposing of it.

Neutralizing Solution

Powdered chalk or baking soda mixed in water work well to neutralize acids. If you work with any acids, you should have a container of neutralizing solution prepared in advance in case you ever need it.

Better to have and not need than to need and not have.



Chapter 7 – Waste Disposal

Some materials used in glass art are flammable, hazardous or toxic. The containers and any remnants in them can be dangerous. Take care how you dispose of them. Safety considerations should include safety to the environment as well as safety for you and others. Dispose of your waste safely and responsibly.

Drain it

Some materials that should never be poured down the drain unless thoroughly neutralized include:

- Etching acids
- Patina
- Flux
- Solvents
- Paints
- Glues

Trash it

Empty containers from toxic or corrosive materials should not be sent to your garbage can or dumpster but should instead be sent to where they can be safely and responsibly disposed of. That would especially include any spray cans and containers from solvents or paint.

Recycle it

Although it's not a safety issue, it's a good practice to recycle materials wherever possible.

Neutralizing Acids

You can buy neutralizing solutions or making your own from baking soda. Just stir baking soda into warm water and keep stirring and adding until no more will dissolve. You can strain out any undissolved residue or just leave it to settle. As some of the level is lowered, add water and stir again.

Straining sediments

Clay particles, glass dust or grit remnants from grinding or sanding glass can plug up your drains. If you pour any liquid with any solid material in it, you should strain it to remove the particles for separate disposal. You could install a sediment trap on wherever you pour it out or you could strain it as you pour it. A disposable paper coffee filter makes a effective low cost sediment strainer.



Chapter 8 – Dust

Dust is a serious hazard that is too often ignored or overlooked when working with glass. Many of the materials used in glass art work create dust. Most of that dust is just a nuisance but some of it is hazardous and can do serious harm if inhaled. The most effective way to avoid inhaling dust is by vacuuming it away. When you use a vacuum to remove dust be sure it has a HEPA filter so it will trap the dust into the filter and not send it back into the room for you to breath in. If your work creates a lot of dust you might consider installing an air purifier.

There are two categories of dust. Nuisance dust and hazardous dust. All dust is a nuisance but not all is hazardous. Dust issues generate many Safety Silly warnings that start from well-intentioned concerns but expand into needless fear mongering. Take the time to learn what category different dust is.

Hazardous Dust

Glass dust

It's important to be especially careful to avoid inhaling glass dust. When you clean up glass dust do it with a wet sponge or cloth. If inhaled, glass dust can cause serious and permanent damage to your lungs. You can't just go to the hospital and have it removed. Once you breath glass dust in, like asbestos, it's in there forever. Protect your lungs – keep the glass dust wet or wear a dust mask.

Glass powder

Many artisans work with glass that have been ground to a fine powder. This is as hazardous and as damaging as glass dust.

Silica

If you sandblast with sand you will produce silica powder. This is as hazardous as glass dust. If you are sandblasting in other than an enclosed sandblasting cabinet, a dust mask is not enough. You should wear a sealed respirator. If you use casting mix that contains silica you should wear a mask when working the with powder and take special care when working with molds or castings made from casting mix.

Mica

Mica is a very fine powder that can be as hazardous as glass dust or glass powder. If you work with mica, take great care to avoid inhaling it.

Kiln paper

Some makes of kiln paper contain silica or ceramic particles. If you're not sure if the kind you're using contains silica or ceramic check with the manufacturer. After firing, some kiln paper is reduced to a fine layer of ash. As with all ceramic fiber material, avoid breathing in any residual dust. Dispose of it either with a HEPA filtered vacuum or by carefully sweeping it up.

Ceramic Fiber Blanket

Contains ceramic fibers. If you don't handle it carefully it will distribute ceramic fibers into the air for you to breathe in. Ceramic fibers are as hazardous as glass dust. Always handle with great care.

Ceramic Fiber Paper

Same as ceramic fiber blanket.

Ceramic Fiber Board

Same as fiber blanket and fiber paper.

Vermiculite Board

This is an excellent material for making molds and kiln shelves and can be cut with any woodworking tools – but when being drilled or sawed it produces a fine dust that if inhaled is hazardous. Wear a dust mask when cutting it.

Nuisance Dust

Plaster

Plaster dust is a nuisance the same as drywall dust. You should wear a mask if you're spreading it around where you will inhale it but breathing in small amounts is not a serious health risk. Just a nuisance.

Kiln Wash

Dust from kiln wash is a nuisance by not seriously dangerous. It should be treated the same as drywall dust. A small amount won't hurt you. If you're bothered by it, wear a dust mask. The cheap disposable kind works as well as any other.

Aluminum Oxide

Aluminum oxide is the material used on carpenter's sandpaper and used by some artisans for sandblasting glass. You should avoid breathing in large amounts of it but small amounts are just a nuisance.

Silicon Carbide

Silicon carbide is used for wet belt sanders, for lap grinders and for sandblasting. Like aluminum oxide, it's a nuisance dust. Wearing a dust mask when working with it is a good idea but not essential.

Dust Extractors

If you generate a lot of dust you might want to install a dust extractor where you work. The key difference between shop vacs and dust extractors is where vacuums use high speed air through a small hose, extractors use slower moving air through a larger hose. They work by creating a continuous controlled air flow to draw out all dust particles.



Chapter 10 – Ventilation

Whether your need is to exhaust fumes from soldering, from torching or for anything else it's important to have enough ventilation to remove dust and fumes.

Control the air flow

You don't need a fan so powerful it can vacuum the tools off your work table. You just need to control where the air moves. Air that is moving slowly in a controlled direction produces better exhaust than a high speed exhaust. A large slow moving fan is more effective at moving air than a small fast moving one that can create air turbulence. To control the air flow requires ensuring the air flows only in from the replacement air intake and out the exhaust exit. Air from anywhere else (like an open window or door) will interfere with that controlled air flow and reduce the effectiveness of your exhaust system. Sealing all air entry to your work area, other than the replacement air intake, might seem excessive - but it will help control air flow.

Pull it - not push it

A fan that pulls air away from your work area is more effective and more efficient than one that pushes it. Pushing air is more likely to create turbulence which can circulate fumes back to the work area.

What size hood?

A bigger hood will collect trap more fumes but a small hood placed close to your work station might work better than a large one farther away

Build a booth

Your exhaust system will work better if you work in a booth than in an open space. If you have an overhead hood, install partition walls from the hood down to your work table to create a three sided booth. This will force the air to vent up and out and prevent it from escaping left or right.

What size fan?

What size fan you need will depend on how close you place your exhaust hood to where you work. A 200 cfm fan will be adequate if your hood is placed less than a foot away but an overhead hood several feet away would require more than 400 cfm in an enclosed booth and 800 cfm in an open work area. You might be tempted to just install the biggest fan you think you might need, but the larger the fan you use, the more replacement air you must provide to compensate.

Calculating fan size requirement

A rough guideline is to assume your fan should draw 125 times the surface area of your hood or work area. For example – for a 24 inch x 30 inch exhaust hood installed in a 3 sided closed booth above your work table, you would calculate having a 5 square foot work area. $5 \times 125 = 625$. To effectively vent fumes, you would need a fan capable of drawing 625 cubic feet per minute. If you didn't have closed sides, you would need a larger capacity fan. If you had the exhaust hood mounted immediately beside or over the torch work area, you could use a smaller capacity fan. It is NOT sufficient to consider only the hood size in calculating fan size. If you use a 2 square foot hood over a 5 square foot work area, you still must exhaust from 5 square feet.

Fume exhaust test

You can use a burning incense stick, lit candle, or lit cigarette to test to see if your exhaust system is removing all fumes. Move it to all the places on your work table you might be working. Watch the fumes and see if they are all being pulled out the exhaust. Is there some place where the fumes do not totally exhaust?

What kind of fan?

You need a fan that actually draws air as opposed to a duct fan that is designed only to boost air that has already been pushed into the duct. Squirrel cage type fans (as used for furnace blowers) or centrifugal in-line fans are preferred. In-line fans are more affected by the heat from torches and should be installed at least 3 feet from the flame. The longer the duct line, the more restriction is created. Booster fans are inexpensive and, if you have to have a relatively long exhaust ducting, it's a very good idea to install one to help boost air flow along. They are especially helpful in helping reduce air flow restrictions created by elbows in the ducting.

Replacement air

It's essential you have an intake that brings in fresh air to replace the air being exhausted. The fresh air intake should be the same size as the exhaust and should be at least 10 feet (3 meters) away from the exhaust to ensure it isn't interfering with the exhaust flow. DO NOT have more replacement air than exhaust air. This will create air turbulence that reduces the effectiveness of your exhaust system.

Air conditioning.

If you have air conditioning you should take special care to be sure it isn't recirculating fumes.

What size duct?

Using undersized duct will restrict air flow. Be sure you use duct large enough for your fan to work to full capacity. Too big is better than too small. It's okay to go from small duct to large duct but NEVER okay to go from large to small (except for the hood).

Duct design

Bends and curves in your ducts will slow down the flow of air traveling through the ducts. The more gentle the bends and curves, the less they'll restrict flow. If you must install a 90° bend, you create less restriction if instead of using a 90° elbow, you use two 45° elbows connected together to create the bend. It'll work even better if you use flexible ducting on a long gentle bend. Avoid using corrugated ducting. It creates turbulence that restricts flow.

Variable speed

There are times when high speed air movement is needed and other times when it creates problems. If possible, install a fan with variable speed controls.

Sound

Low cost fans make more noise than more expensive ones. You don't need a completely silent fan, but a noisy one can be a problem. Not only will it be constantly irritating, it can be detrimental to your work. The importance of sound is frequently overlooked or ignored. Hearing something that "doesn't sound right" is very often the early alert that something is malfunctioning or not working properly. A small inexpensive fan will work as well as a very expensive but, if you can afford it, you'll be a lot happier if you have one that's relatively quiet. You can also help reduce noise if you take care to tape all duct joints and firmly secure the fan and ducting so they won't vibrate.



Chapter 9 – Fumes

Some of the materials glass artists use produce fumes. Some of the fumes created can be a serious hazard. Special care should be taken to protect yourself and others from them.

Spray paint

Some is flammable. All is noxious. Either spray in a booth with controlled ventilation or do it outdoors.

Boron Nitride spray

Some is flammable. All is noxious. Either spray in a booth with controlled ventilation or do it outdoors.

Kiln paper

The fumes from burning kiln paper smell bad but are more irritating than harmful

Ceramic Fiber Paper

If the fumes from burning kiln paper smell bad, those from ceramic fiber paper smell vile. Fortunately, like kiln paper, they are more irritating than harmful.

Galvanized metal

If you fire galvanized metal in your kiln it will give off toxic fumes. Not just bad smelling. Toxic. Life threatening. The best way to deal with kiln firing anything with any galvanized metal in it is NEVER EVER DO IT.

Lead

There are reasons to be concerned working with lead but there is no reason to be concerned about fumes from working with it. Most of the warnings about lead poisoning are fearmongering nonsense promoted by companies hoping to convince you to buy the lead-free alternatives they sell.

Flux

If there has been too much fear about lead poisoning, there has been too little about the potential damage from flux fumes. Vaporized flux is both poisonous and corrosive. You know how irritating flux is on our skin. Imagine how bad it is inside your lungs. You might think it's enough to just use a fan to blow the fumes away from where you're working. It isn't! This just circulates the fumes around the workplace so you can inhale them later. It's important to remove flux fumes entirely from where you work. Several small "fume traps" are available that vacuum the fumes and send them through a filter. To some varying degrees they all work. They work to remove any particle material but not to remove condensed flux in the air. An inexpensive and more effective protection is to extract the fumes entirely with a ventilation system. This can be as simple as a cheap kitchen range hood over your work table that vents the fumes to outside. You can help protect the environment with a HEPA filter on the line venting to outside. The more powerful your extraction fan is, the more fumes you'll remove. A fume trap will work best if it's close to your work

to minimize the fumes that can escape around it. An external vent works best if you can create a booth to trap the fumes and force them out the exhaust. Installing three partition walls around your soldering area is an efficient way to do this. You should try a simple “dip” test to see how well you are removing flux fumes. Dip a hot soldering iron into liquid flux and watch where the fumes go. They should ALL exhaust out, and NOT drift back into your work area.

Flux used for soldering stained glass creates fumes when heated. These fumes are corrosive and toxic. Some brands of flux give off only mild fumes while some are intense. When you use flux while soldering take special care to be sure you vent all those fumes away from you and not into you.

Dust Extractors

They are better than nothing to remove fumes and can be trusted only if they installed to vent to outside. There are filter systems that can remove toxic fumes but they cost as much as a new car.

Air Purifiers

These work to remove dust but are useless for fumes.

Fume Extractors

These will remove fine dust particles but much of the toxic fumes will past right through their filter system.

Effectiveness

How effect a fume extraction system works depends on the volume of air moved (measure as cubic feet minute) and how controlled the air flow. The objective is not to create a high speed flow but instead a constant controlled direction of flow – to outside.

Ventilation Control

Refer to Chapter 10 for ways to create controlled ventilation to exhaust fumes.

Air Conditioner

If you have air conditioning in your work place, take special care to be sure it doesn't interfere with your efforts to control fume distribution.

Open Flame

If you're working with an open flame, be especially attentive to any fumes that might be combustible.



Chapter 11 – Lead

If you do stained glass you work with lead came and with solder that contains lead. By now you have probably heard lots of warnings about how toxic lead is and how it can do permanent damage if it gets into your system. Pay attention to those warnings but also be aware many warnings about lead are irrational nonsense – nothing more than deceptive fearmongering promoted by companies trying to convince you not use lead and instead use the products they sell. It's important you appreciate the dangers of working with lead but equally important you understand the limits of those dangers

SHOULD worry about

Dust

Scraping lead to clean it or cutting it with power tools can create lead dust. You could inhale that dust. Take special care if anything you're doing creates lead dust and always wear a protective mask when you create lead dust.

Ingesting

Ingesting lead is the most common way to get lead poisoning. That is a special concern if lead is in your drinking water and is the reason lead content solder is no longer used to solder copper water lines. Don't eat lead. You could ingest lead if you handle food after working with lead. Always wash your hands after working with lead. If you're fool enough to chew on or suck on a piece of lead while you're working with lead came, there's likely nothing any safety warnings will do to protect you. Work with the lead. Don't eat it. You'll be fine.

Accumulation

Any lead that gets into you stays in you and continues to build up as more is added.

NOT need worry about

Fumes

Soldering lead will NOT produce fumes you can inhale.

Handling

It is safe to handle lead. It will NOT go into your body through the pores of your skin.

Medical Tests

If you work with lead, for peace of mind, you should have regular blood and hair analysis tests done to monitor the amount of lead in your body.



Chapter 12 – Cutting Glass

Safety Glasses

Always wear safety glass when cutting glass. ALWAYS.

Stay Sharp

Most glass cuts come from not paying enough attention to what you're doing. Unless you think wearing dozens of bandaids makes you look cool, staying alert is the smart way to handle glass. Razor sharp edges can slice like a scalpel, and thin slivered shards will impale like a spear. It's important to always be aware of the potential for serious damage when you work with glass. Complacency causes more injuries than anything else. Stay alert. Stay sharp. Pay attention.

Break Fast

You are more likely to cut yourself handling glass after you score it if you ease into the break. The faster and more aggressively you make the break, the more likely it will break along the score and not somewhere unsuspected and unwanted.

Score slow – break fast.

Large sheets

Be extra cautious when cutting large sheets. The greater weight of a large sheet of glass makes it much more difficult to control where it drops.

Oil the score

Applying oil to your cutter head (either by using a self-oiling cutter or dipping it into oil) will always produce a more consistent score. More consistent scores are more likely to break where scored. Glass breaking somewhere unexpected can cause significant accidents. Painting on a strip of oil before you score is even better and is a near universal practice cutting thick glass.

Oiling the score encourages safe breaks.

Build skills

Practicing to acquire good cutting skills is the best way to be safe cutting glass.

Tempered Glass

Tempered glass can NOT be cut. You can score it, but when you try to break it, tempered will explode into small pieces. When a sheet of tempered glass explodes, some of those pieces can fire into your face. Tempered glass can usually be identified by a small "tattoo" or sticker in one corner of the glass. If you know it's tempered, do NOT try to cut it. If you suspect it's tempered, but aren't certain – take precautions. Wear gloves, have full face protection and cover all exposed skin. If you're very, very careful it is possible to grind a very small amount (about 2 mm) off the edge of a piece of tempered glass. Sometimes this will work, but not always –so it's not a good idea unless you really have to do it. You can safely sandblast or acid etch tempered glass, but trying to carve or mechanically etch it will usually cause it to shatter.



Chapter 13 – Tools

Work table height

Make your work tables and counters the right height. If you're the one using them, you might make whatever you find most comfortable but if others use them, it's a good practice to stay with conventional heights. That's 30 – 32" for sitting and 36" for standing. Everything in your home and work environment is at those conventional heights. It will feel more natural if table and counters are set at those heights.

Extension cords

The right size for the right job. You can use an extension cord for anything as long as the wire in it is heavy enough to carry the amount electricity sent to it. The size of the wire is determined by the electrical amperage

Gauge Amps

| | |
|----|----|
| 18 | 7 |
| 16 | 0 |
| 14 | 15 |
| 12 | 20 |
| 10 | 30 |
| 8 | 40 |
| 6 | 55 |
| 4 | 10 |
| 2 | 95 |

40 foot rule

It's not so much a rule as a smart guideline. If the wiring from your service panel to your kiln plug or your extension cord is more than 40 feet (12 meters) you should move up to the next larger gauge wire. For example, if the specifications call for 12 gauge wiring but it runs over 40 feet, you should use heavier 10 gauge wire instead.

Loose cords

If you have extension cords running across the floor, tape them down. It's too easy to trip over a loose wire. Imagine tripping over a loose wire while carrying a tray of glass.

Maintenance

Keep your power tools cleaned and well lubricated. Properly maintained tools cause less accidents.

Keep your tools sharp

Dull tools cause accidents. Keep your tools sharp. Sharp tools make your work easier and save accidents.

Machinery

You should be especially concerned with safety issues when working with machinery.

Eyes

Always wear safety glasses. Fast moving machinery can easily launch a piece of glass into your eye. It's unlikely your local hospital emergency ward needs you to help generate more business for them.

Ears

Many coldworking machines are noisy enough to cause hearing damage. Ear protectors are a lot cheaper than hearing aids.

Hands

Take special care to keep your hands away from moving machinery. Keep all your fingers attached. You never know when you'll need that special one for that special wave for bad drivers.

Fingernails

Long fingernails can easily get caught in moving belts and discs. You'll survive having a nail pulled out but probably swear a lot when it happens.

Hair

Long hair should be tied back to keep it from getting caught. Getting your hair ripped out by getting caught in a machine is a plenty dumb way to experiment with baldness.

Jewelry

All jewelry should be removed when working with machinery to avoid it getting caught. Even if you don't mind losing the appendage it's attached to, at least consider the value of the jewelry.

Clothing

Avoid loose fitting clothing that can get caught in moving machinery – unless you plan to film yourself getting sucked into a machine by the sleeve as a submission for Funniest Home Videos.

Electrical

When you are using any electrical equipment around water take special care to be sure it is safe to use wet. Tools like grinders, laps, and wet belt sanders have sealed motors that are specially made to work wet. Tools not designed to work wet can easily short out or deliver a serious electric shock if water gets into the electrical workings. This is NOT a do-it yourself defibrillator. Be sure all tools are plugged into a GFI (Ground Fault Interruption)



Chapter 14 – Kilns

Burns

At fusing temperature a kiln gets extremely hot. Holding your hand against one can cause burns – but only if you hold it there.. You can briefly touch the outside of your kiln and not be burned. Touch your kiln if you wish but do it quickly. Just don't hold your hand against it unless you're wearing gloves. Kilns are very efficient at retaining heat. If you hold your hand a few inches away from a hot kiln, you will barely notice the heat. Reasonable care is all that's need to avoid being burned by touching your kiln. If you have pets or children in your studio you should special care to keep away from your kilns - but I should warn you. Pet's are often fond of sleeping under kilns.

Kiln placement

- **Walls.** There is little reason to be concerned about getting severely burned touching a kiln but there is reason to be concerned about the heat from a kiln starting a fire. It's a universally recommended practice to position kilns at least 12 inches (30 cm) away from anything combustible. If for any reason you need to place a kiln closer, either place fireproof and heat resistant material against the wall or install a heat reflecting baffle halfway between the kiln and the wall.
- **Ceiling.** Heat rises. Be extra careful of anything placed above your kiln.
- **Floor.** Kilns come with a stand to elevate them a safe distance from the floor. Some heat escapes from beneath a kiln but very little compared to the sides and top. It's a good practice to place something that's fireproof beneath your kiln but it is not essential.

Reaching into your kiln

Some glass art projects (combing, manipulation, hot emboss, crucible pour, etc.) require you reaching inside your kiln while it is hot. Take special care to avoid getting burned if you work inside a hot kiln. How much protection depends on the size of the kiln and how close you get to it.

Risk factors

- bigger kilns send out more heat.
- the wider the kiln lid is opened, the more heat escapes.
- the higher the kiln temperature the more heat escapes.
- the closer you work to the kiln the greater the risk.
- top loading kilns are greater risk than front loading.

Safety Precautions

- **Clothing** – Do not wear any clothing like nylon or polyester that can melt when heated.
- **Hair** – If you have long hair, be sure it's tied back. If you have facial hair be sure it's covered.
- **Gloves** – Wear gloves when working in an open heated kiln. For small kilns and not reaching right down deep inside the kiln, welding gloves are enough. For large kilns or reaching deep inside the kiln you should have high temperature rated fire proof gloves.
- **Glasses** – The heat from an open kiln can burn your face and sear off any facial hair. If you want to remove your eyebrows, use tweezers. When working at an open kiln wear a full face shield.
- **Elements off** - If you're working inside your kiln with metal tools, like tongs for lifting crucibles, or rakes for combing glass, you should take special care to be sure the metal tool doesn't touch an element that is on. It's a good practice to turn the power off when working inside a hot kiln. If you choose to not turn the power off, be certain you have good insulation between you and the metals and you are not grounded to allow electrical current to flow through you.

Venting Your Kiln

Some kilns have a notch on the arm to allow you to open the kiln part way. For kilns that don't have a notch, you might want to vent your kiln by opening it a few inches and inserting a brick or kiln post to hold the lid part open. Wear gloves when doing this.

Looking in your kiln

The infrared light from hot glass and heated kiln elements can do permanent eye damage. Wear tinted glasses. Cheap welder's glass are sufficient. If you're doing glass manipulation or combing you might invest in Didymium glasses to remove the glare from glowing hot glass so you can more clearly see what you're doing.

Extension cords

You can use extension cords on your kiln if they are heavy enough gauge to carry the electrical load. Refer to the Tools chapter for a list of gauge sizes for different amperage kilns.



Chapter 15 – Food Safe Issues

If you're making something for yourself, for a gift or for sale that you expect will be used for food you should be careful it is food safe. Equally importantly, if it is something that might be used for food but is not safe you should clearly identify it as not food safe.

What is not food safe?

Iridescent glass.

The metallic coating on iridescent glass is not food safe unless capped by glass that is food safe.

Mica

Mica is not food safe unless capped by glass that is food safe.

Enamels

Some enamels are food safe and some are not. Unless you are confident any you used are food safe you assume they are no unless capped by glass you know is food safe.

Pottery glazes

Glazed intended for pottery that have been fired onto glass should be treated the same as enamels. Unless you are sure they are food safe, assume they are not.

Lead content glass

If you work with glass that contains more than 1% lead, you should consider it not safe for food unless capped with clear but glass with less lead content would be safe.

Cadmium content glass

Many artisans have expressed concern any glass with cadmium content would be unsafe for food unless capped with clear. No scientific validation has been provided for that claim but if you're concerned, cap it.

Paints & enamels

Your greatest concern for food safety should be when you have fused on paints or enamels. If you are not sure what you're using is safe, check the MSDS.



Chapter 16 – Classroom

Classroom Setup

Safety in a classroom starts with how you set up the classroom

Safety first

Always. Make safety a prime priority. You are responsible for what happens to your students.

Work Stations

You might want to squeeze as many students in as you can to maximize income from classes but resist putting them so close together you increase the likelihood of an accident. A safe and reasonable minimum space per individual is 3 feet (1 meter). More is better but less is dangerous.

Table Heights

People are most likely to work safely when working at heights they are accustomed to. For seating it's usually 30 to 32 inches (80 cm). For standing it's usually 6 feet (180 cm). To work standing, the ideal height is height is the height of the individual. If you have short students (like children) you should have some kind of stands to elevate them to a safe working height. If stools or step ladders are needed (as might be for sandblasting or vitrigraph) be sure they are stable.

Housekeeping

If your classroom is cluttered and disorganized, it's much more likely someone will have an accident than if it's clean and organized.

Lighting

Does it have adequate lighting? Are there dark or shadowed areas?

Ventilation

Is there adequate ventilation? Will your class be producing dust or fumes that need to be exhausted?

Prepare

Take care to provide a safe place to learn and do what you can to minimize the possibility of any accidents or mishaps. You prepare what tools and supplies are needed for your class. Also prepare for what safety protections are needed. Was something left out that should not have been? Is there something in the classroom that presents a hazard?

Be alert

You'll be cruising your classes checking on what everyone is doing. Take special care to watch if they are doing something that is unsafe and could lead to an accident. It is your responsibility to be sure your students work in a safe way.

Plan

Prepare a plan for what you will do if an accident happens. Do you have a first aid kit? Lots of band-aides? Antiseptic? Emergency numbers to call for help? The old axiom still applies

Hope for the best but plan for the worst.

Imagine what might happen and have a plan in place for what to do. Accidents will happen. How bad they are will depend a lot on how they are handled.

Issue warnings

I start every class discussing safety, explaining what the hazards are and what precautions should be taken. Tell your students what to be concerned about, why they should be concerned, and what can happen if they fail to be careful.

Safety Handouts

Have a comprehensive safety handout to give each student. This isn't just for the student. It's also for you. A safety handout will provide you more liability protection than a liability release. It eliminates the possibility someone has an accident and claims after they were not warned about safety issues.

Warning Signs

Place cautionary warning signs where students will see them. Refer to Chapter 19 some sign suggestions.

First Aid Kit

Have your first aid kit where it will be noticed so everyone knows where it is and knows you have one.

Debunk myths

For example, there are many myths about lead poisoning – mostly fear mongering bunk being spread by companies wanting to sell lead free products. Explain how you can only get lead poisoning by eating it. The same applies to many irrational irresponsible comments about some dust hazards. Many people insist kiln wash and silicon carbide dust are a serious health risk. Not so. They are nuisance dusts – no more serious than drywall dust. It's important to debunk myths to ensure credibility so when people are warned about things that ARE serious (like glass dust) they take the warnings seriously.

Don't terrify them

You want to warn them of the need to take precautions but not scare them into being too afraid to participate. I like to use humor to ease tension. I show them how to handle glass to avoid cutting themselves but warn them that glass is sharp and if you keep working with it, you will inevitably cut yourself. Not to worry. Cuts are sharp and heal quickly. I tell them my best advice is

If you work with glass you will inevitably cut yourself but don't worry about it. Glass cuts are so sharp, most of the time you'll see the blood somewhere before you realize you've cut yourself.

If the sight of blood disturbs you, take up pottery.



Chapter 17 – Safety Training

Smart safety is having a plan in place for what you will do if something happens. Old slogan that always applies:

Hope for the best but plan for the worst.

Be prepared. What will you do if:

Someone gets cut

- Is a bandaid enough?
- Is it serious enough to need a compression bandage?
- Does it need antiseptic?
- When do you call for help? Is the phone number handy?

Skin Burn

Do you know how to treat a burn? Is it just enough to run under cold water or is the burn enough to worry about infection?

Acid spill

What do you have to neutralize acid?

Fire

Where is the nearest fire extinguisher? Is it the right kind?

Gas leak

- How best to ventilate?
- Should you evacuate?
- Where is the shut off

Something in someone's eye

Can it be rinsed out? If you don't have an eye wash station or an eye wash cup, do you know how to do an emergency eye rinse?

- Fill a glass or cup to the rim with water
- Bend over and hold the glass up against your eye.
- Open your eye
- Stand up and let the water rinse out your eye.
- Repeat as needed.

Is it time for a trip to the Emergency Room?

Materials Safety Data Sheet

The MSDS is a document that contains information on the potential health effects of exposure and how to work safely with the material it is written about. It includes:

- How to identify the material
- How to safely store the material
- How to work safely with the material.
- Possible hazards from storing or using the material.

Every product that is classified as “hazardous” must have a **Materials Safety Data Sheet**. Almost always such products will have it either included with the product or printed on the packaging. If you are unsure whether or not a material you work with has a MSDS check the internet or ask the supplier.

MSDS warnings are much more likely to be excessive than insufficient. Liability is a serious issue with companies that make or sell hazardous materials. You can reasonably assume any material that is hazardous will come with warnings. If there are no warnings, it is reasonable to assume there is no reason for you to be concerned.

First Aid Training

If you give classes, have you considered taking a class in basic first aid? Could you deal with a student having a heart attack? Could you deal with a major cut?

Medical Issues

If you conduct glass classes, be prepared for a variety of possible medical issues. Try to imagine all that you might ever have to deal with and have a plan in place.

Medications

If you have students cutting glass you might ask if any are taking blood thinners or any medication that might cause special problems if they get cut.

Pregnant

Special care must be taken to be sure pregnant woman are not working where toxic fumes might be generated and especially should not be working with lead.

Allergies

You should ask students if they have any allergies you should be aware of.

Liability

Chapter 20 discusses liability and how it is affected by negligence. If you neglect to make a reasonable effort to learn about safety you could be considered negligent and be held liable for any accident that happens.



Chapter 18 – Visitors

You know how to handle glass. Your employees know how to handle glass. Visitors to your shop do NOT know how to handle glass. If you want to practice Safety Smart you either ban visitors or teach visitors how to handle glass. If you sell glass you should be sure any customer knows how to safely handle it. Many shops prohibit entry to where sheet glass is kept until the visitor can demonstrate they know how to safely handle it. Shops that have sheet glass stored in racks close enough to the floor it can be kicked almost always ban open toe footwear.

Children

There's no reason you can't introduce children to glass art at a fairly young age. If they can hold a glass cutter, they can learn to cut. If their arm is strong enough to hold an iron, they can learn to solder. Children are fascinated with cutting glass and in the whole process of how glass art is made. Even kids as young as six can be taught how to make simple projects. With a little supervision, children can safely work with glass. The safety concerns for them are no different than for adults. Introducing children to safety issues working with glass can be a terrific opportunity to teach them safe work habits that they can later apply to many other things they do later in life. It's also a wonderful pastime to share with your children.

Classes with Children

It is important to carefully control behaviour. Something that starts as a little horseplay can easily lead to a serious accident. When you have children in classes, you should follow a simple guideline:

- Make rules
- Explain the rules
- Enforce the rules.

Pets

Pets can be even more of a worry than children. Glass studios have bits of glass on the floor that a pet can pick up in their paws. Either take extra care if pets visit or consider banning them.

Make Visitors Feel Safe

If you clearly signal to visitors you care about safety, they will feel safe visiting your shop. Those visitors might one day become students or customers. Make them feel safe enough to want to come back.

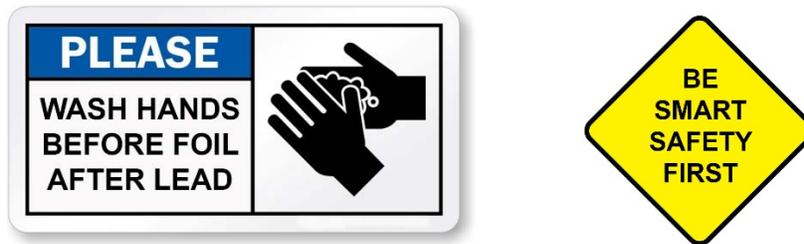
Find a Practical Balance

When you give visitors safety warnings, find a balance between encouraging safety and making them feel uncomfortable. Avoid sliding into needlessly excessive warnings. That visitor might one day be interesting in taking a class from you. Excessive safety warnings are likely to discourage them. If you tell someone they must always wear a respirator when soldering or when handling powders or terrify them about getting cut, few will want to take classes



Chapter 19 – Shop Signs

Putting up signs can be as important for visitors as for those working in your studio.



Good signs can help make your visitors Safety Smart. Some examples.



**Make the signs shop law. Enforce the law.
Enforce it for you, for everyone working with you, for students and for visitors.
Safety rules only work when they apply to everyone.**

Gil Reynolds from Fusion Headquarters proposed some basic shop rules that would make an interesting shop sign.

1. Do not use your hands to sweep glass shards off the table.
2. Never try to catch a falling piece of glass.
3. No soldering in the nude.



Chapter 20 – Liability

The most important issue with liability is whether or not you were negligent. Did you take reasonable precautions?

Negligence

- Did you make a reasonable effort to provide a safe environment?
- Did you give adequate safety warnings?
- Did you ask about medical issues?

Reasonable care

Whether or not you or any of your employees are considered negligent is usually decided on the issue of “reasonable care”. Would a reasonable person reasonably believe you made reasonable effort to provide a safe work environment? It is unreasonable to believe you can, or should, provide protection from everything that might possibly happen.

Liability Release

You can have students sign a liability release but it has no legal protection if you have been negligent. If you want to use a liability release you can download a form from the Glass Campus website at www.glasscampus.com

Liability Insurance

Having liability insurance is always a good practice but your liability release and insurance is likely void if you are negligent. That’s why it’s important you to take reasonable precautions and make reasonable efforts to provide a safe work place.

Safety warning signs

Good safety warning signs help protect you from negligence claims. Chapter 19 provides some example of signs you might post in your work place.

Safety Handouts

Comprehensive safety handouts are the best liability insurance. They are better than a liability release because they eliminate the possibility someone can claim they were not warned about the risks. For best protection, include them as part of your liability release and have students sign to acknowledge they have read and understand the safety warnings.

Children

Children are much more likely to have accidents than adults. If you have children visiting or taking classes in your work place, liability issues are a special concern.



Chapter 21 – Safety Surprise

As you work to apply good safe work practices, a rule you should always consider is:

Expect the unexpected.

Experiment

You should be constantly experimenting to innovate new ways to work with glass but when you experiment you should also be constantly aware of possible side effects of materials you haven't worked with before. Some examples:

- Trying out a new material to make molds.
- A new liquid used to mix powders for screening or painting.
- A binding agent in some new ceramic board or paper.
- A pottery glaze you're trying on glass.
- A metal mold you picked up at a dollar store or thrift shop.
- A new bonding material to hold glass in place in your kiln.
- Kiln firing bottles with the labels still on.

Allergies

You should also be aware that not everyone is affected the same. Not everyone has the same allergies and not everyone is affected to the same degree. Some can work in a studio while a kiln is burning the binder out of ceramic paper while others experience nausea and ferocious headaches. Don't assume because something doesn't bother you means it won't bother others. It's like peanut or pet allergies. Some have them, some don't. Some allergies are just an irritant but some, like peanut and shellfish allergies, can be life threatening.

Accumulation

Some contaminants work the same way as lead and will accumulate in your system – never leaving but constantly building up until they become enough to be toxic.

MSDS

Whenever you experiment with a new material you should first check the Material Safety Data Sheet on that material to learn if there are reasons for concern.

Adventuresome Safety

Adventuresome Safety is when you adopt a sensible balance between Safety Smart and Safety Silly. You want to experiment with new materials and new techniques but won't let your fear prevent you from trying something new. Many of the materials and techniques we routinely use in glass art came from someone adventurous enough to try something new.

Some risks are worth the benefit.



Chapter 22 – Safety Silly

Safety first. It should be first in everything you do and in everything you teach but sometimes safety warnings are amplified and exaggerated enough to become counterproductive – even becoming irresponsible fearmongering leading to credibility loss. When this happens it creates distrust and encourages individuals to ignore the really important safety warnings. Let's examine some such Safety Silly warnings.

Kilns can't have extension cords

This claim is as common as it is silly. If the gauge of wire is heavy enough to carry the amount of electricity fed to it, you can use an extension cord on anything.

Dusts masks are needed for all dusts

Dust masks are always a good idea but much of the dust we create is just a nuisance. If you're just creating a small amount of dust and what you're creating isn't a serious hazard, whether or not to wear a mask is elective and not mandatory. Your choice.

Never fire your kiln unattended

Unless you have foolishly installed your kiln too close to something combustible, there's no reason to stay with your kiln. Kilns are specifically designed to tolerate high heat for extended periods. If your kiln fires up its highest possible temperature and stays there for many hours, all that will happen is you'll use up a lot of electricity until you turn it off. The kilns we use have electronic controllers that are installed specifically to eliminate the need to babysit your kiln.

Don't run a 15 amp kiln on a 15 amp breaker

If your kiln draws too much power for a 15 amp circuit it will trip the 15 amp breaker and disconnect the electricity. If you keep drawing too much power, all that will happen is you'll keep tripping the breaker. That's what the breaker is for.

Exhaust vent fans must be 125 cfm for every square foot of hood area

The objective is to have fans big enough to remove the fumes – not big enough to vacuum inhale your tools. There are lots of ways to make sure you are safely removing noxious fumes without resorting to giant industrial capacity fans.

Propane tanks must never be inside

In many places it's prohibited and having propane tanks inside will void insurance coverage, but in some places it's a perfectly legal, perfectly acceptable and a relatively common practice. Check with your local Fire Marshall to learn if your building is zoned to allow propane tanks inside.

Flashback arrestors must always be used with torches

These are not needed on surface mix torches. Using one on a surface mix torch is a waste of money to buy and a waste of time to install.

Handling lead will cause lead poisoning

The concern about lead poisoning is mostly irrational paranoia steadily fueled with propaganda dispersed by companies that would like to have lead banned so you will be forced to switch to their more expensive alternatives. Leaded gas was banned because it did produce fumes that could be inhaled. Lead was banned in paint because children ate it. Solder containing lead was banned for use in water lines because it got into the water we drank. Those were legitimate reasons for banning lead, but there are no legitimate reasons for banning it in stained glass use.

Safety Margins & Credibility Concerns

Some artisans have become so concerned about safety that it may be needlessly restricting many of their activities. Needlessly excessive safety allowance creates a credibility concern. If you repeatedly see that speeds are posted at 30 mph, but you know that it's safe to drive at 60 mph, wouldn't it be reasonable to assume that it's always safe to drive at twice the posted speeds? People that exaggerate safety concerns may be well-intentioned but they may also be doing more harm than good if their exaggerations cause people to doubt all safety warnings. It's a good safety practice to wear a safety belt but you don't need a NASCAR standard roll cage, crash helmet and fire suit for driving to the supermarket.

It is often said if you can't offer a solution you shouldn't make a complaint. That applies to safety warnings. If you can't explain why, you shouldn't be making safety warnings. If you tell someone to do or not do something, tell them why. We had a sign in our shop that said, "Wash hands – before foil, after lead". The reasons? Skin oil on your hands can prevent foil from sticking to the glass and lead residue on your hands can be transferred to your mouth. Exaggerated warnings usually evolve from well intentioned individual passing along warnings they often don't fully understand. "Wash your hands after handling leads" expands to "Don't touch lead" which expands to "Don't use lead". Credibility collapses when people realize the warning "Don't use lead" are unreasonable and irrational.

Safety smart is mostly common sense. Safety failure is usually simple stupidity.

Two different approaches to safety:

Always Safe

You can have safety rules that are so rigid and so all encompassing, if followed will ensure you are always safe under all conditions.

Make Allowance

You can have basic rules that apply under most conditions but be prepared to make allowance for times conditions require extra concern.

Think of it like setting speed limits for a section of highway. The engineers test the curves and slopes and conclude under dry conditions it is safe to drive 60 mph – but if it has rained and the road is wet a safe speed would only be 40 mph. The Always Safe approach would be to set the speed limit at 40 mph. The Make Allowance approach would be to set the speed limit at 60 mph with cautionary warnings to drive slower if the road is wet.

You must decide for yourself which approach you want to use.