

HEALTH & SAFETY ENDEAVOUR RISK ASSESSMENT FORM

Ra No./ERMS Ref:	Date: [REDACTED]	Version No.: <u>3</u>	Review Date:	Authorized by: [REDACTED] 
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STEP 1 – ENTER INFORMATION ABOUT THE ACTIVITY/TASK, ITS LOCATION AND THE PEOPLE COMPLETING THE RISK ASSESSMENT

Location name: Mezzanine Level – Melbourne Connect	Building No.: 290	Room No.: Exhibition Floor	Assessed by: [REDACTED]	HSR/Employee representative:
Description of activity/task: Demonstration of a prototype smart mattress system that regulates temperature using a water-based thermal layer and electronic control system. The prototype operates by circulating temperature-controlled water through a flexible PVC tubing network embedded within the mattress topper. Water is stored in a sealed internal container located inside the console unit, from where it is pumped out to a serpentine cooling block where it is heated or cooled using Thermoelectric Coolers (TECs). The TECs transfer heat up on one side and cool down on the other when electrical current is applied – the opposite happens if this current is reversed. This allows the system to precisely regulate the water temperature. A pump then circulates the conditioned water through tubing connected to the PVC water grid, which is a part of the mattress topper. To maintain safe and efficient operation, the console contains heatsinks and cooling fans that dissipate excess heat generated by the TECs. Images of the prototype console and mattress grid have been attached on page 7.				
Workplace conditions (Describe layout and physical conditions - including access and egress) A 2m x 2m indoor booth on the mezzanine level of Melbourne Connect. Equipment will be contained within the booth to maintain clear access and safe movement.				
List systems of work for the activity/task: • Training/Inductions • SOPs • Emergency processes • Inspections to be completed • Existing controls		Relevant training modules: • Risk Assessment Workshop organized by Endeavour team (28/04/2026) Existing controls: • Endeavour Exhibition guidelines - https://endeavour.unimelb.edu.au/information-for-student-participants • Previous guidelines created for prototyping of the project at Wet Labs and Telstra Creator Space		

Is there past experience with the activity/task that may assist in the assessment?

- Existing controls
- Industry standards
- Training / Induction
- Codes of Practice
- SOPs
- Incidents & near-misses
- Incident Investigation
- Standards
- Legislation
- Guidance material

Training / Induction:

- Endeavour Student Information Session (11/03/2026)

Relevant past/present subjects we have undertaken:

- Engineering Capstone Project Part 1 (ENGR90037) - [REDACTED]
- Engineering Capstone Project Part 2 (ENGR90038) - [REDACTED]
- Mechanical Systems Design (MCEN30021) - [REDACTED]
- Design and Manufacturing Practice (MCEN 90054) - [REDACTED]
- Mechatronics System Design (MCEN90061) - [REDACTED]
- Mechanics and Materials (MCEN30017) - [REDACTED]
- Materials (MCEN90014) - [REDACTED]
- Thermodynamics (MCEN90015) - [REDACTED]
- Fluid Dynamics (MCEN90008) - [REDACTED]

STEP 2: RISK RATING – RISK MATRIX AND DEFINITIONS

Likelihood	Consequence					
		Insignificant	Minor	Moderate	Major	Severe
	Almost certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	Extreme	Extreme
	Possible	Low	Medium	Medium	High	Extreme
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Likelihood
Almost certain – will occur in most circumstances when the activity is undertaken (greater than 90% chance of occurring)
Likely - will probably occur in most circumstances when the activity is undertaken (51 to 90% chance of occurring)
Possible – might occur when the activity is undertaken (21 to 50% chance of occurring)
Unlikely – could happen at some time when the activity is undertaken (1 to 20% chance of occurring)
Rare – may happen only in exceptional circumstances when the activity is undertaken (less than 1% chance of occurring)

Consequence
Insignificant – First aid treatment, minor injury, no time off work
Minor – Single occurrence of medical treatment, minor injury, no time off work
Moderate – Multiple medical treatments, non-permanent injury, less than 10 days off work
Major – Extensive injuries requiring medical treatment (e.g. surgery), serious or permanent injury/illness, greater than 10 days off work
Severe – Severe injury/illness requiring life support, actual or potential fatality, greater than 250 days off work

Risk Rating Priority for Action			
	Risk acceptance guide	Action	Recommended action time frame
Extreme	Not acceptable	Cease or isolate source of risk	Immediate
		Implement further risk controls	Up to 1 month
High	Generally (in most circumstances) not acceptable	Monitor, review and document controls	Ongoing
		Implement risk controls if reasonably practicable	1 to 3 months
Medium	Generally (in most circumstances) acceptable	Monitor, review and document controls	Ongoing
		Implement risk controls if reasonably practicable	3 to 6 months
Low	Acceptable	Monitor and review	Ongoing

STEP 3 – IDENTIFY HAZARDS AND ASSOCIATED RISK RATINGS AND CONTROLS

For each step in the task:

- Break down the task into manageable **steps**. List the steps in the order that they occur;
- Identify the **hazard(s)** associated with each step;
- Determine and record an **inherent risk score** using the risk matrix;
- Provide a **control description** for each current or proposed risk control;
- Specify the risk **control type**, for each current or proposed risk control;
- Where **proposed risk control(s)** have been identified complete an [Health & Safety: Action plan](#);
- Determine and record the **residual risk score** using the risk matrix.

Hierarchy of Control (Control Type)

El – Elimination

S – Substitution

En – Engineering

Sh – Shielding

A – Administrative

M – Monitoring

P – PPE

Is – Isolation

T – Training

H – Health Monitoring

G – Guarding

In – Inspection

HAZARD GUIDANCE – YOUR HAZARDS MAY INCLUDE THE FOLLOWING. HAZARDS ASSOCIATED WITH YOUR PROJECT ARE NOT LIMITED TO THIS LIST.

PHYSICAL	ENVIRONMENTAL	EVENT/EXHIBIT	OTHER
- Being cut or stabbed - Struck, crushed or entangled - Shearing or friction - Moving parts - Slip, trip or fall - Manual handling/ergonomics - Vibration - Other	- Extremes of temperature - High wind or humidity - Inadequate light - Dusts, fumes or vapors - Exposure to UV or other radiation - Uneven terrain/surface - Extreme temperatures (hot/cold) - Other	- Inadequate Emergency Management – events are crowded. How do you respond/ get out in an emergency and make sure you don’t block any exits or emergency equipment? - Transport/Travel – how are you and your project traveling to/from the exhibit. Can it get damaged or accidentally hurt a member of the public? - Public/Audience Interaction – If you are doing any demonstrations, how do you ensure the safety of yourselves and members of the public (participants and observers)? - Set up & Pack Down – How do you ensure your display is stable and doesn’t fall. Remember public interactions. - Manual Handling – do you need to lift or carry your project or other heavy/awkward items? - Electrical Safety – If you need power, how do you ensure you’re not overloading power circuits and that nobody trips over any power cables? - Unauthorized Access to your display/project – how do you keep people safe if you have to leave your project unattended? Consider children walking around. - Security & Privacy – are you collecting personal information/photos from public or participants, including digital information. How are you managing this? - If part or all of your exhibit was to break/spill, how is it safely cleaned and disposed of?	- Noise - Dust - Infectious agents or materials - Chemicals - Radiation - Engineered nanoparticles - Animals - Electric shock - Other

Steps in the Task (Your methodology – consider: transporting your project to the event, any demonstrations, packing up etc)	Hazards	Inherent Risk Score	Control Description (Current and Proposed)	Control Type	Residual Risk Score
Transporting the project (Smart mattress) from TCS to Event	Physical Hazard - Manual handling of mats/console	Medium - Likelihood: Possible Consequence: Moderate	- Team lifting if greater than 15kg (The prototype should be between 10-15kg not including water). Manual Handling training on TrainMe completed. - Use of trolley for transport - Ergonomic demonstration setup – Assembly and disassembly of the prototype will not	En, A	Low - Likelihood Unlikely Consequence: Minor

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HEALTH A SAFETY: TASK RISK ANALYSIS (TRA) FORM 4

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Steps in the Task (Your methodology – consider: transporting your project to the event, any demonstrations, packing up etc)	Hazards	Inherent Risk Score	Control Description (Current and Proposed)	Control Type	Residual Risk Score
			include physical stress.		
Initial Setup	Electrical Hazard - Water–electrical interface (pump/electronics near water tubing)	Extreme - Likelihood: Likely Consequence: Severe	- IP-rated enclosures for separation of electronics/water - Drip trays for leak containment of up to 2 liters of water (Maximum capacity). Additional measures if deemed necessary after the Project Safety Review meeting. - Dry testing and wet trials prior to the day of final demonstration	En, In, M	Medium - Likelihood: Possible Consequence: Moderate
Demonstrations	Electrical Hazard - Overheating/Fire from Short Circuits	High - Likelihood: Likely Consequence: Moderate	- Thermal cut-offs and fuses - Temperature monitoring sensors - Regular inspection before final exhibition	En, In, M	Low - Likelihood: Unlikely Consequence: Moderate
	Electrical Hazard - Shock from mains-powered console	High - Likelihood: Likely Consequence: Moderate	- RCD-protected outlets - Test & Tag - Insulated enclosures - Lock-out/tag-out (LOTO)	En, In, A	Low - Likelihood: Rare Consequence: Moderate
	Thermal Hazard - Burns from high water temperature (>40°C)	Medium - Likelihood: Possible Consequence: Moderate	- Software temperature limits - Independent thermal shutoff - Warning labels during demonstration. - Water temperature will not exceed 40°C to minimize burn risk.	En, A	Low - Likelihood: Unlikely Consequence: Minor
	Thermal Hazard - Contact with hot TECs	Low - Likelihood: Unlikely Consequence: Minor	- Enclosure of TEC – These will be placed within the console setup and will not be accessible by participants. - Clear signage during the demonstration.	En, A	Low - Likelihood: Rare Consequence: Insignificant
	Water System Hazards - Water leakage causing slips/trips	Medium - Likelihood: Possible Consequence: Moderate	- Leak monitoring - Isolation mats - Absorbent materials available - Trays beneath the prototype.	M, En, P	Low - Likelihood: Unlikely Consequence: Minor
	Water System Hazard - Pump/pressure failure (tubing bursts)	Medium - Likelihood: Possible	- Flow/pressure monitoring - Pressure-relief valves. Water pressure will not exceed 30-50psi.	M, En, In	Low - Likelihood: Rare Consequence:

Steps in the Task (Your methodology – consider: transporting your project to the event, any demonstrations, packing up etc)	Hazards	Inherent Risk Score	Control Description (Current and Proposed)	Control Type	Residual Risk Score
		Consequence: Moderate	Test with dummy load before exhibition.		Minor
	Environmental Hazard - Noise from pump/fans	Low - Likelihood: Possible Consequence: Minor	- Pump and fan sounds will not exceed 80db. They will only last at maximum noise levels during initial setup and will be quieter past that point. - Ear protection if needed - Acoustic shielding for long demonstrations if required	P, Sh	Low - Likelihood: Rare Consequence: Insignificant
	Human Testing Hazards - Burns/shocks to human subjects	High - Likelihood: Likely Consequence: Severe	- Minimize human exposure – Participants will only be able to place a hand on the mattress setup to feel the heating and cooling. - Ethics approval required - Use double-insulated devices - Consent and first aid on standby.	A, En, P	Low - Likelihood: Rare Consequence: Moderate
	Human Testing Hazards – Allergic reactions to materials	Medium - Likelihood: Possible Consequence: Moderate	- Use of biocompatible materials - Confirmed with SDS in the Chemwatch system – Only Polyester and Polyvinyl chloride tubing will be in direct contact with participants. - Obtain participant consent.	S, In, A	Low - Likelihood: Rare Consequence: Minor
	Data and Privacy Risks - Collection of personal thermal data	Medium - Likelihood: Possible Consequence: Moderate	- Obtain participant consent for any data collected - Anonymize and encrypt all datasets - Comply with University data management and privacy protocols - No identifiable storage without consent.	A, En, In	Low - Likelihood: Rare Consequence: Minor
Pack Up	Physical Hazard - Manual handling of mats/console	Medium - Likelihood: Possible Consequence: Moderate	- Team lifting if greater than 15kg. Manual Handling training on TrainMe completed. - Use of trolley for transport - Store in pre-designated storage area.	A, En	Low - Likelihood: Unlikely Consequence: Minor

STEP 4 – IMPLEMENTATION AND CONSULTATION PROCESS

Determine the person responsible for reviewing and implementing the risk assessment, including the identified controls. Ensure a Health & Safety: Action plan has been completed, reviewed and signed off where proposed controls have been identified.

Obtain the authorization of the management representative.

Ensure the HSR (if applicable) has been consulted. Ensure the employees undertaking the activity have been consulted.

Record below the names of the persons consulted.

Management representative		HSR/Employee representative	
Employee(s)		Employee(s)	
Employee(s)			
Person Responsible for implementation or escalation			

Extra writing room - use this page to enter extended comments or descriptions

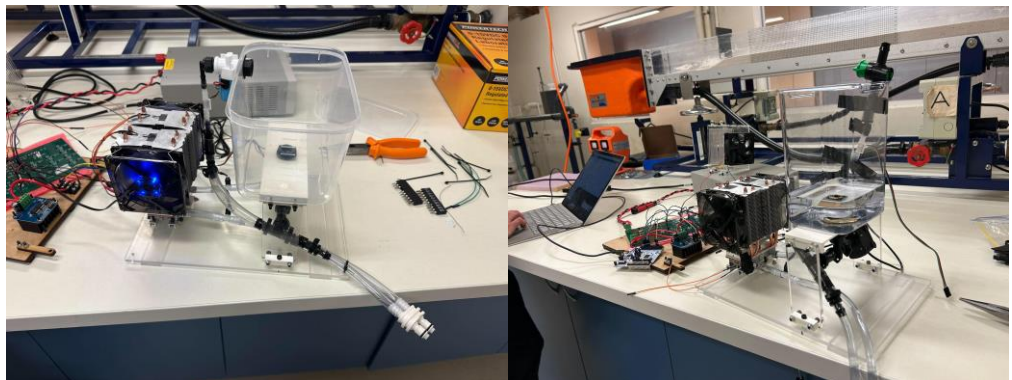


Figure 1. Images of the console during prototype testing

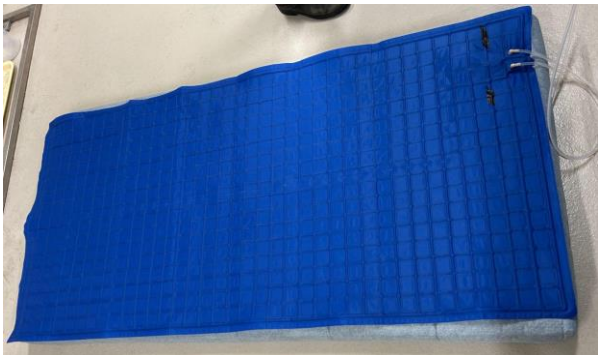


Figure 2. Image of the mattress water grid during prototype testing

For use in conjunction with the [Health & Safety: Risk management requirements](#).

For further information, refer to <http://safety.unimelb.edu.au/management/implement> or contact your [Health and Safety Business Partner](#).