






Substance	Hazard	Comment
Bromine <i>Liquid</i>	 TOXIC  CORROSIVE  ENVIRONMENTAL HAZARD	<p>DANGER: fatal if inhaled; causes severe skin burns and eye damage; very toxic to aquatic organisms.</p> <p>Effects of exposure by inhalation can increase over time. Inhalation by those with known breathing difficulties (eg, asthma) may exacerbate such pre-existing conditions.</p> <p>For a 15-minute exposure, the concentration of the vapour in the atmosphere should not exceed 1.3 mg m^{-3}.</p> <p>Keep the following next to liquid bromine at all times: At least 500 cm³ of 1 M sodium carbonate and also a container of solid hydrated sodium carbonate (washing soda) for treating spills on hard surfaces.</p>
Moderately concentrated bromine solution, in water or organic solvents <i>(if 0.2M or more)</i>	 CORROSIVE	<p>DANGER: causes severe eye damage; irritating to skin.</p> <p>Bromine rapidly diffuses out of solution, producing a vapour which is very toxic if breathed in. Effects of exposure by inhalation can increase over time. Inhalation by those with known breathing difficulties (eg, asthma) may exacerbate such pre-existing conditions.</p> <p>A saturated solution in water is about 0.25 M.</p> <p>There may also be hazards associated with the organic solvent; see relevant CLEAPSS <i>Student Safety Sheets</i>.</p>
Moderately dilute bromine solution, in water or organic solvents <i>(if 0.06 M or more but less than 0.2 M)</i>	 IRRITANT	<p>WARNING: irritating to eyes and skin.</p> <p>Bromine rapidly diffuses out of solution, producing a vapour which is very toxic if breathed in. Effects of exposure by inhalation can increase over time. Inhalation by those with known breathing difficulties (eg, asthma) may exacerbate such pre-existing conditions.</p> <p>There may be hazards associated with the organic solvent; see relevant CLEAPSS <i>Student Safety Sheets</i></p>
Very dilute bromine solution, in water or organic solvents <i>(if less than 0.06 M)</i>	LOW HAZARD	<p>There may be hazards associated with the organic solvent; see relevant CLEAPSS <i>Student Safety Sheets</i>.</p> <p>0.002M is suitable for testing alkenes for unsaturation and for halogen/halide displacement reactions.</p>

Typical control measures to reduce risk

- Use the lowest concentration and smallest volume possible.
- Wear eye protection and protective nitrile gloves for all but the most-dilute solutions.
- **Avoid breathing the fumes from concentrated solutions, eg, by the use of a fume cupboard.**
- When bromine liquid is in use, have plenty of 1M sodium carbonate solution available to deal with spills.

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?**
- **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 the eye** Flood the eye with gently-running tap water for 10 minutes. Consult a medic.
- **Vapour breathed in** Remove the casualty to fresh air. Consult a medic if breathing is even slightly affected.
- **Swallowed** Do no more than wash out the mouth with water. Do **not** induce vomiting. Consult a medic.
- **Spilt on the skin or clothing** Remove contaminated clothing, and then drench the skin with plenty of water. Consult a medic.
- **Spilt on the floor, bench, etc** **For spills of all but a few drops of liquid bromine, open windows and evacuate the laboratory.** For small bromine spills, add solid hydrated sodium carbonate (or 1M sodium carbonate solution) and leave for 1 hour. Mop up and rinse with plenty of water.