



CoP008 – Glass apparatus

008.1 General safety guidance

Many serious accidents are caused by careless handling of glass apparatus including glass tubing, rods and thermometers. A protective cloth should always be used when cutting glass tubing, particularly large diameter, or when inserting tubing or thermometers into rubber bungs; a lubricant should be used where appropriate. Cut ends of glass rods and tubing should be fire-polished before use.

All glassware should be examined closely before use and any damaged pieces disposed of or sent for repair. Never return damaged glassware to storage. Always clear up broken glass apparatus immediately. A small piece of plasticine is often useful for collecting slivers of glass. Broken glass must always be placed in a separate bin for disposal. Never allow broken glass into the general waste; someone may be cut very badly through such thoughtlessness. Before undertaking glass blowing repairs or alterations to glass apparatus or experimental systems, ensure that all toxic and/or flammable vapours have been thoroughly purged from the system.

Eye protection is mandatory when operating glass apparatus under vacuum. Thin-walled glass vessels that are to be evacuated should be protected by binding with adhesive tape (half inch wide) leaving gaps of no more than one inch; a metal mesh cover will provide the same protection. The use of plastic mesh covers is not recommended. Evacuated glass desiccators should be protected with a metal mesh cage and must not be transported whilst evacuated. Air should be admitted gradually when a vacuum within glass apparatus is to be released. Never evacuate a badly scratched flask or one with a star crack; apparatus damaged in this way will often fail under vacuum.

All large glass flasks should be supported adequately; it is dangerous to clamp such a vessel only at the neck. Great care is required when handling large pieces of glassware with wet hands. Winchester bottles must never be carried by the neck but must always be transported in properly designed bottle carriers.

Great care is required when freeing stoppers from flasks or bottles, particularly if the contents are hazardous. If a bottle of chemical has been heated by sunlight or as a result of being stored near a burner, hotplate or radiator, the contents should be cooled prior to releasing the stopper; this is particularly important in the case of strong ammonia solutions. Bottles containing strong acids, particularly perchloric acid, or strong alkalis, must not be placed directly on wooden shelving or bench tops; porcelain or plastic dishes or trays should always be used.

008.2 Glass vacuum lines

A visual inspection of glassware to check for cracks and scratches and that all stopcocks are free to open and close should be undertaken before operating vacuum pumps. Glassware that is regularly subjected to extremes of temperature or which is



liable to experience mechanical stress during use, or in cleaning operations, should be routinely returned to a glassblower for stress annealing.

Glass Dewar vessels should be contained within metal or plastic secondary containment vessels.

Glass bulbs with a volume greater than 100cm³ should be taped or encased in a metal mesh cover.

Any vessel that has been cooled in liquid nitrogen should not be allowed to warm up without first being evacuated to a pressure less than 1mm Hg in order to ensure that no liquid air has been condensed.

008.3 Pipetting

Pipetting by mouth is strictly prohibited in this University. Electric pipettes, bulbs, or aspirators should be used to pipette chemicals or start a siphon. Fitting pipette pumps or other pipetting aids incorrectly is the cause of many glass cut injuries, which are often serious. Pipetting aids should be fitted with great care, utilising suitable lubrication where necessary, and employing a protective cloth, in case the pipette should fracture. Laboratory workers should receive suitable instruction in the correct use of teats and mechanical pipetting devices from their supervisors or Principle Investigators.

Document version

Version number	Summary of change	Date and by whom
V1.0	New template	06/06/2023 HE

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