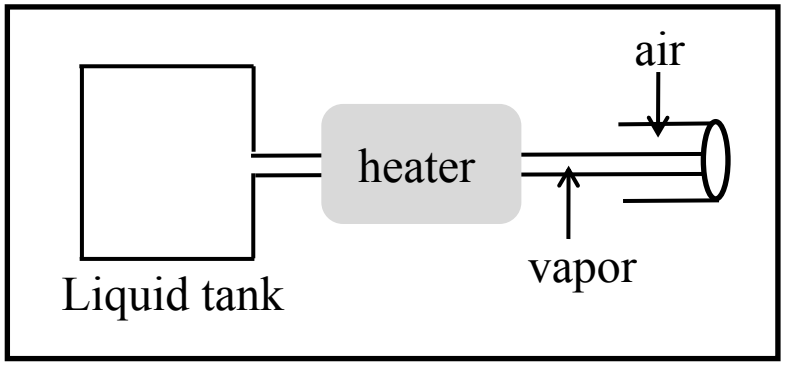
Lab safety – aerosols / sprays / fog machines



(Video of a fog machine in operation)

- Constant liquid volume = 10 ml
- Reactivity and rate of vaporization varies linearly with surface area

Droplet radius	Total surface area
1 cm	3 cm^2
100 μm	0.3 m^2
1 μm	30 m^2

1. http://www.eliminatorlightingdirect.com/EF_400_400_Watt_Mini_Fog_Machine_p/ef-400.htm
2. Vitz, E., Lyle, K. S., *J. Chem. Educ.*, **2008**, 85(10), 1385
3. http://chemistry.about.com/od/howthingswork/a/smokemachines_3.htm

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Typical constituents of "Fog juice" are –

- Water + 15 to 35% glycerol (safest of the lot)
- Water + ethylene glycol (poisonous, may decompose to formaldehyde)
- Water + propylene glycol or di-propylene glycol (may be contaminated)
- Mineral oils

Alternate ways to create fog

- Mix dry ice with water
  - Dry ice can cause frostbite
  - Adequate ventilation is necessary to avoid high concentration of CO_2 gas and subsequent respiratory hazards
- Concerns about triggering a fire alarm

…so minimize the spray volume, organic content and always spray in a hood

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