



Risk Assessment – VI-RA-020- FPLC Start

Risk Assessment: Use of AKTA FPLC Start equipment

Scope

ÄKTA start is an easy-to-use chromatography system that automates manual purification procedures. This Fast Protein Liquid Chromatography (FPLC) System allows the isolation and visualization of protein (UV) in real-time. Small sample volumes can be conveniently loaded using via injection valve or for larger volume, via aspiration through a narrow-bore tube. Buffer switching and mixing are automated. Flow and pressure are monitored and controlled. Purified proteins are collected automatically using the Frac30 fraction collector.

The use of FPLC equipment involves pump mechanisms driving buffer flow under medium pressure onto chromatographic columns (Sephadex/Sepharose/HiTrap etc). FPLC systems have a range of moving parts that are mostly enclosed. Detection is via UV (visual display on PC monitor) and void sample/buffer that passes through the system is collected as waste into an appropriate channel (e.g. durable plastic waste container seated within a 'spill' tray).



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Risk Assessment:

Hazard (Cause and consequence)	Affected Groups	Existing controls	Risk	Further Action
<p>Exposure to hazardous substances:</p> <ul style="list-style-type: none"> - Hazardous chemicals can be used during the run cycle and also during the cleaning system cleaning. - Biological substance can be used during the run cycle. 	<p>Staff Students and visitors</p>	<p>Employ good laboratory practice: wear lab coat, glasses and gloves when handling all buffer and chemicals.</p> <p>COSHH must be read and understood before work commences</p> <p>RA and SOP relating to the AKTA Start system must be read and understood.</p> <p>New staff and students must work under supervision until signed off to work independently.</p> <p>Where relevant, chemicals must be handled in a fume hood and stored correctly when finished with.</p> <ul style="list-style-type: none"> • NaOH is corrosive and dangerous to health. When using hazardous chemicals, avoid spillage and wear protective glasses and other suitable Personal Protective Equipment (PPE). 	<p>Medium</p>	<p>Use correctly labelled and identified chemical storage</p>



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<p>Working with buffers under pressure</p>	<p>Staff Students and visitors</p>	<p>If there is a blockage causing elevated high pressure, the run will pause automatically. Carefully check connectors and pipework for work blockage at this point before re-starting the instrument.</p> <p>User will wear safety spectacle at all-time whilst using the equipment.</p>	<p>Low</p>	<p>None</p>
<p>Spillage hazard</p>	<p>Staff Students and visitors</p>	<p>Avoid spillage of fluids on the surfaces of the instrument which have cables, plugs and other wirings. Be careful if there is spillage of fluids on the tray while trying to remove the tray from ÄKTA start.</p> <p>Make sure that there is always at least 20 cm of free space around ÄKTA start to allow for sufficient ventilation. When turning or moving the instrument, take care not to stretch or squeeze tubing or cables. A disconnected cable may cause power interruption or network interruption. Stretched tubing may cause bottles to fall, resulting in liquid spillage and shattered glass. Squeezed tubing may cause increase in pressure, or block liquid flow. To avoid the risk of knocking over bottles, always place bottles on the buffer tray and turn or move carefully.</p>	<p>Medium</p>	<p>None</p>



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		<ul style="list-style-type: none"> • Max weight on Buffer tray: Do not place containers with a volume of more than 1 litre each on the Buffer tray. The maximum allowed weight on the Buffer tray is 5 kg. • Large spillage: Switch off ÄKTA start and unplug the power cord, if large spillage occurs. 		
Use of electrical equipment	Staff Students and visitors	<p>Ensure that all equipment is in good repair before use, and must be PAT tested in accordance with specified time-lines.</p> <p>Ensure that there is relevant RA for specific items of equipment that have specific hazards associated with them.</p> <p>The instrument must not be moved without authorisation from the Principal Investigator (Geraldine Gillespie) – if moving the instrument is required it must only be moved horizontally, any further movement can only be carried out by a trained engineer.</p> <ul style="list-style-type: none"> • Electrical shock hazard: Do not open any covers or parts unless specified in the user documentation. Except for the maintenance and service described in the user documentation, all other repairs should be done by service 	Medium	Any breakdowns to be immediately reported to the lab manager



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		<p>personnel authorized by GE Healthcare Life Sciences.</p> <ul style="list-style-type: none"> • Disconnect power: Always switch off power to the instrument before replacing any component on the instrument or cleaning the instrument, unless stated otherwise in the user documentation. 		
Fire hazard and explosion hazard due to flammable liquids used with the equipment	Staff Students and visitors	<p>When using flammable liquids with ÄKTA start, follow these precautions to avoid any risk of fire or explosion.</p> <ul style="list-style-type: none"> • Fire Hazard. Before starting the system, make sure that there is no unintentional leakage in the instrument or tubing. • Explosion hazard. To avoid building up an explosive atmosphere when using flammable liquids, make sure that the room ventilation meets the local requirements. 	Low	None
Exposure to UV light	Staff Students and visitors	<p>The instrument contains a 280nm UV light, which is contained and user will not be exposed as long as the SOP is followed.</p> <p>Always switch off power to the instrument before replacing the UV flow cell.</p>	Low	None
Cuts and grazes due to glass breakage	Staff Students and visitors	<ul style="list-style-type: none"> • Always support large 160cm columns using a retort stand and two clamp 'arms' spaced approximately 60-80cm apart. 	Medium	None



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<ul style="list-style-type: none">- The instrument is used in conjunction with a 160cm Superdex glass column. If not adequately supported, the column could overturn if accidentally knocked.		Position the retort stand-supported Superdex columns to the side of the base unit, where it is least likely to obstruct computer access.		
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