

# Vacuum Operation Safety

## To turn on:

1. Check that the cold trap is clean and dry before attaching to the vacuum line.
2. **With the Dewar lowered and the system closed to air**, turn the vacuum pump on and ensure vacuum performance is leak free (check gauge display).
3. Half-fill the Dewar with liquid nitrogen and carefully raise into position. **Never immerse a cold trap in liquid nitrogen unless under vacuum as liquid oxygen (blue in colour) may condense.** The result of this can be a violent explosion caused by re-vaporisation or by oxidation of organic solvents etc.
4. Attach the apparatus to the manifold via thick walled rubber tubing. Evacuate the apparatus.

Source: <http://www.adm.monash.edu.au/ohse/documents/hazard-alerts/vacuum-pumps-cold-traps.html>

**To clean trap or shut system down:**

1. Carefully lower the Dewar and turn the pump off.
2. Vent the system to air and wait for any frozen liquid, which may prevent easy removal of the trap, to thaw.
3. Once the cold trap can be removed, put on a face shield and carefully place the cold trap into an empty Dewar holder to help contain any possible explosion. (Remember that liquid oxygen can be shock sensitive).
4. Carefully transport the cold trap in the Dewar to a fume cupboard and allow to stand overnight behind a safety screen.
5. If the cold trap is likely to have condensed toxic or corrosive vapours, the entire assembly must be placed in the fume cupboard behind a safety screen.
6. Replace with a second clean, dry trap and continue.

Under no circumstances should the system be left open to air with the Dewar containing liquid nitrogen in place.

**If liquid oxygen is suspected to have been condensed:**

1. Notify all laboratory personnel of possible danger.
2. Wear a face shield, fastened laboratory coat and leather gloves.
3. Make sure that the cold trap is no longer in a sealed system. Verify that its contents are either open to the atmosphere or connected to the atmosphere by a pressure relief valve.
4. Carefully place an empty Dewar box and safety screen around the trap in situ. Do not attempt to remove.
5. Leave cold trap to stand overnight vented to air and then carefully re-inspect to check that all suspect material has evaporated.

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