**General principles of safety and health in laboratories**

- The laboratory, including passageways, exits, roads, equipment and facilities must be neat and clean.
- Waste, stains and residues of hazardous or dangerous substances will be eliminated quickly.
- It is forbidden to carry out different jobs not authorized directly by the responsible, and use devices and equipment without prior knowledge of its operation.
- The lab coat must be buttoned. Wide sleeves should be avoided.
- Hair must be collected.
- Closed shoes must be worn (flip flops or cloth shoes must not be worn).
- Laboratory clothing (gown) should not be worn outside of it, avoiding its use in common areas of the ICV.
- It is prohibited to eat, smoke and / or store food and drink in laboratories.
- The use of Personal Protective Equipment (safety glasses, gloves ...) is mandatory.
- All chemicals must be properly labeled and in good condition.
- Once the laboratory task is finished, it must be completely cleaned and collected. Also ensure the disconnection of appliances, water, gas, etc..

**Classification of chemical substances**

Depending on how dangerous chemicals are classified as:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosives</td>
<td><img src="image" alt="Explosives" /></td>
</tr>
<tr>
<td>Oxidants</td>
<td><img src="image" alt="Oxidants" /></td>
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<tr>
<td>Flammable</td>
<td><img src="image" alt="Flammable" /></td>
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<tr>
<td>Toxic</td>
<td><img src="image" alt="Toxic" /></td>
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<tr>
<td>Corrosive</td>
<td><img src="image" alt="Corrosive" /></td>
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<tr>
<td>Irritants, Carcinogenic, Teratogenic, Mutagenic, Allergenic</td>
<td><img src="image" alt="Irritants" /></td>
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<tr>
<td>Dangerous for the environment</td>
<td><img src="image" alt="Dangersome" /></td>
</tr>
</tbody>
</table>

MORE INFORMATION IN:

Chemical Handling

- Read the Safety Data Sheet (SDS) carefully.
- SDS must be available in the laboratory.
- The reactivity of the products must be known.
- Appropriate personal protective equipment (PPE) should always be used (see SDS).
- Use the gas showcase.
- When a liquid is poured from a bottle into a glass, it should be done slowly avoiding splashing.
- To take solid substances, spoons or spatulas will be used.
- Safety pipettes will be used to collect liquids.
- Pipetting with the mouth is strictly forbidden, rubber or automatic “pears” must be used.
- Flammable substances must be far from the heat source
- Funnels or dispensers must be used for transfers
- They will be done in small quantities.
- All products must be properly labeled and registered.
- Food containers should not be used.
- Label:
  - Chemicals that do not have any label and / or safety data sheet must be discarded.
  - Chemicals with similar characteristics must be grouped, separating incompatible ones and isolating those of special characteristics (carcinogenic, very toxic, explosive, flammable, etc.)
  - Aggressive products should be stored in specific cabinets and never higher than 165 cm.
  - Refrigerators must be specials of increased safety and not have an internal electrical installation.
  - Chemicals must be stored in different materials depending on their features
    a. Substances that attack glass: Containers of synthetic or metallic materials.
    b. Substances that decompose in light: Opaque glass or dark glass containers.
    c. Alkaline metals: With a high boiling solvent protective layer.
    d. White phosphorus: Under a layer of water.
    e. Mercury (> 3kg): Steel containers with screw closure

Glassware handling

- Its good condition must be verified or discarded.
- After a violent blow, hit or knock, dispose it immediately even if there is no visible anomaly or damage.
- It must be heated by interposing a metal mesh between the glass and the flame.

Glass assemblies:

- Prevent the materials used from being stressed.
- Always use brackets and clamps.
• Use grease on all fixings and plastic plugs (whenever possible).
• Glass balls should be slowly introduced into the bathrooms
• To unclog glassware, the appropriate PPE must be used and the operation carried out behind the door of laboratory hood.

**Electrical equipment handling**

• Know the location of the electrical differentials.
• Do not make continuous use of extensions and/or multiconnectors.

**Flame devices**

• They must have a safety system that allows the gas supply to be cut in case of an emergency.
• Always work under a laboratory hood.
• Appropriate PPE should be used to work with flame/heat.

**Heating devices**

• If working with volatile substances, a localized extraction system or a condensation system should be used to retain them.
• Always use a temperature controller.
• Use the appropriate PPE: protective glasses, tweezers and gloves resistant to high temperatures.
• If fire occurs, cut off the power immediately. Use a CO2 extinguisher.

**Furnaces:**

• If gases are used, ensure the good condition of the installation.
• Do not open working ovens (retinal burns, skin, refractory tears, etc.).

**Liquid Nitrogen**

• Liquid N2 with exposed body parts will never be handled.
• Use personal protective equipment (face mask and gloves)
• Clothing must be clean and dry, and not tight to the body.
• Containers must always be placed in a well ventilated area.
• Containers must be far from any source of heat and heavy objects should never be placed on top of the lids of these containers.

**Gas Installations**

• Containers must be fixed to a support by a chain.
• They must be closed if they are not in use.
• They will be away from heat sources.
• When handling bullets, appropriate PPE should be used.

**Lab Equipment**

• The laboratory must have a specific safety manual for each equipment in that laboratory.
• PPE appropriate to each device should be used.

**Hot baths:**

• They should not be filled to the edge.
• Use supports that ensure the stability of the bath.
• Specific glass that withstands high temperatures must be used.
• Whenever possible, work under a localized extraction system.

**Heater/Stove:**

• If working with flammable vapors, specific safety stoves must be used.
**Laser work**

- Rooms or labs with laser devices will be protected and marked, as well as the laser equipment itself.
- Install a flashing light outside in the area of access to the room or lab where the 3B or 4 laser device is located, which is activated when the equipment is in operation.
- Place specific screens or separate rooms for cutting, welding or drilling operations with laser devices.
- Remove any explosive, flammable product or solvents from the work area with laser equipment.
- The beam path must finish at the end of its path on a material with diffuse reflection and appropriate technical properties.
- Class 3B and 4 lasers must have a protective housing, confinement and interlocking system.
- Do not allow the presence of beams in passing areas.
- Limit the duration and level of exposure.
- Use appropriate personal protective equipment.

**Inform the ICV prevention service of the incident / accident**

MORE INFORMATION IN:

www.icv.csic.es/prevención