

Chemical hazards

Collective protective equipment must be used before personal protective equipment.

Indeed, wearing a mask in the laboratory protects the person handling it but does not protect other people present in the laboratory. Working under a fume hood eliminates the discomfort of wearing a mask and protects others.

The person handling bottles containing commercial products is exposed to chemical risks at all times. Before handling any bottle, it is advisable to :

- Wear appropriate protective equipment: cotton lab coat, EEC-approved safety glasses, protective gloves;
- Handle bottles under a ventilated fume hood (for concentrated acids or bases, for example);
- Check the laboratory glassware before any manipulation to avoid cuts (chipped glass) or breakage during use (chipped glassware, cracks, etc.);
- Do not pipette directly from the bottle. Transfer the necessary volume to a clean beaker and label it. This avoids contaminating the stock solution.

Safety pictograms, meanings and precautions

Symbols	Definitions	Examples	Precautions
Explosive 	Any product that can explode under the effect of a shock, friction, or heat.	Gases (hydrogen, acetylene, propane, butane, LPG). All types of aerosols (even empty) can become explosive at 50°C: air fresheners, hairsprays, paint, varnish, windshield de-icers, etc. Picric acid, fireworks, etc.	Avoid heat, shock, and friction. Protect from sunlight. Do not store near a heat source, lamp, or radiator.
Harmful 	Products which, by inhalation, ingestion, or skin penetration, can cause poisoning. The severity depends on the product and the dose received.	Turpentine, pesticides, mothballs, effervescent bleach tablets, solvents for varnishes.	Avoid any contact with the skin (gloves, screens, lab coats, etc.). Work in a well-ventilated area, under a fume hood, or in the open air. Do not eat or chew gum. Wash hands after handling. Note: Aerosol products are among the most dangerous.
Toxic 	Any product that, by inhalation, ingestion, or skin penetration, can cause serious, acute, or chronic health risks and even death. What differentiates toxicity is the dose at which the risk appears.	Methanol, alcohol for burning, stain remover, disinfectant (creoline), pesticides. Carcinogens: zinc oxide, ethylene oxide, zinc chromates, asbestos. Stain removers, trichloroethylene. Paint removers. Carbon monoxide, mercury, chlorine, hydrocyanic acid, cyanide.	
Very toxic 	Any product that, by inhalation, ingestion, or skin penetration, can lead to extremely serious, acute, or chronic risks and even death.		
Easily flammable 	Products that can ignite easily upon contact with a flame, a heat source (hot surface), or sparks.	Oil, turpentine, diluted ethyl alcohol, formalin.	Store all products in a well-ventilated room. Avoid using the product near a heat source, hot surface, sparks, or an open flame. Do not wear synthetic clothing. Have a fire extinguisher at hand. Always keep flammable products (F) away from oxidizing agents (O).

<p>Extremely flammable</p> 	<p>Any product that can ignite very easily upon contact with an energy source (flame, spark, etc.), even at negative temperatures.</p>	<p>Gasoline, alcohol for burning, pure ethyl alcohol, acetone, ether.</p>	
<p>Oxidizer</p> 	<p>Any product which, in contact with other substances, particularly flammable ones, causes a strongly exothermic reaction. Oxidizers are materials rich in oxygen that have the property of sustaining combustion and, consequently, fueling fires.</p>	<p>Hydrogen peroxide and other peroxides, chlorates, permanganates, nitric and perchloric acids.</p> <p>Keep away from flammable and combustible materials. Risk of fire or explosion if in contact with flammable substances.</p>	
<p>Risk of biological contamination</p> 	<p>For humans: risk of contamination linked to the presence of a pathogen or a GMO. For the environment: risk of contamination linked to the presence of a pathogen or a GMO (Genetically Modified Organism).</p>	<p>Blood, bacterial cultures, protozoa.</p>	<p>Upon seeing this symbol, respect aseptic rules. Wash hands with soap and water after handling. In case of an accident (spill on the benchtop, cut with contaminated equipment, etc.), wash and disinfect the wound and/or the work surface. Protect cuts or wounds with latex or vinyl gloves. Keep products in their original packaging (hermetically sealed container, safety cap). Store products properly, never place them on a windowsill or near a table or bench edge. Protect skin and eyes from splashes. Always use gloves and safety glasses. Always wash hands thoroughly after handling. In case of emergency, rinse the affected areas thoroughly with water for 10 minutes.</p>
<p>Irritant</p> 	<p>Non-corrosive products which, by inhalation, ingestion, or by immediate, prolonged, or repeated contact with the skin, eyes, or mucous membranes, can cause an inflammatory reaction.</p>	<p>Ammonia, diluted bleach, dishwashing detergents, methanol-based window cleaners.</p>	
<p>Corrosive</p> 	<p>Substances that have the power to damage living tissues (particularly in the human body) and to attack other materials such as metals and wood.</p>	<p>Drain cleaners, descalers, caustic soda, strong acids (sulfuric acid in batteries), strong bases, oven cleaners, toilet cleaners, dishwasher products (in their wet state).</p>	
<p>Radioactive materials</p> 	<p>Radioactivity is a phenomenon related to the structure of matter. Some atoms (radioelements) are unstable and emit ionizing radiation which, during their interaction with matter, can ionize it, i.e., remove one or more electrons from its atoms.</p>	<p>Cosmic radiation, telluric radiation (from the ground), radioelements, radioactive leaks, radiology, nuclear medicine.</p>	
<p>Dangerous for the environment</p> 	<p>Substances and preparations which, if they enter the environment, would present or could present an immediate or delayed risk for one or more</p>	<p>Some active ingredients of pesticides (organochlorine compounds: lindane, parathion) and weed killers. CFCs (chlorofluorocarbons). Certain solvents (thiodicresol). Certain heavy metal compounds (copper</p>	<p>This symbol means the product is toxic to aquatic organisms or may cause long-term adverse effects in the aquatic environment. Do not discharge into drains or the environment. Dispose of waste properly in designated collection</p>

	components of the environment (air, water, soil, fauna, flora). These substances can be: very toxic to aquatic organisms or soil, toxic to wildlife, dangerous to the air (e.g., the ozone layer).	methanesulfonate). PCBs (polychlorinated biphenyls). PCTs (polychlorinated terphenyls).	points.
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Biological Hazards

- This pictogram is present at the entrance to microbiology or biology laboratories, as well as on containers intended for waste (Petri dishes, plastic, Pasteur pipettes, hemolysis tubes, etc.) or biological products (all samples to be analyzed, blood samples, etc.).
- It indicates the potential contamination by a biological agent of a known or unknown nature (bacteria, protozoa, viruses, etc.).
- Upon seeing this symbol, respect the rules of asepsis. Wash your hands with soap and water after handling. Disinfect work surfaces and soiled equipment (after gloves removal).
- In the event of an accident (spill on the benchtop, cut with contaminated equipment, etc.), wash and disinfect the wound and/or the work surface.
- Protect wounds with a bandage or wear latex or vinyl gloves. 
- Keep your vaccination record up to date.
- Genetic engineering: risks of mutation and genetic manipulations are new risks that must be evaluated.

Radiological Risks



Pictogram present in all radiology laboratories where radiation poses a danger, whether for short-term or long-term exposure.

- Risks related to the use of ionizing radiation (α , β , γ) and non-ionizing radiation (UV and IR).

Electrical Hazards

Direct or immediate physiological effects of electric current:

- **Electrification** refers to the various physiological and pathophysiological manifestations due to the passage of electric current through the human body.
- **Electrocution** is fatal electrification.
- **Arc burns** are caused by the intense heat released during the production of an electric arc.

Technical measures: the classes of electrical equipment:

- The equipment used must be Class I (symbol \perp) meaning it is equipped with a protective conductor (green/yellow color for the earth conductor).
- Alternatively, it can be Class II (symbol \square within a \square) meaning it has double insulation. In this case, it must not be grounded.
- Class III equipment operates under a very low safety voltage of 48 Volts AC.
- The use of Class 0 equipment (i.e., not comprising a protective conductor or not meeting Class II standards) is strictly prohibited in workplaces.

Alternating voltages (50 Hz) at 50 volts are dangerous for humans.

Necessary equipment:

- Sensitive differential circuit breaker.
- Emergency stop button (emergency off).

Mechanical Risks