

The EAA group guide to high vacuum pumps

Operating a high vacuum pump.

Before switching the pump on check that the solvent trap is empty and that all the taps on the manifold are closed to air. Next, turn the pump on and immerse the solvent trap in a Dewar filled with liquid nitrogen, **to the top**. This will prevent the oil from becoming contaminated. Do not immerse the solvent trap in liquid nitrogen unless it is evacuated, as this will cause liquid oxygen to condense (a pale blue liquid). Similarly, never leave a tap on the manifold open to air while the pump is active and the trap is immersed in liquid nitrogen. The result of this can be a violent explosion. In the case of liquid oxygen condensation, switch off the pump, carefully remove the liquid nitrogen Dewar from the trap and then vent air through the manifold. Next, mount a blast shield in front of the trap and calmly evacuate the lab. Allow the liquid oxygen to evaporate, then continue working. When you want to switch the pump off, close all taps on the manifold and switch the pump off. Remove the liquid nitrogen Dewar immediately after switching the pump off and then vent air into the trap through the manifold. It is very important to vent the pump otherwise oil may suck back into the trap (not fun).

Care of high vacuum pump.

High vacuum pumps are very expensive items, but they will give reliable service for many years if they are treated properly. For an organic chemist to work efficiently he/she must be able to rely on pumps working properly and this will only be the case if they are treated with care. The main reason for deterioration of vacuum pumps is contamination of the oil with volatile organic compounds and acidic vapours. To avoid this problem, you should be very conscientious about keeping the coolant well topped-up around the trap, and emptying them regularly. No matter how careful you are, some solvent vapour will find its way into the pump, and for this reason the pump should be ballasted regularly, at least an hour once a week (suggested during group meetings). More importantly, the pump oil should be changed every six months. The high vacuum pump coordinator will schedule the yearly oil change and will show people how to do that, he can also show you how to ballast the pump.