Zinc *and its* compounds

including zinc oxide, carbonate, sulfate(VI), chloride and bromide

Substance	Hazard	Comment
Zinc (metal) *granulated or sheets of metal*	**Currently not classified as hazardous**	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*	 **FLAMMABLE**  **ENVIRON. HAZARD**	DANGER: in contact with water releases flammable gases which ignite spontaneously; catches fire spontaneously if exposed to air; toxic to aquatic life with long-lasting effects. Reacts violently with iodine, sulfur and copper(II) oxide. Most school samples have a surface coating of zinc oxide, making reactions unpredictable.
Zinc oxide **Zinc carbonate**	**Currently not classified as hazardous**	The zinc oxide fumes ('philosopher's wool') formed when zinc dust burns in air are regarded as hazardous dust.
Zinc salts *Solids or concentrated solutions* **Sulfate(VI)** (*if 1.5 M or more*) **Chloride** / **bromide** (*if 1 M or more*)	  **CORROSIVE** **HARMFUL**  **ENVIRON. HAZARD**	DANGER: Harmful if swallowed (especially saturated solutions for crystal growing); causes serious eye damage (sulfate); causes severe skin burns and eye damage (chloride & bromide); toxic to aquatic life with long lasting effects. When preparing zinc sulfate by reacting zinc and sulfuric acid, the reaction can be slow and is often incomplete.
Zinc salts (*most solutions*) **Sulfate(VI)** (*if less than 1.5 M but 0.2 M or more*) **Chloride** (*if less than 1M but 0.2 M or more*) **Bromide** (*if less than 1 M but 0.1 M or more*)	  **CORROSIVE** **IRRITANT**	DANGER: corrosive to eyes (all) and to skin (chloride and bromide); respiratory irritant (chloride if more than 0.4 M, bromide if more than 0.2 M).
Zinc salts (*dilute solutions*) **Sulfate(VI)** (*if less than 0.2 M but 0.06 M or more*) **Chloride** (*if less than 0.2 M but 0.1 M or more*) **Bromide** (*if less than 0.1 M but 0.05 M or more*)	 **IRRITANT**	WARNING: irritating to eyes (all) and skin (chloride & bromide).
Zinc salts (*very dilute solutions*) **Sulfate(VI)** (*if less than 0.06 M*) **Chloride** (*if less than 0.1 M*) **Bromide** (*if less than 0.05 M*)	**Currently not classified as hazardous**	–

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 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 all emergency situations, alert the responsible adult immediately. Be aware that actions may include the following:

- In the eye — Irrigate the eye with gently-running tap water for at least 20 minutes. Call 999/111.
- In the mouth/swallowed — Do no more than rinse and spit with drinking water. Do **not** induce vomiting. Call 999/111.
- Dust breathed in — Remove the casualty to fresh air. Consult a medic if breathing is difficult.
- Spilt on the skin or clothing — Remove contaminated clothing. Irrigate the affected area with gently-running tap water for at least 20 minutes. Call 999/111 as appropriate. Rinse clothing.
- 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).

