





also applies to **Denatured alcohol** and **Methylated spirit**

| Substance | Hazard | Comment |
|--|---|--|
| Ethanol Liquid pure |  FLAMMABLE | DANGER: highly flammable liquid & vapour. There is a serious risk of liquid catching fire; its vapour may catch fire above 13 °C. The vapour/air mixture is explosive (from 3.3 to 19% ethanol). The concentration in the air should not exceed 5760 mgm ⁻³ . Evaporation/cooling experiments: Alcohol-based hand gels may be used to experience the cooling effect of evaporation. Apply only a small quantity to the back of a hand. Do not use surgical spirits. |
| Industrial denatured alcohol (IDA) formerly Industrial methylated spirit (IMS) |  FLAMM. HARM. HEALTH | DANGER: highly flammable liquid & vapour; harmful if swallowed; may cause damage to organs. This is ethanol, containing 5% methanol (v/v). It is often used in schools in place of pure ethanol (because it is cheaper) and usually labelled just as 'Ethanol' but it is more hazardous than pure ethanol because of the methanol. Commonly used as a solvent, eg, for chlorophyll, for indicators (universal indicator, phenolphthalein). |
| Completely denatured alcohol (CDA) |  FLAMM. HARM. HEALTH | It contains methanol, propan-2-ol, methyl ethyl ketone, a bitter-tasting compound and, sometimes, a purple dye. CDA is not suitable for use indoors. |
| Surgical spirit Ethanol, with small amounts of castor oil, methyl salicylate and diethyl phthalate |  FLAMM. CORROS. ENVIR. | It is prescribed for medical purposes, eg, foot infections. It must not be swallowed. Use only as prescribed. Do not use for skin evaporation experiments. |
| Ethanol Dilute solution in water | LOW HAZARD | Alcoholic drinks contain ethanol, typically 3 to 7% (v/v) (beers), 11 to 14% (v/v) (wines), 30 to 40% (v/v) (spirits). Although chemical hazards are low, there may be considerable effects on the body leading to a loss of judgement, slower reaction times, etc. Consumption is dangerous if driving a vehicle or operating machinery. |

Typical control measures to reduce risk

- Use the smallest volume possible; wear eye protection.
- Make sure the room is well ventilated.
- Check that equipment for extinguishing fires is nearby, eg, damp cloth, bench mat, fire blanket.
- **Do not use near naked flames; if heating necessary, use an electrically-heated water bath or hot water from kettle.**

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, does ethanol need to be heated? Could quantities of the vapour be breathed in? Might there be fooling around?
- **How serious would it be if something did go wrong?**
NB Some of the most serious accidents in school science have involved ethanol fires, including clothing fires and badly-burnt skin.
- **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 10 minutes. Consult a medic.
- **Swallowed** Do no more than wash out the mouth with water. Do **not** induce vomiting. Consult a medic. NB: casualty may show signs of drunkenness.
- **Spilt on the skin or clothing** Remove contaminated clothing and rinse it. Wash the affected area and clothing with plenty of water.
- **Clothing catches fire** Smother flames on clothing or the skin with a fire blanket or other material. Cool any burnt skin with gently-running tap water for 10 minutes.
- **Other ethanol fires** Allow fires in sinks, etc to burn out. Fires at the top of test tubes, beakers, etc should be smothered with a damp cloth or heat-resistant mat.
- **Spilt on the floor, bench, etc** Extinguish all Bunsen flames. Wipe up small amounts with a cloth and rinse well. Open windows for larger amounts, cover with mineral absorbent (eg, cat litter), scoop into a bucket and add water.