

## Ethanol

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

Substance	Hazard	Comment
<b>Ethanol</b> Pure	 HIGHLY FLAMMABLE	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). Breathing vapour may result in sleepiness: the concentration in the air should not exceed 5,760 mg m <sup>-3</sup> .
<b>Industrial denatured alcohol (IDA)</b> [formerly <b>Industrial methylated spirit (IMS)</b> ]	 HIGHLY FLAMMABLE	It is more hazardous than pure ethanol because of the presence of 5% (v/v) methanol which is TOXIC. It is often used as a solvent, eg, for chlorophyll and for indicators, eg, Universal indicator, phenolphthalein and in chromatography.
<b>Completely denatured alcohol (CDA)</b>	 HARMFUL	It contains methanol, pyridine and a purple dye. CDA has a bad odour and is not suitable for use indoors.
<b>Surgical spirit</b> (It contains small amounts of castor oil, methyl salicylate and diethyl phthalate)	 HIGHLY FLAMMABLE	It is suitable for demonstrating the cooling effect of evaporation. It can be applied to the skin on the back of the hand. It is used for medical purposes, eg, foot infections, cleaning the skin. It must not be swallowed.
<b>Ethanol</b> Dilute solution in water	LOW HAZARD	Alcoholic drinks contain ethanol, typically 3 to 7% (beers), 11 to 14% (wines), 30 to 40% (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 is necessary, use an electrically-heated water bath or hot water from a 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 practical jokes or fooling around? Are any reaction products hazardous?
- **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 needing grafts.
- **How can the risk(s) be controlled for this activity? Can it be done safely? Does the procedure need to be altered?**

### Emergency action

- In the eye  
Flood the eye with gently-running tap water for 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. NB: The 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-proof mat.
- Spilt on the floor, bench, etc  
Extinguish all Bunsen-burner flames. Wipe up small amounts with a cloth and rinse it well. For larger amounts, open all windows, cover with mineral absorbent (eg, cat litter), scoop into a bucket and add water.