

 University of South Australia	WHS FORM			WHS08
	SAFE OPERATING PROCEDURE Refer WHS Guideline: Safe Operation Procedure (SOP) Development			
Workplace: School of PMB Playford Building – Food Only Labs P1 or P7.				
Safe Operating Procedure developed by: Judith Lukas/Permal Deo		Approved:		Date: 20 June 2017
TASK/OPERATION: Use and Maintenance of the <i>Christ Alpha 1-2 LDplus</i> Freeze Dryer, to preserve food samples by the removal of frozen water from them.				Review Date:
Resources/Preparation: Any glassware used must specifically designed for using under high pressure as recommended in the manual. Improper glassware or damaged glassware is at risk of imploding and must be very carefully checked for damage prior to use. Injury could occur from imploding glassware.				
Environment, cleanup and waste disposal		Nil		
Emergency procedures and shutdown		Nil		
Legislative references:		AS/NZS 3760:2010 In service safety inspection and testing of electrical equipment AS/NZS 3013:2005 : Electrical installations – Classification of the fire and mechanical performance of wiring system elements		
Sequence of job steps (What to do in the right order, seek to contain within 10 broad steps, where possible.)		List potential risks of each step	Recommended risk control measures in the Safe Operating Procedure (What to have in place to do each step safely)	Personal Protective Equipment (Be specific)
1. PREPARATION FOR USE Position equipment in a suitable well ventilated dry location, where it will not be moved or knocked during operation.		Inadequate circulating airflow around the equipment during operation leads to overheating.	Ensure the equipment is at least 30cm away from surfaces or other equipment, and not operating near heat generating equipment, ambient temperature must be in the range +10°C to +25°C. Ensure good airflow around unit vents	

2. The ice condenser chamber must be clean and dry before commencing. Ensure the media drain valve is CLOSED, before starting the pump.		Ensure the ice condenser chamber is clean and dry – water residues from the preceding drying run must be removed with a clean dry cloth. Condensed liquid and defrosting water can be drained from the Aeration and Media drain valve on the left (L) hand side of the unit, by operating the knob. Hose should drain liquid into a container underneath the unit, the hose should always be ABOVE the level of draining liquid, and this collected liquid should be emptied away once finished collecting.	Gloves
3. Check the level of vacuum pump oil is within the range of minimum and maximum on the glass window at the rear of the pump before starting. Check the liquid level in the collecting vessel of the filter.		Pump oil level and condition of the oil should be checked at regular intervals, and topped up as necessary with supplied oil. Discharged Oil mist is captured in the oil mist separator to prevent discharge into the room. Condensed oil mist must be periodically removed.	
4. Plug power cord in, ensuring the power cord is not exposed to damage from heat or other damage.	Damage to power cord will compromise the safety of the unit.	As per step 1. Ensure equipment is operated away from other equipment and sources of heat, and liquids that could be spilled onto it, or any combustible substances.	
5. Product that is to be dried must be pre-frozen – either directly in the freeze dryer or in a separate deep freeze. Pre-chilling shelves will prevent the product thawing before evacuation.			
6. Layer thickness of 1-2 cm should not be exceeded. Liquids should be no more than 1cm, unless a spin freezing device is used to create a thin drying layer.	Drying duration negatively affected.		
7. Place the Perspex drum manifold on the top of the condenser. If needed a <u>very</u> thin layer of vacuum grease may be applied to seals to ensure a good seal under vacuum.			
8. Ensure valves of all accessories are closed before switching on the pump		Consult the manual for proper positions of locking handles on rubber valves	
9. OPERATION Turn on the mains switch on the unit – unit performs a self-test and initialization.			

10. The user interface can now set mode, using the left function key and up and down keys. Set values for freezing drying and the timer can be changed in the Main Menu option selected with the right Function key, and up and down arrow keys while in “Standby” mode.		Consult the equipment manual for detailed instructions. 3 modes: Standby, ∞ - Freeze dryer is performing a continuous run, ☹ - timed run mode. 4 active phases: Freezing, Warm-up VP, Main Drying, Final Drying. Timer settings between 1 minute and 200 hours are possible. Selecting the ∞ option deactivates the timer.	
11. Switch on the vacuum pump to warm up the pump – ice condenser cools and vacuum pump is activated.		Required to reach operating temperature, and cool the condenser.	
12. End of Warm-up VP signals readiness to commence main drying with “continue with phase” or you can abort by returning to Standby using the Mode key.			
13. At the end of drying switch the vacuum pump off and aerate the drying chamber via the media drain valve or rubber valve. Remove the Drum Manifold, remove samples. Place the unit in standby mode.			
14. DEFROSTING ICE CONDENSER In main menu select “Special Functions” then “defrosting ice condenser”. Time and temp for defrosting can be set in the main menu in options.	The chamber must not be covered drying defrosting to prevent overheating.		
15. SWITCHING OFF Freeze dryer must be in stand-by mode. Switch off the mains switch.			
16. CLEANING and MAINTENANCE	Damage to unit or accessories. Particle residues contaminating other samples	Remove residues thoroughly with a non-abrasive cloth. Only use mild detergent and non-abrasive cloth to clean the equipment	
17. EQUIPMENT IS FOR FOOD ONLY USE	Risk of chemical or biological contamination of dried product that may be used for human consumption.	No hazardous biological or chemical substances to be used in this equipment. No product or equipment that has been in labs with chemicals or PC2 facilities may be used in this equipment.	
Definitions:			

Note: Once you have completed this form you may transfer the finalized steps and safety controls to a simpler document for presentation purposes.