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Inventory of Work Activities			
Reference Number: **(please refer to S&H RA Repository for next running number)**	**22-0196**	**Division**	**POD**
Title	**[RaPID Project] Design and Development of Frozen Foodstuff Storage Box**		

Ref	Location	Process	Work Activity	Remarks
1	RaPID Latitude (DV-AP-SRB1D)	System Design & Procurement	a. CAD Drawing - System Architecture & Partitioning Parts Acquisition. b. Hardware fabrication and system integration c. Soldering Operations	
2	Collaborator's Premises	Prototyping & Testing	a. Installation of nitrogen (N_2) Valve & Piping b. Installation of Sensors & Controller c. Hardware fabrication and system integration d. Soldering operation e. Assembly, testing and troubleshooting f. Move and work in logistic area	

*add more rows if necessary.

** Examples: Contents will be automatically deleted when new content is typed into the rows.

Note:

1. This form is to be completed before filling in the Risk Assessment Form.
2. The contents of the Process (column) and Work Activity (column) in the Inventory of Work Activities Form are to be copied over to the Process (row) and Work Activity (column), respectively, in the Risk Assessment Form.

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RISK ASSESSMENT						
Reference Number	22-0196			RA Leader:	Kang Liat Chuan	Approved by:	Daniel Mok
Title:	Design and Development of Frozen Foodstuff Storage Box			RA Team:	Lee Xiang Ting Darryl Lam Wei Cheng Aw Kok Seng	Signature:	
Division:	POD	Location:	RaPID Latitude (DV-AP-SRB1D) & Collaborator's Premises			Designation:	Head of RaPID Centre
Last Review Date:	14/11/22	Next Review Date:	13/11/2025			Date	14/11/22

	Hazard Identification			Risk Evaluation				Risk Control						
Ref	Activity	Hazard	Possible injury / ill-health	Existing risk controls	S	L	RPN	Additional controls	S	L	RPN	Implementation Person	Due date	Remarks
1. System Design & Procurement (@ DV-AP-SRB1D)														
1a	CAD Drawing - System Architecture & Partitioning Parts Acquisition.	Ergonomic – prolonged computer usage.	Eye and muscle fatigue.	• Take periodic breaks to rest eyes and stretch legs. • Work in adequately lighted spaces.	2	1	2 (L)	NIL	NA	NA	NA	NIL	NA	**Residual Risk: To be constantly vigilant on the surrounding

Likelihood / Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5 (M)	10 (M)	15 (H)	20 (H)	25 (H)
Major (4)	4 (M)	8 (M)	12 (M)	16 (H)	20 (H)
Moderate (3)	3 (L)	6 (M)	9 (M)	12 (M)	15 (H)
Minor (2)	2 (L)	4 (M)	6 (M)	8 (M)	10 (M)
Negligible (1)	1 (L)	2 (L)	3 (L)	4 (M)	(M)

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	Hazard Identification			Risk Evaluation				Risk Control							
Ref	Activity	Hazard	Possible injury / ill-health	Existing risk controls	S	L	RPN	Additional controls	S	L	RPN	Implementation Person	Due date	Remarks
1b	Hardware fabrication and system integration	Physical – high speed machine motion and chip formation.	Cuts and lacerations.	• Ensure that the safety guards of the rotating spindles or chucks are activated before operating. • Do not wear gloves when machine is operating. • Handle sharp materials and tools with anti-cut gloves.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	
		Physical – loose workpiece clamping.	Cuts and Flying Debris impacts.	• Ensure that the workpiece is securely clamped. • Ensure that the vice or chuck keys are removed before starting. • Ensure that the chip guards are in position. • Wear safety goggles.	3	2	6 (M)	1. Designated work area with proper vice for securing work piece. 2. Ensure staff are brief of the PPE required (Eye, hand and foot personal protection)	3	1	3 (L)	Site SIT representation.	On site	
		Physical – sharp edges from tools and workpieces.	Eye injuries, cuts and abrasions.	• Wear Eye and Hand Personal Protective Equipment. • Use deburring tools.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	

Likelihood / Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5 (M)	10 (M)	15 (H)	20 (H)	25 (H)
Major (4)	4 (M)	8 (M)	12 (M)	16 (H)	20 (H)
Moderate (3)	3 (L)	6 (M)	9 (M)	12 (M)	15 (H)
Minor (2)	2 (L)	4 (M)	6 (M)	8 (M)	10 (M)
Negligible (1)	1 (L)	2 (L)	3 (L)	4 (M)	(M)

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	Hazard Identification			Risk Evaluation				Risk Control							
Ref	Activity	Hazard	Possible injury / ill-health	Existing risk controls	S	L	RPN	Additional controls	S	L	RPN	Implementation Person	Due date	Remarks
1c	Soldering operation	Physical – heat from soldering .	Burns	• Ensure that the power supply is switched off during the setup. • Ensure that the soldering iron, the rework station and the hot air tube are resting in the holder when not in use. • Ensure that the soldering tools and electrical components are not wet. • Hold the solder tool only at the handle like a pen. • Hold the soldering iron with tweezers. • Turn off the rework station and the hot air tube when not in use. • Remove any excess soldering iron using the provided sponge. • Do not wear gloves. • Wear safety goggles.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	
2. Prototyping & Testing (Collaborator's Premises)														
2a	Installation of liquid nitrogen (LN_2) valve & piping	Physical – thermal burns due to extreme cold temperature	Skin injuries due to frostbite or cryogenic burns	• Installation to be done at well ventilated area • Operator/project staff to wear proper PPE including safety glasses w/ side shields,	3	1	3(L)	NIL	NA	NA	NA	NIL	NA	

Likelihood / Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5 (M)	10 (M)	15 (H)	20 (H)	25 (H)
Major (4)	4 (M)	8 (M)	12 (M)	16 (H)	20 (H)
Moderate (3)	3 (L)	6 (M)	9 (M)	12 (M)	15 (H)
Minor (2)	2 (L)	4 (M)	6 (M)	8 (M)	10 (M)
Negligible (1)	1 (L)	2 (L)	3 (L)	4 (M)	(M)

	Hazard Identification			Risk Evaluation				Risk Control							
Ref	Activity	Hazard	Possible injury / ill-health	Existing risk controls	S	L	RPN	Additional controls	S	L	RPN	Implementation Person	Due date	Remarks
				cryogen gloves, closed-toe shoes, long pants (no cuffs), lab coat or long sleeved shirt. • Thermally insulated hand tools to be used • Operator/project staff to be briefed of standard work procedure (SOP) before handling of valve and piping connection										
2a	Installation of nitrogen (N_2) valve & piping	Oxygen deficiency	Suffocation / Asphyxiation	• Oxygen deficiency monitoring device shall be installed within the project area. • Proper shut down of nitrogen source prior to start work. • Room air ventilation system or open-air work condition.	3	1	3(L)	NIL	NA	NA	NA	NIL	NA	

Likelihood / Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5 (M)	10 (M)	15 (H)	20 (H)	25 (H)
Major (4)	4 (M)	8 (M)	12 (M)	16 (H)	20 (H)
Moderate (3)	3 (L)	6 (M)	9 (M)	12 (M)	15 (H)
Minor (2)	2 (L)	4 (M)	6 (M)	8 (M)	10 (M)
Negligible (1)	1 (L)	2 (L)	3 (L)	4 (M)	(M)

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	Hazard Identification			Risk Evaluation				Risk Control						
Ref	Activity	Hazard	Possible injury / ill-health	Existing risk controls	S	L	RPN	Additional controls	S	L	RPN	Implementation Person	Due date	Remarks
2b	Installation of sensors & controller	Electrical – Defective or exposed electrical components.	Electrical shocks and electrical Burns.	• Ensure that the power supply is switched off before conducting pre-use checks. • Conduct pre-use checks for defects or exposures before using electrical components. • Report any defective or exposed electrical components to the lab staff immediately.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	
		Electrical – overloading circuits.	Fires.	• Do not use multi-plugs on power cords to prevent overloading. • Ensure that the power supply is switched off after using electrical equipment.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	
		Electrical – short circuits.	Electric shocks.	• Conduct visual checks to ensure that no damage to the electrical insulations. • Cut off the power supply in the event of water spillage over electrical equipment.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	

Likelihood / Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5 (M)	10 (M)	15 (H)	20 (H)	25 (H)
Major (4)	4 (M)	8 (M)	12 (M)	16 (H)	20 (H)
Moderate (3)	3 (L)	6 (M)	9 (M)	12 (M)	15 (H)
Minor (2)	2 (L)	4 (M)	6 (M)	8 (M)	10 (M)
Negligible (1)	1 (L)	2 (L)	3 (L)	4 (M)	(M)

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	Hazard Identification			Risk Evaluation				Risk Control							
Ref	Activity	Hazard	Possible injury / ill-health	Existing risk controls	S	L	RPN	Additional controls	S	L	RPN	Implementation Person	Due date	Remarks
2c	Hardware fabrication and system integration	Physical – high speed machine motion and chip formation.	Cuts and lacerations.	• Ensure that the safety guards of the rotating spindles or chucks are activated before operating. • Do not wear gloves when machine is operating. • Handle sharp materials and tools with anti-cut gloves.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	
2c	Hardware fabrication and system integration	Physical – loose workpiece clamping.	Cuts and Flying Debris impacts.	• Ensure that the workpiece is securely clamped. • Ensure that the vice or chuck keys are removed before starting. • Ensure that the chip guards are in position. • Wear safety goggles.	3	2	6 (M)	3. Designated work area with proper vice for securing work piece. 4. Ensure staff are brief of the PPE required (Eye, hand and foot personal protection)	3	1	3 (L)	Site SIT representation.	On site	
2d	Hardware fabrication and system integration	Physical – sharp edges from tools and workpieces.	Eye injuries, cuts and abrasions.	• Wear Eye and Hand Personal Protective Equipment. • Use deburring tools.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	
2e	Soldering operation	Physical – heat from soldering .	Burns	• Ensure that the power supply is switched off during the setup. • Ensure that the soldering iron, the rework station and the hot air tube are resting in the holder when not in use.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	

Likelihood / Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5 (M)	10 (M)	15 (H)	20 (H)	25 (H)
Major (4)	4 (M)	8 (M)	12 (M)	16 (H)	20 (H)
Moderate (3)	3 (L)	6 (M)	9 (M)	12 (M)	15 (H)
Minor (2)	2 (L)	4 (M)	6 (M)	8 (M)	10 (M)
Negligible (1)	1 (L)	2 (L)	3 (L)	4 (M)	(M)

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	Hazard Identification			Risk Evaluation				Risk Control						
Ref	**Activity**	**Hazard**	**Possible injury / ill-health**	**Existing risk controls**	**S**	**L**	**RPN**	**Additional controls**	**S**	**L**	**RPN**	**Implementation Person**	**Due date**	**Remarks**
2e	Soldering operation **(Continue)**	Physical – Heat from soldering	Burns	• Ensure that the soldering tools and electrical components are not wet. • Hold the solder tool only at the handle like a pen. • Hold the soldering iron with tweezers. • Turn off the rework station and the hot air tube when not in use. • Remove any excess soldering iron using the provided sponge. • Do not wear gloves. • Wear safety goggles.										
2e		Physical – flammable materials.	Fires and explosions.	• Keep flammable materials away from the rework station. • Work on fireproof and/or fire-resistant surfaces.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	
2e		Chemical – presence of toxic fumes and exposure via inhalation.	Toxication and Eye irritation.	• Switch on the fume extractor unit during the soldering. • Open area with good ventilation • Use only non-leaded soldering iron. • Wear safety goggles.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	

Likelihood / Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5 (M)	10 (M)	15 (H)	20 (H)	25 (H)
Major (4)	4 (M)	8 (M)	12 (M)	16 (H)	20 (H)
Moderate (3)	3 (L)	6 (M)	9 (M)	12 (M)	15 (H)
Minor (2)	2 (L)	4 (M)	6 (M)	8 (M)	10 (M)
Negligible (1)	1 (L)	2 (L)	3 (L)	4 (M)	(M)

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Ref	Activity	Hazard	Possible injury / ill-health	Existing risk controls	S	L	RPN	Additional controls	S	L	RPN	Implementation Person	Due date	Remarks
2e	Soldering operation (Continue)	Chemical – presence of deposit fumes and exposure via lead ingestion.	Toxication / Poisoning.	• Wash hands and arms with soap after the soldering.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	
2e		Ergonomic – prolonged soldering.	Eye and muscle fatigue.	• Take regular breaks. • Change body postures during the soldering and conduct stretching exercises when resting. • Conduct the soldering under proper lighting and magnification.	2	1	2 (L)	NIL	NA	NA	NA	NIL	NA	
2f	Assembly, testing and troubleshooting	Physical – sharp edges and abrasive surfaces from cutting, smoothing, fastening, tapping and wiring tools.	Cuts and abrasions.	• Wear safety glasses, gloves and covered footwear. • Ensure that the workpiece is securely clamped. • Trained and experienced worker.	3	1	3 (L)	NIL	NA	NA	NA	NIL	NA	
2f		Physical – flying chips from hammering tools.	Bruises.	• Wear safety glasses and safety gloves. • Inspect the hammer head and ensure that it is firmly attached to the handle before using.	2	1	2 (L)	NIL	NA	NA	NA	NIL	NA	

Likelihood / Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5 (M)	10 (M)	15 (H)	20 (H)	25 (H)
Major (4)	4 (M)	8 (M)	12 (M)	16 (H)	20 (H)
Moderate (3)	3 (L)	6 (M)	9 (M)	12 (M)	15 (H)
Minor (2)	2 (L)	4 (M)	6 (M)	8 (M)	10 (M)
Negligible (1)	1 (L)	2 (L)	3 (L)	4 (M)	(M)

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	Hazard Identification			Risk Evaluation				Risk Control							
Ref	Activity	Hazard	Possible injury / ill-health	Existing risk controls	S	L	RPN	Additional controls	S	L	RPN	Implementation Person	Due date	Remarks
2g	Move and work in logistic area	Contact with forklift, Pallet jack, EPJ, Reach truck	Bodily injuries	• Comply to warehouse safety requirement. • High visibility vest / Reflective vest. • Move in designated safe work path. • Proper barricade in work area.	4	1	4 (M)	1. Site familiarization before start work. 2. Obtain site supervisor approval before start work to ensure no vehicle will enter area.	4	1	4(M)	Site SIT representation.	On site	

*add/ delete rows if necessary.

** Examples: Contents will be automatically deleted when new content is typed into the rows.

Likelihood / Severity	Rare (1)	Remote (2)	Occasional (3)	Frequent (4)	Almost Certain (5)
Catastrophic (5)	5 (M)	10 (M)	15 (H)	20 (H)	25 (H)
Major (4)	4 (M)	8 (M)	12 (M)	16 (H)	20 (H)
Moderate (3)	3 (L)	6 (M)	9 (M)	12 (M)	15 (H)
Minor (2)	2 (L)	4 (M)	6 (M)	8 (M)	10 (M)
Negligible (1)	1 (L)	2 (L)	3 (L)	4 (M)	(M)

Level	Severity	Description
1	Negligible	Not likely to cause injury or ill-health.
2	Minor	Injury or ill-health requiring first-aid only (includes minor cuts and bruises, irritation, ill-health with temporary discomfort).
3	Moderate	Injury or ill-health requiring medical treatment (includes lacerations, burns, sprains, minor fractures, dermatitis and work-related upper limb disorders).
4	Major	Serious injuries or life-threatening occupational diseases (includes amputations, major fractures, multiple injuries, occupational cancers, acute poisoning, disabilities and deafness).
5	Catastrophic	Death, fatal diseases or multiple major injuries.

Level	Likelihood	Description
1	Rare	Not expected to occur but still possible.
2	Remote	Not likely to occur under normal circumstances.
3	Occasional	Possible or known to occur.
4	Frequent	Common occurrence.
5	Almost certain	Continual or repeating experience.

Risk score	Acceptability of risk	Recommended actions
Low 1-3	Acceptable	No additional risk control measures may be needed. Frequent review and monitoring of hazards are required to ensure that the risk level assigned is accurate and does not increase over time.
Medium 4-12	Tolerable	A careful evaluation of the hazards should be carried out to ensure that the risk level is reduced to as low as reasonably practicable (ALARP) within a defined time period. Interim risk control measures, such as administrative controls, may be implemented while long term measures are being established.
High 15-25	Not acceptable	High Risk level must be reduced to at least Medium Risk before work commences. There should not be any interim risk control measures and risk control measures should not be overly dependent on personal protective equipment. If practicable, the hazard should be eliminated before work commences. Management review is required before work commences.