





Zinc & its compounds

including Zinc oxide, carbonate, sulfate(VI), chloride, bromide

Substance	Hazard	Comment
Zinc metal (granulated or sheets of metal)	LOW HAZARD	Pure zinc does not react readily with dilute acids, without a catalyst [usually copper(II) sulfate]. Iron or steel is often coated with zinc (galvanised) to protect it from rusting.
Zinc metal (powder or dust)	 HIGHLY FLAMMABLE	Under suitable conditions may react with water to produce extremely flammable gas (see <i>Sheet 50</i>). Can ignite spontaneously in air or react violently with iodine, sulfur and copper(II) oxide. Most school samples have a surface coating of zinc oxide, making reactions unpredictable.
Zinc oxide or carbonate	LOW HAZARD	The zinc oxide fumes ('philosopher's wool') formed when zinc dust burns in air are regarded as hazardous dust.
Zinc sulfate(VI) Solid or concentrated solutions (If 0.4 M or more)	 HARMFUL / IRRITANT	Harmful if swallowed (especially saturated solutions for crystal-growing). There is a risk of serious damage to the eyes. When preparing zinc sulfate by reacting zinc and sulfuric acid, the reaction can be slow and is often incomplete.
Zinc sulfate(VI) Dilute solutions (If less than 0.4 M)	LOW HAZARD	
Zinc chloride or bromide Solid or concentrated solutions (If 0.7 M or more)	 CORROSIVE	These cause burns and are harmful if swallowed. The anhydrous solids are especially dangerous. The solids absorb water from the atmosphere. Electrolysis of molten zinc chloride/bromide or solutions produce chlorine or bromine.
Zinc chloride or bromide Fairly dilute solutions (If less than 0.7 M but more than 0.3 M)	 IRRITANT	-
Zinc chloride or bromide Dilute solutions (If less than 0.3 M)	LOW HAZARD	-

Typical control measures to reduce risk

- Use the lowest possible quantities and concentrations.
- Only electrolyse zinc chloride/bromide solutions briefly, unless in a fume cupboard (essential for the molten compounds).
- Assume zinc powder/dust is fresh and not partially oxidised on the surface.
- When reacting zinc and acid, check no acid remains before evaporating solutions (pH should be 4 or higher).
- Wear eye protection.

Assessing the risks

- *What are the details of the activity to be undertaken? What are the hazards?*
- *What is the chance of something going wrong?*
Eg, Solutions spurting out of test tubes when heated or solutions heated to dryness and decomposing.
- *How serious would it be if something did go wrong?*
Eg, Are there hazardous reaction products (such as chlorine from the electrolysis of zinc chloride)?
- *How can the risk(s) be controlled for this activity?*
Eg, Can it be done safely? Does the procedure need to be altered? Should goggles or safety spectacles be worn?

Emergency action

- In the eye Flood the eye with gently-running tap water for at least 10 minutes. See a doctor.
- Swallowed Do no more than wash out the mouth with water. Do **not** induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor.
- Dust breathed in Remove the casualty to fresh air. See a doctor if breathing is difficult.
- Spilt on the skin or clothing Remove contaminated clothing and rinse it. Wash off the skin with plenty of water.
- Spilt on the floor, bench, etc Scoop up solid (take care not to raise dust). Wipe up small solution spills or any traces of solid with cloth; for larger spills use mineral absorbent (eg, cat litter).