

SPARQ-ed Risk Assessment Sheet : Centrifuge and Microcentrifuge Use

Description of Risk	Hazard				Analyse / Evaluate Risk			Overall Risk Category (see explanation on last page)						
	Source	Current Controls	Event	Category	Consequences	Exposure	Probability							
Door Release Lock Fails : Centrifuge has an inbuilt control so it cannot spin if door is not properly locked. If locking fails, user is at high risk of injury from spinning rotor.	Mechanical	When inbuilt control fails, notify responsible officer immediately and do not use centrifuge. Wait for the rotor to stop spinning completely, before opening lid.	Injury can result from spinning rotor at a very high speed when lid is opened.	Being hit by moving object	Substantial : Centrifuge speeds can reach up to >20 000rpm	Frequent : Daily use of centrifuge types.	Practically Impossible : Inbuilt safety mechanism in centrifuges. Injury unlikely if controls measures are followed	Exposure						
								Prob	VR	R	U	O	F	C
								AC	Low	Mod	Subs	Subs	High	VH
								QP	Low	Low	Mod	Mod	Subs	High
								UP	Low	Low	Low	Mod	Mod	Subs
								RP	Low	Low	Low	Low	Low	Mod
								C	Low	Low	Low	Low	Low	Low
								PI	Low	Low	Low	Low	Low	Low
Exposure to Biological Fluids : All personnel in the lab use centrifuges.	Microbiological	All personnel are trained in use of centrifuge. Use of PPE. Personnel required to consult MSDS and perform risk assessments for any chemicals being used in lab. Clean up spills immediately according to MSDS instruction. Balance tubes carefully (by weight for larger centrifuges [tubes over 10mL], by eye for microfuge [0.5-2mL tubes]). Inspect equipment prior to use. External maintenance as required. Place caps on buckets or rotor prior to centrifuging hazardous substances to prevent leakage during use. Imbalance function detection inbuilt on some centrifuges to cause the rotor to slow down for stoppage and preventing maximum speed being reached	Containers may break due to faulty equipment, tubes being unbalanced, tubes being damaged or not sealed correctly. This can result in gross spillage of hazardous biological fluids or the generation of hazardous aerosols.	Contact with, or exposure to biological factors	Substantial : Worst case scenario - eg spinning samples, spills or aerosols created through incorrect usage may (at worst) cause transmission of pathogens.	Unusual : Less harmful material (such as cultured cells) is centrifuged on almost a daily basis.	Conceivable : It is unlikely to happen if lids are placed on buckets and if correct tubes are used, but not impossible.	Exposure						
								Prob	VR	R	U	O	F	C
								AC	Low	Mod	Subs	Subs	High	VH
								QP	Low	Low	Mod	Mod	Subs	High
								UP	Low	Low	Low	Mod	Mod	Subs
								RP	Low	Low	Low	Low	Low	Mod
								C	Low	Low	Low	Low	Low	Low
								PI	Low	Low	Low	Low	Low	Low
Exposure to Hazardous Chemicals : All personnel in the lab use centrifuges.	Chemical	All personnel are trained in use of centrifuge. Use of PPE. Personnel required to consult MSDS and perform risk assessments for any chemicals being used in lab. Clean up spills immediately according to MSDS instruction. Balance tubes carefully (by weight for larger centrifuges [tubes over 10mL], by eye for microfuge [0.5-2mL tubes]). Inspect equipment prior to use. External maintenance as required. Place caps on buckets or rotor prior to centrifuging hazardous substances to prevent leakage during use. Imbalance function detection inbuilt on some centrifuges to cause the rotor to slow down for stoppage and preventing maximum speed being reached	Containers may break due to faulty equipment, tubes being unbalanced, tubes being damaged or not sealed correctly.	Single contact with chemical or substance	Substantial : Depending on chemicals involved, person could incur injury to skin.	Rare : Personnel use centrifuge on a weekly basis with solutions that contain various chemical components.	Conceivable : Conceivable that exposure may occur but unlikely with control features in place.	Exposure						
								Prob	VR	R	U	O	F	C
								AC	Low	Mod	Subs	Subs	High	VH
								QP	Low	Low	Mod	Mod	Subs	High
								UP	Low	Low	Low	Mod	Mod	Subs
								RP	Low	Low	Low	Low	Low	Mod
								C	Low	Low	Low	Low	Low	Low
								PI	Low	Low	Low	Low	Low	Low

SPARQ-ed Risk Assessment Sheet : Centrifuge and Microcentrifuge Use (continued)

Description of Risk	Hazard				Analyse / Evaluate Risk			Overall Risk Category (see explanation on last page)							
	Source	Current Controls	Event	Category	Consequences	Exposure	Probability								
Injury in Quick-Spin Centrifuges : Use of micro-centrifuge on daily basis to quickly spin down 0.2 ml, 0.5ml, 1.5ml tubes.	Mechanical	The lid is secured before the quick spin is commenced. The lid is not opened till the centrifuge is stopped completely, and then the tubes are removed. Also the centrifuge is placed in the centre of the bench, and not close to the edge to avoid it falling off the bench during the spin.	The fingers may get hit if attempt to remove the tubes while the centrifuge is still in spin mode. These centrifuges are light weight and at such high speed could move and fall off the bench if it was placed near the edge and could cause injury to part of body (ie. foot)	Being hit by moving object	Substantial : Could get hit by flying object or fingers hit when rotor is still spinning.	Frequent : Quick-spin microcentrifuges are used on a daily basis.	Conceivable : Unlikely if used properly.	Prob	Exposure						
									VR	R	U	O	F	C	
								AC	Low	Mod	Subs	Subs	High	VH	
								QP	Low	Low	Mod	Mod	Subs	High	
								UP	Low	Low	Low	Mod	Mod	Subs	
								RP	Low	Low	Low	Low	Low	Mod	
								C	Low	Low	Low	Low	Low	Low	
								PI	Low	Low	Low	Low	Low	Low	
Risk of Electrocutation : When equipment fails, electrical hazards can cause damage.	Electrical	Circuit breakers, induction and training in use of the equipment. Power supply to the centrifuge should be regularly checked. Relevant equipment is tagged and tested. Equipment is tested by engineering for technical compliance annually. As long as equipment is maintained in good operating condition, the risk of electrocution is largely negated. Laboratory personnel are forbidden to access centrifuge electronics/workings.	Exposure to live current. Movement of equipment can cause damage to leads, exposing user to electrical hazard.	Contact with electricity	Very Serious : Person could get an electric shock causing disability or fatality.	Rare : Rare exposure to live electricity, especially with regular testing and tagging in place.	Practically Impossible : All power points in lab are earthed. Equipment is tested by engineering for technical compliance annually.	Prob	Exposure						
									VR	R	U	O	F	C	
								AC	Subs	High	VH	VH	VH	VH	
								QP	Mod	Subs	High	VH	VH	VH	
								UP	Low	Mod	Subs	High	VH	VH	
								RP	Low	Low	Mod	Mod	Subs	High	
								C	Low	Low	Low	Low	Mod	Subs	
								PI	Low	Low	Low	Low	Low	Low	
Rotor Failure or Detachment During Use : Imbalance and mishooked buckets can cause rotor failure. Corrosion and stress can also cause rotor failure. Rotors damaged due to dropping etc can cause rotor to fail.	Mechanical	All personnel are trained in use of centrifuge. Balance tubes carefully by weighing tubes on balance. Tubes to be balanced across from each other in rotor. Check all buckets are hooked correctly and can swing freely before starting centrifuge. Visually inspect rotor for signs of damage before use. External maintenance as required.	Very poor balance of tubes may cause the rotor to fail during operation, possibly generating flying debris. Rotors are dropped while changing - causing injury to personnel or compromising rotor integrity.	Being hit by moving object	Substantial : Depends on degree of rotor damage and speed and size of centrifuge, top speed would be 4000rpm in the lab	Frequent : All personnel in the lab use a centrifuge on an almost daily basis.	Conceivable : A person may forget to balance their tubes or not notice a fault in the centrifuge itself.	Prob	Exposure						
									VR	R	U	O	F	C	
								AC	Low	Mod	Subs	Subs	High	VH	
								QP	Low	Low	Mod	Mod	Subs	High	
								UP	Low	Low	Low	Mod	Mod	Subs	
								RP	Low	Low	Low	Low	Low	Mod	
								C	Low	Low	Low	Low	Low	Low	
								PI	Low	Low	Low	Low	Low	Low	

Explanation of Overall Risk Categories

Exposure					
Very Rare (VR) – extremely rare (has not yet occurred)	Rare (R) – hardly every occurs (but has been known to occur)	Unusual (U) – does not occur often (from once per month to once per year)	Occasional (O) – sometimes occurs (from once per week to once per month)	Frequent (F) – occurs often (approximately once daily)	Continuous (C) – occurs repeatedly (or many times daily)

Probability (Prob)					
Almost Certain (AC) – is the most likely and expected result if the hazard event takes place	Quite Possible (QP) – is quite possible, not unusual, has an even 50/50 chance	Unlikely but Possible (UP) – Would be an unusual sequence or coincidence	Remotely Possible (RP) – would be a remotely possible coincidence	Conceivable (C) – has never happened after many years of exposure, but is conceivably possible	Practically Impossible (P) – has never happened after many years of exposure and is virtually impossible

Overall Risk Category				
Low – risk is normally acceptable	Moderate (Mod) – should be dealt with as soon as possible but situation is not an emergency	Substantial (Subs) – should receive attention as soon as possible	High – immediate correction required	Very High (VH) – immediate correction required

The Overall Risk Category for each element is highlighted in **green**.