

Iron and its compounds

including iron(II) and iron(III) oxides, carbonate, sulfate(VI), chlorides, bromide
note: iron(II) compounds are often called ferrous, and iron(III) compounds ferric

Substance	Hazard	Comment
Iron (metal) powder	 FLAMMABLE	WARNING: the powder is a flammable solid. Iron filings/powder in the eye are very painful because the iron oxidises rapidly in the saline environment. Samples of iron are often not very pure and on reacting with dilute acids may produce the TOXIC gas hydrogen sulfide (smelling of bad eggs) (see Sheet 59). For reaction with sulfur, see Sheet 82. Iron often coated with zinc (galvanised) to protect it from corrosion.
Iron (metal) filings, sheets or bars of metal	Currently not classified as hazardous	
Iron oxides and iron(II) carbonate	Currently not classified as hazardous	Applies to all iron oxides: iron(III) oxide (haematite), iron(II) iron(III) oxide (magnetite or ferrosferric oxide). Iron(II) carbonate is usually sold mixed with a sugar (saccharated), to slow down oxidation.
Iron(II) and iron(III) sulfate(VI) ammonium iron(II) sulfate (Mohr's salt) ammonium iron(III) sulfate (ferric alum) Solid or concentrated solutions (iron(II): if 0.5 M or more; iron(III): if 0.3 M or more)	 IRRITANT	WARNING: Causes skin and serious eye irritation. Iron(III) also harmful by ingestion if 0.6 M or more. Usually solutions are made up in dilute sulfuric acid, which may itself be hazardous (see Sheet 22), to slow down oxidation. Ammonium iron(II) and ammonium iron(III) solutions are more stable but are still made up in acid to limit oxidation.
Iron(II) and iron(III) sulfate(VI) ammonium iron(II) or iron(III) sulfate Dilute solutions (iron(II): if less than 0.5 M; iron(III): if less than 0.3 M)	Currently not classified as hazardous	Solutions which have been made up in sulfuric acid, which may itself be hazardous (see Sheet 22).
Iron(II) and iron(III) chloride Hydrated or anhydrous solid, or concentrated solutions (if 0.1 M or more).	  HARMFUL CORROSIVE	DANGER: harmful if swallowed; causes skin irritation and serious eye damage. Some suppliers classify anhydrous solids and solutions more concentrated than 0.2 M as corrosive. Usually solutions are made up in hydrochloric acid (see Sheet 20) to slow down oxidation. Solution (about 2 M) used for etching printed circuit boards.
Iron(II) and iron(III) chloride Dilute solutions (if less than 0.1 M)	Currently not classified as hazardous	Usually solutions are made up in hydrochloric acid (see Sheet 20) to slow down oxidation.

Typical control measures to reduce risk

- Use the lowest possible quantities and concentrations.
- Take care not to rub the eye with fingers contaminated with iron filings or powder.
- 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?
- 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. Call 999/111 if breathing is difficult.
- Spilt on the skin or clothing Brush solid off contaminated clothing. Irrigate the affected area with gently-running tap water for at least 20 minutes as appropriate. Call 999/111 as appropriate. Rinse clothing.
- Spilt on the floor, bench, etc Brush up solid spills, trying to avoid raising dust, then wipe with a damp cloth. Wipe up solution spills with a cloth and rinse it well.