

Risk Assessment: Flash Column Chromatography

Hazards	Who Might be Harmed and How?	Existing Control Measures	Further Actions Required	Responsible Person	Date
Exposure to silica dust	<i>Research staff carrying out flash column chromatography. Estates staff or contractors who access the laboratory for cleaning / maintenance operations.</i> Silica gel is a fine powder that can generate dust plumes when poured from containers or swept up in the event of a spillage. Inhalation of silica dust can lead to irritation of the lungs and long-term exposure could result in silicosis and related ill-health effects.	Silica gel is decanted and manipulated exclusively within a fume cupboard to prevent inhalation of silica dust. Silica gel is typically mixed with organic solvents to generate a slurry during use. Forming a slurry reduces the release of dust lowering the risk of exposure by inhalation. Spillages of silica are cleaned immediately to prevent accidental generation of dust plumes by cleaning staff and other laboratory users. Silica waste is collected in dedicated sealed containers that are removed by an external waste contractor.	No further actions needed at this time, but risk assessment subject to regular review.	N.A.	N.A.

Hazards	Who Might be Harmed and How?	Existing Control Measures	Further Actions Required	Responsible Person	Date
Exposure to organic solvents	<i>Research staff carrying out flash column chromatography. Estates staff or contractors who access the laboratory for cleaning / maintenance operations</i> Column chromatography requires the use of common organic solvents such as petroleum ether, hexane, cyclohexane, ethyl acetate, diethyl ether, methanol and dichloromethane. Exposure to these solvents via direct contact or inhalation may lead to skin, lung or eye irritation. Inhalation may also cause drowsiness. Dichloromethane is a suspected carcinogen.	Solvents are dispensed and used inside a fume cupboard to prevent exposure by inhalation. Standard laboratory PPE (including laboratory coat, safety glasses and nitrile gloves) are worn during handling operations to reduce the risk of direct contact with skin and eyes. Solvent winchesters and solvent waste containers are kept sealed when not in use to limit the amount of organic material that becomes volatile.	No further actions needed at this time, but risk assessment subject to regular review.	N.A.	N.A.

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Glassware under pressure	<i>Research staff carrying out flash column chromatography.</i> Compressed air or nitrogen are used to generate a positive pressure within the column to increase the rate at which the solvent mixture is eluted. If excessive pressure is applied, there is a risk of glassware failing leading to mixtures of silica and solvent spraying / spilling resulting in potential exposure to hazardous materials. Failure of glassware poses a risk of users sustaining cuts from shards of glass ejected from broken chromatography columns.	Where possible, bellows are used to generate pressure rather than compressed air / nitrogen. The use of manual bellows reduces the risk of glassware being subjected to excessive pressure. If compressed air / nitrogen lines are used, in-line regulators are used where possible, to down-regulate the air pressure at the point of use, reducing the risk of glassware being subjected to excessive pressure. Where manual bellows and in-line regulators are not used, the compressed gas supply should be connected such that users can manually control the amount of pressure applied to the glassware (e.g. by using a "t-piece" that is partially obstructed by a user's hand to apply pressure to the equipment). This approach reduces the risk of glassware being subjected to excessive pressure. Glassware used for column chromatography will be subject to regular checks to identify cracks / damage that may weaken the integrity of the column to reduce the risk of glassware failing.	No further actions needed at this time, but risk assessment subject to regular review.	N.A.	N.A.

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Fire hazard	<i>All building users</i> Column chromatography requires the use of flammable organic solvents. If solvent / solvent vapour ignites, the resulting fire poses a risk to all building users.	Column chromatography will be performed in a working area clear of ignition sources (e.g. Bunsen burners) Spillages of organic solvents will be cleaned immediately to prevent the generation of excessive solvent vapour.	No further actions needed at this time, but risk assessment subject to regular review.	N.A.	N.A.

Training Requirements:

General training gained through an undergraduate degree in Chemistry or related subjects is required.

Specialised Emergency Response (if required):

Major spillages of silica gel: The immediate area should be evacuated. If laboratory users have become covered in dust as part of the accident, they should remain in place and minimise their movement to limit the amount of dust that becomes airborne. The H&S Manager should be contacted who can help clean up whilst wearing an appropriate face-fitted FFP3 mask and provide an emergency mask to anyone exposed during the incident. During cleaning operations, dry sweeping will be avoided; silica will be treated with water to prevent the generation of dust plumes. Any individual suspected of inhaling silica will be moved to fresh air. For eye exposure, rinse with water for at least 15 minutes.

Major spillages of solvent: If safe to do so, contain and absorb the spill using spill-kits located in the communal corridors whilst wearing appropriate PPE (gloves, goggles, lab coat). If the spillage is outside of a fume cupboard and the solvent poses no immediate fire risk, lab users should be alerted and the area evacuated until the solvent has evaporated and been removed by the LEV system.

Fire: Use an appropriate fire extinguisher (CO₂ or dry powder) to tackle any small fire in the ignition phase. Activate the fire alarm and evacuate if the fire cannot be controlled. Inform the Fire Wardens located at each emergency exit to allow information to be relayed to the Emergency Services

Version Control:

Version Number	Purpose or Changes	Document Status	Author of Changes, Role and School/ Unit	Date
1.0	Original Document	Published	Kevin Jones, Chemistry	02/07/2026