

Risk Assessment: Use of Schlenk Lines

Hazards	Who Might be Harmed and How?	Existing Control Measures	Further Actions Required	Responsible Person	Date
Implosion	<i>Research staff using laboratory.</i> Damaged glassware (Schlenk line and round-bottomed flasks attached to vacuum lines) placed under vacuum pose an implosion risk. An implosion may cause glass shards to be propelled and strike laboratory users resulting in cuts / penetration injuries.	Glassware is inspected before use to reduce the risk of glassware failure. Damaged glassware is immediately discarded to prevent accidental use.	No further actions needed at this time, but risk assessment subject to regular review.	N.A.	N.A.

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Explosion / failure of glassware under positive pressure	<i>Research staff using laboratory.</i> Schlenk lines are connected to an inert gas supply (nitrogen or argon). If an inert gas is fed into the Schlenk line without an appropriate release mechanism, the resulting pressure may result in the glassware failing. If gas is condensed in the cold trap and allowed to warm when sealed, the resulting pressure could lead to a glassware failure.	An oil bubbler is installed to allow excess inert gas to be safely vented. The oil bubbler also serves as a visual gauge of gas flow rate to allow the inlet gas flow to be controlled. Users will inspect the oil bubbler for blockages during daily use and clean / replace as required. A relief valve is always left open to allow any condensed vapours / gases to safely evaporate without a build-up of pressure.	No further actions needed at this time, but risk assessment subject to regular review.	N.A.	N.A.

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Cold burns	<i>Research staff filling or moving dewar containing liquid nitrogen.</i> Liquid nitrogen is used in cold traps to condense volatile vapours. If liquid nitrogen makes contact with the skin / eyes, this could result in severe cold burns.	Protective gloves and safety glasses are worn when manipulating liquid nitrogen.	No further actions needed at this time, but risk assessment subject to regular review.	N.A.	N.A.

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Fire	<i>Research staff using rotary evaporator.</i> If the cold trap, primarily used to condense volatile organic vapours, is left open to air, this could result in the formation of liquid oxygen. Liquid oxygen can react violently with organic material and can result in a fire.	User training on Schlenk lines highlights the hazards associated with liquid oxygen. Care is taken to ensure vacuum taps are not left open.	No further actions needed at this time, but risk assessment subject to regular review.	N.A.	N.A.

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Chemical exposure	<i>Research staff using laboratory.</i> Schlenk lines are commonly used to remove trace volatile materials from research samples by placing them under reduced pressure. If the volatile organics are drawn through the system and vented from the vacuum pump into the laboratory, this could expose researchers to chemical hazards leading to ill-health effects.	A liquid nitrogen cold trap is used to condense volatile material and limit the amount of vapour drawn through the vacuum pump. The exhaust from the vacuum pump is directed into a fume cupboard via flexible tubing to remove any vapours not captured by the cold trap.	No further actions needed at this time, but risk assessment subject to regular review.	N.A.	N.A.

Training Requirements:

General chemistry laboratory training is required. Users receive local instruction covering safe operation of Schlenk lines on a laboratory specific basis.

Specialised Emergency Response (if required):

Glassware implosion / explosion: Isolate area and inform H&S Manager. First Aider should be called if anyone has sustained cuts / penetration injuries. Collect and clear broken glass if safe to do so.

Formation of liquid oxygen: If liquid oxygen is formed, power to the vacuum pump should be isolated and the cold trap removed where safe to do so. The immediate area should be evacuated and the H&S Manager informed.

Burns: If a user sustains cold burns, immediately treat the burn with tepid water and contact a departmental First Aider for ongoing assistance.

Fire: Trigger fire alarm at fire call point and evacuate building. Inform fire wardens at emergency exits of the incident. Place a call with the fire service to confirm that fire activation is genuine.

Version Control:

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