



# Phorge Makerspace Safety Guide

## General Safety Guidelines Overview

### 1. Orientation and Training

- You are responsible for your own safety. It is your responsibility to ensure you understand all safety protocols and procedures.
  - i. Any negligence or unsafe behavior will result in a safety violation.
  - ii. The shop manager may revoke any privileges at any time for unsafe behavior or failure to follow safety procedures.
- Complete any required orientation or training sessions prior to using any and all equipment.
- Familiarize yourself with the equipment, tools, and safety procedures.

### 2. Personal Protective Equipment (PPE)

- Wear appropriate PPE for the task (e.g., safety goggles, gloves, ear protection).
- Avoid loose clothing, jewelry, and tie back long hair.

### 3. Work Area Organization

- Keep your work area clean and organized.
- Ensure proper lighting and ventilation in your workspace.
- Clearly label hazardous materials and ensure they are stored safely.

### 4. Tool and Equipment Safety

- Inspect tools and equipment before use to ensure they are in good working condition.
  - i. Never disable or remove any safety guard for any reason.
  - ii. Report all damaged tools and equipment immediately to the Shop Manager.
- Use tools and equipment only for their intended purpose.
- Follow the manufacturer's instructions for operating tools and equipment.

### 5. Electrical Safety

- Ensure all electrical equipment is properly grounded.
- Never solder on any components that are plugged in and be sure you know the risks associated when working with electrical components.
- Do not overload electrical outlets or power strips.
- Always ask the shop manager before unplugging any electrical equipment or before using any extension cords.
- Disconnect equipment from power sources before performing maintenance or repairs.

### 6. Fire Safety

- Know the location and proper use of fire extinguishers.
- Never use flammable materials near open flames or sparks.
- Do not block emergency exits and keep escape routes clear.

## 7. Chemical Safety

- Read and understand Material Safety Data Sheets (MSDS) for any chemicals you use.
- Store chemicals in labeled, appropriate containers and in designated storage areas.
- Use proper ventilation when working with volatile substances.

## 8. First Aid and Emergency Procedures

- Know the location of first aid kits and emergency contact information.
- Report all accidents and injuries immediately to the makerspace staff.
  - i. All injuries must be documented with a Phorge Makerspace Accident Investigation Form.
- Familiarize yourself with the emergency evacuation plan and procedures.

# General Phorge Equipment Guidelines

## Hand Tools

- Use the right tool for the job.
- Keep cutting tools sharp and in good condition.
- Always cut away from your body and keep hands clear of the cutting path.

## Power Tools

- Ensure proper training before using any power tool.
- Always use guards and safety devices as provided.
- Disconnect power before changing blades or bits.
- Only pre-approved power tools are allowed in the shop. Talk to the shop manager for approval.

## 3D Printers

- Follow manufacturer guidelines for setup and operation.
- Only approved materials are allowed in the space due to risk of damaging the equipment. **Shop manager will determine which materials are allowed. The Shop Manager may also revoke access to materials if they determine the material may cause harm to the user or equipment.**
- **Please approve all filaments with the shop manager.**
- Do not touch the printer head or build plate during operation as they can be very hot.
- Ensure proper ventilation when using materials that emit dangerous fumes.
- Clean the print bed before use with 3 sprays of isopropyl alcohol and a paper towel.

## Laser Cutters

- Never leave the laser cutter unattended while it is operating.
- Ensure the material being cut is suitable for the laser cutter and does not emit harmful fumes.
  - **Only approved materials are allowed on the laser cutter.**
  - **All materials must be approved by the shop manager.**
- Keep the area around the laser cutter clean and free of flammable materials.

## Soldering Equipment

- Work in a well-ventilated area to avoid inhaling fumes.
- Always assume the soldering iron is hot and place it in its stand when not in use.
- Use proper techniques to avoid burns and accidental contact with hot solder.

## Industrial Equipment

### CNC Machines

Welders

Table Saw

Band Saw

Planer

Dust Collection System

CNC Mill

Manual Mill

Manual Metal Lathe

Wood Lathe

Wazer

Plasma Cutter

Drill Press

Air Compressor

PHORGGE

## Safety Guidelines

## 1. Orientation and Training

MAKERSPACE

### Orientation

- **Introduction to the Space:** Orientation sessions provide an overview of the makerspace layout, including workstations, equipment locations, and emergency exits. This helps users navigate the space efficiently and safely.
  - Please check with the Shop Manager or Executive Director for orientation times.
- **Understanding Policies:** Orientation covers the makerspace's policies, such as usage rules, reservation systems for equipment, and protocols for reporting issues or accidents. Knowing these policies ensures users can operate within the guidelines and contribute to a cooperative environment.
- **Safety Procedures:** Users are introduced to general and specific safety procedures, including the proper use of personal protective equipment (PPE), emergency response protocols, and the location of safety equipment like fire extinguishers and first aid kits.
- Staff reserves the right to ask any person in the space to leave at any time, for any reason. An explanation may or may not be provided. This person may not be told of the

reason, however there will be a report provided to the board of directors to ensure this policy is fairly enforced.

- Unsafe behavior will not be tolerated. If you are asked to stop operating any piece of equipment, you must safely stop the machine and understand you may be asked to leave. Safety is our top priority.

### **Training on Tools and Equipment**

- **Basic Training:** Basic training sessions are provided for common tools and equipment. This includes hand tools, power tools, 3D printers, laser cutters, and soldering equipment. Training ensures that users know how to operate these tools safely and effectively.
- **Advanced Training:** For more complex or potentially hazardous equipment, such as CNC machines or specialized tools, advanced training sessions are available. These sessions are often mandatory before users are allowed to operate the equipment independently.
- **Certification:** Certification programs typically include hands-on training, a safety test, and a demonstration of competency. Certified users are then allowed to use some of the equipment without supervision.
  - **Please check with the Shop Manager to get certified on any of the equipment in the space.**

### **Continuous Learning**

- **Workshops and Classes:** Phorge makerspace offers ongoing workshops and classes to help users improve their skills and learn new techniques. These sessions can cover a wide range of topics, from beginner to advanced levels, and often focus on specific projects or tools.
- **Mentorship Programs:** Experienced makers or staff members may offer mentorship to newer users. Mentorship programs provide personalized guidance, helping users develop their skills and confidence in using the makerspace.
- **Online Resources:** Access to online tutorials, manuals, and safety guidelines can supplement in-person training. Users are encouraged to review these materials regularly to stay updated on best practices and new equipment.

### **Record Keeping and Accountability**

- **Training Records:** Makerspaces often keep records of users' completed training sessions and certifications. This helps ensure that only qualified individuals operate certain equipment and allows staff to track training needs.
- **Feedback Mechanisms:** Users are encouraged to provide feedback on training sessions and suggest improvements. This helps the makerspace continuously improve its training programs and address any gaps in safety or knowledge.

## 2. Personal Protective Equipment (PPE)

### Importance of PPE

- **Safety Barrier:** PPE acts as a barrier between you and potential hazards in the makerspace, reducing the risk of injury or exposure to harmful substances.
- **Legal and Ethical Responsibility:** Wearing PPE is not only a best practice but also a legal requirement in many jurisdictions. It demonstrates a commitment to maintaining a safe environment for all users.

### Types of PPE and Their Uses

- **Safety Goggles and Face Shields:** Protect your eyes from flying debris, chemical splashes, and intense light sources (e.g., lasers or welding arcs). Always wear eye protection when working with tools that can generate particles or liquid splashes.
- **Gloves:** Different types of gloves offer protection from various hazards:
  - **Cut-resistant Gloves:** For handling sharp objects and tools.
  - **Heat-resistant Gloves:** For working with hot materials, such as during soldering or metalworking.
  - **Chemical-resistant Gloves:** For handling hazardous chemicals.
  - **Lathes:** Use of gloves when operating lathes is **strictly prohibited**.
- **Ear Protection:** Use earplugs or earmuffs to protect your hearing when working with loud machinery or in noisy environments. Prolonged exposure to high noise levels can cause permanent hearing damage.
- **Respirators and Masks:** Protect your respiratory system from dust, fumes, and harmful vapors. Use the appropriate type of mask for the specific hazard (e.g., N95 respirators for dust, organic vapor masks for solvents).
- **Protective Clothing:** Wear lab coats, aprons, or coveralls to protect your skin and regular clothing from chemicals, sparks, and debris. Flame-resistant clothing may be necessary for activities like welding.
- **Foot Protection:** Wear closed-toe shoes, preferably with steel toes, to protect your feet from falling objects, sharp debris, and chemical spills.

### Proper Use and Maintenance of PPE

- **Correct Fit:** Ensure PPE fits properly to provide effective protection. Ill-fitting PPE can be uncomfortable and less effective.
- **Regular Inspection:** Inspect PPE before each use for any signs of wear, damage, or contamination. Replace any damaged or compromised PPE immediately.
- **Cleaning and Storage:** Clean PPE according to the manufacturer's instructions and store it in a clean, dry place away from direct sunlight and chemicals. Proper storage extends the life of the equipment and maintains its effectiveness.
- **Replacement and Disposal:** Follow guidelines for the replacement of disposable PPE and the proper disposal of contaminated items. Reusable PPE should be replaced according to the manufacturer's recommended schedule or when it shows signs of wear.

## PPE Compliance and Culture

- **Encouraging Compliance:** Promote a culture of safety where PPE use is normalized and encouraged. Provide easy access to PPE and ensure all users understand its importance.
- **Training and Education:** Include PPE training as part of the initial orientation and ongoing safety training. Users should know how to select, use, and maintain their PPE properly.
- **Signage and Reminders:** Signs and reminders are around the makerspace to reinforce the use of PPE, especially in high-risk areas. Visual cues can help users remember to wear the necessary protective gear.

## Special Considerations

- **Specific Tasks:** Identify tasks that require specialized PPE and ensure users are aware of these requirements. For example, welding requires a specific type of helmet and protective clothing.
- **Emergency Situations:** PPE is available for emergency situations, such as chemical spills or fires. Make sure users know where to find emergency PPE and how to use it.

By emphasizing the importance of PPE and ensuring it is used correctly, makerspaces can significantly reduce the risk of accidents and injuries, creating a safer environment for all participants.

## 3. Work Area Organization

### Importance of Organization

- **Safety:** A clean and organized work area minimizes the risk of accidents and injuries. Tripping hazards, misplaced tools, and clutter can lead to dangerous situations.
- **Efficiency:** An organized workspace allows you to find tools and materials quickly, improving productivity and reducing downtime.
- **Professionalism:** Maintaining a tidy work area demonstrates respect for the makerspace and other users. It creates a welcoming environment and encourages good habits among all participants.

### Tips for Organizing Your Work Area

#### Setup and Layout

- **Designated Work Zones:** Phorge makerspace is divided into specific zones for different types of work (e.g., woodworking, electronics, 3D printing). This helps keep activities organized and ensures that tools and materials are used in the appropriate areas.
- **Work Surfaces:** Keep workbenches and tables clear of unnecessary items. Only keep the tools and materials you need for your current project on your work surface.

### Storage Solutions

- **Tool Storage:** Use pegboards, tool chests, and wall-mounted racks to store tools. Label storage areas to help users quickly find and return tools to their proper places. **Always put tools away in their proper location.**
- **Material Storage:** Store raw materials, such as wood, metal, and plastic, in designated areas. Use shelving units, bins, and racks to keep materials organized and easily accessible.
- **Project Storage:** Use labeled bins, shelves, or lockers to keep projects safe and organized, preventing them from cluttering workspaces.

### Cleanliness and Maintenance

- **Regular Cleaning:** Users will clean their work area after each use, including sweeping up debris, wiping down surfaces, and returning tools to their proper places.
- **Waste Disposal:** There are adequate waste disposal options, such as trash cans, recycling bins, and hazardous waste containers. Clearly label these containers and empty them regularly to prevent overflow.

### Workflow and Efficiency

- **Workflow Planning:** Plan your workflow before starting a project. Gather all necessary tools and materials and organize them in the order they will be used. This reduces the need to stop and search for items mid-project.
- **Checklists:** Use checklists to ensure you have all the necessary tools and materials before starting a project. This helps prevent interruptions and keeps your work area organized.
- **Time Management:** Allocate specific times for setup, work, and cleanup. This helps maintain a structured environment and ensures that the workspace is ready for the next user.

### Encouraging Good Habits

- **Training and Orientation:** Include work area organization as part of the orientation and training sessions. Educate users on the importance of keeping a tidy workspace and how it contributes to overall safety and efficiency.
- **Lead by Example:** Makerspace staff and experienced users should model good organizational habits. Set a positive example for new users to follow.
- **Drug and Alcohol Free Space.** Do not operate or be within the space under the influence of any substance or intoxicating medication that may impair judgement.

### Special Considerations

- **Shared Spaces:** Users should be aware of their responsibilities and respect the space and tools of others.

- **Accessibility:** Ensure that storage solutions and work areas are accessible to all users, including those with disabilities. This includes providing adjustable workbenches, clearly labeled storage, and accessible pathways.
- **Emergency Preparedness:** Keep emergency exits and pathways clear of clutter. In case of an emergency, users should be able to quickly and safely evacuate the area.

By maintaining an organized work area, makerspaces can enhance safety, efficiency, and user satisfaction, creating a more productive and enjoyable environment for everyone.

## 4. Tool and Equipment Safety

### Importance of Tool and Equipment Safety

- **Prevention of Injuries:** Proper use and maintenance of tools and equipment significantly reduce the risk of injuries and accidents.
- **Prolonged Equipment Life:** Regular maintenance and correct usage ensure that tools and equipment last longer, providing reliable performance over time.
- **Efficiency and Accuracy:** Safe and proper use of tools leads to more efficient and accurate project outcomes.

### Guidelines for Tool and Equipment Safety

#### Inspection and Maintenance

- **Pre-Use Inspection:** Always inspect tools and equipment before use. Check for any signs of damage, wear, or malfunction. Look for cracks, loose parts, frayed wires, and other potential hazards.
- **Reporting Issues:** Immediately report any damaged or malfunctioning tools to makerspace staff. Do not attempt to use or repair the equipment yourself unless you are trained and authorized to do so.

#### Proper Usage

- **Manufacturer's Instructions:** Read and understand the manufacturer's instructions for each tool or piece of equipment. Follow these instructions carefully to ensure safe and effective use.
- **Intended Purpose:** Use tools and equipment only for their intended purpose. Improper use can lead to damage and increase the risk of injury.
- **Operating Techniques:** Learn and practice proper operating techniques. For example, use both hands to operate power tools when required, maintain a stable stance, and keep hands and fingers away from moving parts.

#### Handling and Storage

- **Safe Handling:** Handle tools and equipment with care. Avoid dropping or mishandling items, as this can cause damage or create hazards.
- **Secure Storage:** Store tools and equipment in designated storage areas when not in use. Ensure that they are placed securely to prevent them from falling or being damaged.
- **Sharp Objects:** Store sharp tools, such as knives and saws, with protective covers or in designated slots to prevent accidental cuts or injuries.

## Electrical Safety

- **Grounding:** Ensure that all electrical equipment is properly grounded to prevent electric shocks.
- **Power Cords:** Inspect power cords for fraying, cuts, or other damage. Replace damaged cords immediately.
- **Avoid Overloading:** Do not overload electrical outlets or power strips. Use appropriate extension cords and power sources for your equipment.
- **Disconnect When Not in Use:** Unplug tools and equipment when they are not in use, and before performing any maintenance or adjustments, properly install the lock on the plug

## Fire Safety

- **Fire Hazards:** Be aware of fire hazards associated with specific tools and materials. For example, welding and cutting tools can generate sparks, and certain chemicals are flammable.
- **Fire Extinguishers:** Know the location and proper use of fire extinguishers in the makerspace. Ensure that fire extinguishers are easily accessible and regularly inspected.
- **Combustible Materials:** Keep combustible materials away from open flames, sparks, and heat sources. Store flammable liquids in approved containers and in designated storage areas.

## Specific Equipment Guidelines

### Hand Tools

- **Use the Right Tool:** Always use the appropriate tool for the job. Using the wrong tool can lead to damage and injury.
- **Sharpness:** Keep cutting tools sharp. Dull tools require more force to use and can slip, leading to accidents.
- **Proper Grip:** Hold tools with a secure grip and use both hands when necessary. Maintain control at all times.

### Power Tools

- **Safety Guards:** Always use the safety guards provided with power tools. These guards are designed to protect you from moving parts and debris.
- **Secure Workpieces:** Clamp or secure workpieces to prevent movement during cutting, drilling, or sanding operations.
- **Start and Stop:** Make sure the power tool is off before plugging it in or making adjustments. Allow the tool to reach full speed before beginning work and turn it off before setting it down.

### 3D Printers

- **Setup and Calibration:** Ensure the 3D printer is properly set up and calibrated before use. Incorrect setup can lead to failed prints and potential damage.
- **Hot Surfaces:** Avoid touching the printer head and build plate during and after operation, as they can remain hot for some time.
- **Material Handling:** Use appropriate materials for the printer and ensure they are stored correctly to avoid contamination and damage.

## Lasers

- **Material Compatibility:** Only use materials approved for laser cutting. Some materials can emit harmful fumes or catch fire.
- **Ventilation:** Ensure the laser cutter is properly ventilated to remove fumes and smoke. Regularly clean and maintain the ventilation system.
- **Monitoring:** Never leave the laser cutter unattended while it is operating. Monitor the cutting process to catch any issues immediately.

## Soldering Equipment

- **Fume Extraction:** Always use the extraction fans.
- **Hot Surfaces:** Always assume the soldering iron is hot. Place it in its stand when not in use, and avoid touching the tip or recently soldered joints.
- **Proper Techniques:** Use proper soldering techniques to avoid burns and ensure strong, reliable joints.

## CNC Machines

- **Setup and Calibration:** Double-check the setup and calibration of the CNC machine before starting. Incorrect settings can lead to tool breakage and workpiece damage.
- **Tool Path:** Verify the tool path and settings before starting the machine. Ensure the path is clear of obstacles and properly programmed.
- **Safe Distance:** Remain within reach of the Emergency stop of the machine during operation.

## Manual Lathes/Mills

- **Setup:** Have a plan/print with order of operation. Ensure work/materials are secure within vices or chuck jaws, handles are removed from vices or chucks when beginning work. Power Feeds are not engaged, tool heights and touchoffs are appropriate for the work being performed.
- **General Safety:** Wear approved safety glasses or a full face shield with side protection. Secure loose clothing, long hair, and remove jewelry. Do not wear gloves while operating rotating machinery. Ensure all guards are in place and functioning. Be familiar with the location and function of all emergency stops and power controls.
- **Lathe Operation:** Remove the chuck key immediately after use. Ensure the workpiece is clamped securely in the chuck or between centers. Stand clear of the rotational plane when starting the machine. Keep hands away from rotating parts. Use appropriate speeds and feeds. Never adjust tools or the workpiece while the lathe is running. Remove chips with a brush or magnetic tool—never by hand.
- **Mill Operation:** Clamp the workpiece securely using a vise or appropriate fixture. Remove T-handles, drawbar wrenches, or any setup tools before starting the machine. Use correct spindle speeds and feed rates for the tool and material. Never attempt to hand-hold a workpiece while milling. Stop the spindle before making any adjustments or taking measurements. Do not use compressed air to clear chips—use a brush or vacuum instead.
- **Shutdown & Cleanup:** Turn off the machine and allow all motion to stop before cleaning or leaving the work area. Clean chips with brushes and avoid bare

hands. Wipe down the machine and return tools to their proper locations. Report any damaged equipment, missing guards, or unusual behavior immediately to the shop supervisor.

## Training and Supervision

- **Proper Training:** Ensure users receive proper training on each piece of equipment before use. Training will cover safe operation, maintenance, and troubleshooting.
- **Supervision:** Supervise new or inexperienced users until they demonstrate competence with the equipment. Provide guidance and assistance as needed.
- Do not distract others while they are operating equipment.
- Always stay outside of yellow taped areas while the equipment is being operated.

By adhering to these tool and equipment safety guidelines, makerspace users can create a safer working environment, reduce the risk of accidents, and ensure the longevity and reliability of the tools and equipment.

## 5. Electrical Safety

### Importance of Electrical Safety

- **Preventing Electric Shocks:** Electrical safety practices help prevent electric shocks, which can cause serious injuries or even death.
- **Avoiding Fires:** Proper use and maintenance of electrical systems reduce the risk of electrical fires.
- **Protecting Equipment:** Safe electrical practices help prevent damage to tools and equipment, ensuring their longevity and reliable performance.

### Electrical Safety Guidelines

#### Grounding and Wiring

- **Proper Grounding:** Ensure that all electrical equipment is properly grounded. Grounding provides a path for electrical currents to safely dissipate, reducing the risk of electric shock.
- **Inspect Wiring:** Regularly inspect all wiring for signs of damage, wear, or fraying. Replace damaged wires immediately to prevent electrical hazards.
- **Avoid Overloading Circuits:** Do not overload electrical circuits or outlets. Use power strips with surge protection and ensure they are rated for the load they will carry.
- **Use Proper Extension Cords:** Use extension cords that are rated for the power requirements of the equipment. Avoid using multiple extension cords in series, and do not exceed the recommended length.

#### Handling Electrical Equipment

- **Dry Hands and Work Areas:** Always ensure your hands are dry when handling electrical equipment. Keep work areas dry to prevent water from coming into contact with electrical components.
- **Disconnect Power:** Before performing any maintenance or adjustments on electrical equipment, disconnect it from the power source. This includes changing blades or bits on power tools and troubleshooting equipment.
- **Proper Storage:** Store electrical equipment in a dry, cool place. Ensure that cords and cables are coiled neatly and not kinked or twisted, which can cause damage.

#### Safety Devices

- **Circuit Breakers and Fuses:** Ensure that circuit breakers and fuses are in place and functioning correctly. These devices protect electrical systems from overloads and short circuits.
- **Ground Fault Circuit Interrupters (GFCIs):** Use GFCIs in areas where water is present, such as near sinks or in outdoor environments. GFCIs detect ground faults and quickly shut off power to prevent electric shock.
- **Surge Protectors:** Use surge protectors to safeguard sensitive electronic equipment from voltage spikes. Ensure surge protectors are rated for the equipment they are protecting.

#### Equipment Use and Maintenance

- **Follow Manufacturer's Instructions:** Always follow the manufacturer's instructions for the use and maintenance of electrical equipment. This ensures safe operation and helps prevent damage.
- **Regular Maintenance:** Perform regular maintenance on electrical equipment to ensure it is in good working condition. This includes cleaning, lubricating, and inspecting for signs of wear.

#### Personal Protective Equipment (PPE)

- **Insulated Tools:** Use insulated tools when working with electrical equipment. Insulated tools reduce the risk of electric shock.
- **Rubber-Soled Shoes:** Wear rubber-soled shoes to provide additional insulation from electric currents.
- **Non-Conductive Gloves:** Use non-conductive gloves when handling electrical components to reduce the risk of electric shock.

#### Safe Work Practices

- **Avoid Wet Conditions:** Do not use electrical equipment in wet or damp conditions. Water is a conductor of electricity and increases the risk of electric shock.
- **Unplug When Not in Use:** Unplug electrical equipment when it is not in use. This prevents accidental activation and reduces the risk of electrical fires.
- **Use the Right Equipment:** Use electrical equipment that is suitable for the environment. For example, use outdoor-rated equipment for exterior projects and explosion-proof equipment in areas with flammable gasses.

### Emergency Procedures

- **Know the Location of Breaker Panels:** Familiarize yourself with the location of breaker panels and how to shut off power in an emergency.
- **First Aid for Electric Shock:** Know the basic first aid procedures for electric shock. This includes not touching the person directly if they are still in contact with the electrical source, calling emergency services, and performing CPR if necessary.
- **Report Hazards:** Immediately report any electrical hazards to makerspace staff. This includes damaged cords, faulty equipment, and exposed wiring.

### Training and Education

- **Orientation and Training:** Include space safety in the orientation and training sessions for new users. Ensure they understand the basic principles of shop safety and the specific practices for the makerspace.
- **Regular Safety Reviews:** Conduct regular safety reviews and refresher courses on space safety. This helps keep all users up to date with best practices and any new equipment or procedures.
- **Signage and Labels:** Use clear signage and labels to indicate electrical hazards, breaker panel locations, and emergency shut-off procedures.

### Special Considerations

- **Shared Equipment:** In shared makerspaces, establish clear guidelines for the use and maintenance of shared electrical equipment. Ensure all users understand their responsibilities.
- **Accessibility:** Ensure that electrical safety measures are accessible to all users, including those with disabilities. This includes easy access to breaker panels and clearly labeled emergency shut-off switches.
- **High-Voltage Equipment:** For high-voltage equipment, such as certain types of CNC machines or industrial tools, provide additional training and supervision. Ensure that only qualified users have access to this equipment.

By following these electrical safety guidelines, makerspace users can significantly reduce the risk of electric shocks, fires, and equipment damage, creating a safer and more productive environment for everyone.

## 6. Chemical Safety

### Importance of Chemical Safety

- **Health Protection:** Proper handling of chemicals prevents exposure to toxic substances that can cause short-term or long-term health effects.
- **Environmental Protection:** Safe disposal and use of chemicals protect the environment from contamination and pollution.
- **Compliance:** Adhering to chemical safety guidelines ensures compliance with local, state, and federal regulations, avoiding legal issues and penalties.

## Chemical Safety Guidelines

### Identification and Labeling

- **Clear Labeling:** Ensure all chemicals are clearly labeled with their contents, concentration, and hazard information. Use original containers with manufacturer labels whenever possible.
- **Safety Data Sheets (SDS):** Maintain an accessible collection of Safety Data Sheets for all chemicals in the makerspace. SDS provide detailed information on the properties, hazards, and safe handling of chemicals.
- **Proper Storage:** Store chemicals in designated areas according to their hazard class. Separate incompatible chemicals to prevent reactions. Use appropriate storage cabinets for flammable, corrosive, and toxic substances.

### Personal Protective Equipment (PPE)

- **Eye Protection:** Wear safety goggles or face shields when handling chemicals that can splash or produce harmful vapors.
- **Gloves:** Use gloves made of materials resistant to the chemicals you are handling. Consult the SDS for recommendations on glove types.
- **Protective Clothing:** Wear lab coats, aprons, or coveralls to protect your skin and clothing from chemical spills. Use chemical-resistant footwear if necessary.
- **Respiratory Protection:** Use appropriate respirators or masks to protect against inhaling harmful vapors, dust, or fumes. Ensure respirators are fit-tested and used according to the manufacturer's instructions.

### Handling and Use

- **Read Labels and SDS:** Before using any chemical, read the label and SDS to understand the potential hazards and safe handling procedures.
- **Use in Well-Ventilated Areas:** Work with chemicals in well-ventilated areas or use fume hoods to prevent the buildup of hazardous vapors.
- **Avoid Direct Contact:** Minimize direct contact with chemicals by using tools and equipment, such as pipettes and tongs, to transfer and handle substances.
- **No Eating or Drinking:** Do not eat, drink, or store food in areas where chemicals are used or stored to avoid contamination.

### Spill and Accident Response

- **Spill Kits:** Maintain well-stocked spill kits that include absorbent materials, neutralizers, protective equipment, and disposal bags. Ensure that users know the location and proper use of spill kits.
- **Emergency Procedures:** Establish and communicate clear procedures for responding to chemical spills, exposures, and accidents. Include steps for evacuation, containment, and cleanup.
- **First Aid:** Provide first aid kits and ensure users know basic first aid procedures for chemical exposure, such as flushing eyes and skin with water.

### Storage and Disposal

- **Chemical Segregation:** Store chemicals according to their hazard classification. For example, separate acids from bases and flammables from oxidizers.

- **Temperature Control:** Store chemicals at appropriate temperatures to prevent reactions and degradation. Use refrigerators or freezers for temperature-sensitive substances.
- **Secure Storage:** Keep chemical storage areas locked and accessible only to authorized personnel. Label storage cabinets with hazard symbols and contents.
- **Disposal Procedures:** Follow proper disposal procedures for chemical waste. Do not pour chemicals down the drain unless specifically instructed by waste disposal guidelines. Use designated containers for chemical waste and ensure they are clearly labeled.

#### Training and Education

- **Initial Training:** Include chemical safety training in the orientation for new users. Cover the basics of chemical hazards, PPE, handling procedures, and emergency response.
- **Ongoing Education:** Provide regular training updates and refresher courses on chemical safety. Address new chemicals, updated regulations, and changes in procedures.
- **Signage and Documentation:** Post signs indicating the locations of safety equipment, such as eye wash stations, emergency showers, and spill kits. Keep an updated inventory of all chemicals and ensure SDS are readily accessible.

## 8. Emergency Procedures

### Importance of Emergency Procedures

- **Immediate Response:** Knowing what to do in an emergency can save lives, prevent injuries, and minimize damage.
- **Preparedness:** Having established procedures ensures everyone is prepared and can act quickly and efficiently.
- **Compliance:** Following safety regulations and guidelines helps to meet legal and insurance requirements.

### Emergency Procedure Guidelines

#### Fire Safety

- **Fire Extinguishers:** Know the locations of fire extinguishers and how to use them. Fire extinguishers should be easily accessible and regularly inspected.
- **Fire Exits:** Identify and keep fire exits clear at all times. Ensure that exits are clearly marked and free from obstructions.
- **Evacuation Plan:** Familiarize yourself with the makerspace's evacuation plan. Know the designated meeting point outside the building.
- **Fire Drills:** Participate in regular fire drills to practice evacuation procedures. Fire drills help to ensure everyone knows what to do in case of a fire.

#### First Aid

- **First Aid Kits:** Know the location of first aid kits. Ensure they are well-stocked and regularly checked for expired or used items.

- **Injury Reporting:** Report all injuries, no matter how minor, to the makerspace staff. Proper reporting helps to identify hazards and prevent future incidents.

#### **Chemical Spills**

- **Spill Kits:** Know the location of chemical spill kits and how to use them. Spill kits should contain absorbents, neutralizers, PPE, and disposal bags.
- **Spill Response:** In the event of a chemical spill, alert others and evacuate the area if necessary. Use the spill kit to contain and clean up the spill, following the instructions provided.
- **Chemical Exposure:** If exposed to chemicals, follow the first aid measures outlined in the Safety Data Sheets (SDS). This may include flushing with water, seeking medical attention, and reporting the incident.

#### **Electrical Emergencies**

- **Power Shutoff:** Know the location of electrical panels and how to shut off power in an emergency. Shutting off power can prevent electrical fires and injuries.
- **Electrical Shock:** If someone receives an electric shock, do not touch them directly. Disconnect the power source and call for medical help immediately. Provide CPR if trained and necessary.
- **Reporting Issues:** Report any electrical hazards, such as damaged wires or malfunctioning equipment, to the makerspace staff immediately.

#### **Severe Weather**

- **Weather Alerts:** Stay informed about severe weather conditions. Many areas have weather alert systems that provide warnings for storms, tornadoes, and other severe weather.
- **Shelter Locations:** Know the designated shelter locations within the makerspace. These areas should be away from windows and exterior walls.

#### **Medical Emergencies**

- **Emergency Contacts:** Have a list of emergency contacts available, including local emergency services and nearby hospitals.
- **AEDs (Automated External Defibrillators):** Know the location of AEDs and how to use them. AEDs can save lives in the event of a cardiac emergency.
- **Medical Information:** Encourage users to share any relevant medical information, such as allergies or chronic conditions, with makerspace staff. This information can be crucial in an emergency.

#### **Communication**

- **Emergency Numbers:** Emergency contact numbers are in visible locations throughout the makerspace. This includes fire, police, medical services, and poison control.
- **Alarm Systems:** Phorge makerspace has functioning alarm systems for fire and other emergencies. Regularly test these systems to ensure they are working properly.

#### **Special Considerations**

- **Accessibility:** Ensure emergency procedures accommodate users with disabilities. This may include having evacuation chairs and ensuring all users know how to assist those with mobility issues.

- **Visitor Safety:** Develop procedures for the safety of visitors and non-regular users. Ensure they are aware of emergency exits and procedures.

By adhering to these emergency procedure guidelines, Phorge Makerspace can enhance the safety and preparedness of all users, ensuring quick and effective responses to emergencies. This not only protects the individuals involved but also helps to maintain a safe and secure environment for the entire community.

# PHORGE

## M A K E R S P A C E

## Revision Tracking

Date	Name	Changes	Revision
7/30/25	Original Release	Released to Public	Rev 1

PHORGE

MAKERSPACE