

RSPHys Risk Assessment: RA_076015_Parylene Coater

- This form is used when a documented risk assessment is required in accordance with Appendix A of WHSMS Handbook Chapter 3.1.
- Original risk assessments must be provided in a convenient location accessible by all people affected by the risk assessment.
- Static risk assessments must be forwarded to local WHS Manager for inclusion in the School Static Risk Assessment Register.

| Static Risk Assessment No. | | Assessment Date | Reviewed by Date | Version | Top Residual Risk | |
|--|---|---|---|---------------------------------|-------------------|--------------|
| RA_076015_Parylene Coater | | 07.11.2024 | 07.11.2027 | 1.0 | Low | |
| Name of the activity | Use of Parylene coater for depositing parylene thin films Hazards Assessed: Electrical, Plant and Equipment, Chemical, Ergonomics and Manual Tasks | | | | | |
| Description of the activity | Deposition of Parylene coatings | | | | | |
| School/ Department | Research School of Physics, EME | Location | Building 160, Level 3, Room P3.51 | | | |
| Risk Assessment Team Have you completed ANU WHS Risk Management Training? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No IF NO, DO NOT PROCEED | Person responsible for room | Horst Punzmann | Email | Horst.punzmann@anu.edu.au | Ph | 02 612 50001 |
| | Person responsible for equipment | Olivier Lee Cheong Lem | Email | laurent.leecheonglem@anu.edu.au | Ph | 02 612 51698 |
| | Name | Huma Latif | Email | Huma.latif@anu.edu.au | Ph | 0406681584 |
| | Name | Rick Walsh | Email | Rick.walsh@anu.edu.au | Ph | 02 6125 0105 |
| | Name | | Email | | Ph | |
| Who is affected by this RA? | <input checked="" type="checkbox"/> All people at the location <input type="checkbox"/> A group of people (list right) <input type="checkbox"/> A single person (list right) | People consulted on this RA (All persons affected, or their representatives need to be consulted) | Kaushal Vora | | | |
| WHS Legal and Other Requirements | Work Health and Safety Act 2011 (Cth) Work Health and Safety Regulations 2011 (Cth) Hazard Management (WHSMS Handbook Chapter 3.1) Manual Tasks and Ergonomics Safety Management (WHSMS Handbook Chapter 3.11) | | | | | |
| Type of RA | <input checked="" type="checkbox"/> | Static RA (long term, > 6 months) | Send a copy to WHS Manager and keep original locally near the activity/location, accessible to all people affected. | | | |



| | | | |
|--|--------------------------|--|---|
| | <input type="checkbox"/> | Dynamic RA (short term < 6 months) | Keep the original locally (electronically or physically) near the activity/location, accessible to all people affected. |
|--|--------------------------|--|---|

Risk Assessment Instruction

1. Using Error! Reference source not found. as a guide, list the hazards of the activity in the 'Hazards' column of the RA Form. Include information on when and where the hazard is present during the activity.
2. Estimate inherent risk of the hazard (without any controls in place) using the Likelihood against Consequences definitions described in [Table 1](#) and [Table 2](#) and the ANU WHS Risk Matrix ([Table 3](#)). List them in 'Inherent Risk' column of the RA Form for each hazard.
3. Develop control measures in accordance with the Hierarchy of Control Principle ([Table 4](#)) and list them in 'Control' column of the RA Form.
4. Estimate the residual risk of the hazard after implementing all controls. Remember that engineering, administrative and PPE controls only reduce the likelihood of an event occurring, not the consequences.
5. Identify any controls that are not in place as corrective actions and implement them before undertaking the activity.
6. Obtain approval from relevant people as identified.
7. Identify if this is a static risk assessment (> 6 months) or dynamic risk assessment (< 6 months).
8. Send a copy of the static risk assessments to WHS Managers– Keep on file for 7 years.
9. Keep originals of risk assessments in close vicinity of the activity. Dynamic risk assessments can be destroyed 1 year after the activity ceases.
10. Review the static risk assessments and associated safe work procedures in accordance with **Section 3.1.2.6: Step 4 of Chapter 3.1** requirements

| Risk Assessment | | | | | | | |
|---|---------------|-------------|-------------|--|---------------|-------------|-------------|
| Hazards Also list where and when can the hazards present? | Inherent Risk | | | Control Measures When designing controls, follow the Hierarchy of Controls Principle, assigning the most effective controls before less effective controls (see Table 4). <i>List the control category and the controls for each hazard below. For any controls that are not in place, fill in the Actions table on the next page.</i> | Residual Risk | | |
| | Likelihood | Consequence | Risk rating | | Likelihood | Consequence | Risk rating |
| Electrical ➤ Electrical Shock (both minor and major) ➤ Electrocutation | Possible | Major | High | Engineering <ul style="list-style-type: none"> Room access limited to trained staff through Cardax/Salto Testing and tagging of all electrical equipment and power cords. Residual Current Devices (RCDs) installed on all electrical circuits in the area. Emergency Off/ EPO (Emergency Power Off) button available in the room. Emergency Off/ EPO (Emergency Power Off) button available on the device. Administration <ul style="list-style-type: none"> Tier 3 Induction (160_L3_P3.51_Induction) Signage on lab door indicating type of hazards. | Rare | Minor | Low |
| Plant and Equipment ➤ Cryo Chiller Cold surface (~ -20°C) | Possible | Moderate | High | Engineering <ul style="list-style-type: none"> Room access limited to inducted workers through Cardax/Salto. Administration <ul style="list-style-type: none"> Tier 3 Induction (160_L3_P3.51_Induction) Tier 2 Training: ANU WHS Risk Management Training (WHSO03, Pulse) System to be operated according to 'Diener Parylene P6' manual. First Aid Equipment located in gowning area. Appropriate signs affixed to indicate possible cold surfaces and time required before cold-trap reaches touch-safe temperature. PPE <ul style="list-style-type: none"> Provide 'cryo-type gloves for surface cleaning of cold-trap | Rare | Moderate | Low |

| Risk Assessment | | | | | | | |
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| | Likelihood | Consequence | Risk rating | | Likelihood | Consequence | Risk rating |
| Plant and Equipment ➤ Heat Generating oven (max 750°C). Fully Insulated | Likely | Moderate | High | Engineering <ul style="list-style-type: none"> Room access limited to inducted workers through Cardex/Salto Emergency Stops External housing designed to insulate from heaters. Equipment housing is touch safe. Administration <ul style="list-style-type: none"> Tier 3 Induction (160_L3_P3.51_Induction) Signage indicating type of hazards contained within. Tier 2 Training: ANU WHS Risk Management Training (WHSO03, Pulse) | Rare | Moderate | Low |
| Plant and Equipment ➤ Vacuum Chamber | Possible | Minor | Medium | Engineering <ul style="list-style-type: none"> Vacuum chamber design to withstand operational requirement. Room access limited to trained staff through Cardex/Salto. Administration <ul style="list-style-type: none"> Tier 3 Induction (160_L3_P3.51_Induction) | Rare | Moderate | Low |
| Plant and Equipment ➤ Pinch when opening/closing deposition chamber lid | Possible | Moderate | High | Engineering <ul style="list-style-type: none"> Room access limited to inducted workers through Cardex/Salto. Administration <ul style="list-style-type: none"> Tier 3 Induction (160_L3_P3.51_Induction) Tier 2 Training: Manual Tasks (WHSO22, Pulse) Ensure hands are not placed under lid and not let go of lid handle until lid is fully opened or closed | Unlikely | Insignificant | Low |

| Risk Assessment | | | | | | | |
|---|---------------|-------------|-------------|---|---------------|-------------|-------------|
| Hazards Also list where and when can the hazards present? | Inherent Risk | | | Control Measures When designing controls, follow the Hierarchy of Controls Principle, assigning the most effective controls before less effective controls (see Table 4). <i>List the control category and the controls for each hazard below. For any controls that are not in place, fill in the Actions table on the next page.</i> | Residual Risk | | |
| | Likelihood | Consequence | Risk rating | | Likelihood | Consequence | Risk rating |
| Chemical ➤ Flammable Liquid Isopropanol, Ethanol for part cleaning/wipe down | Unlikely | Minor | Medium | Substitution <ul style="list-style-type: none"> Only small volumes of flammable liquids (no more than 1 L) to be stored in the lab space adjacent to the machine. Engineering <ul style="list-style-type: none"> Room access limited to inducted workers through Cardex/Salto. Administration <ul style="list-style-type: none"> Tier 3 Induction (160_L3_P3.51_Induction) Tier 2 Training: Hazardous Substances (WHSO11, Pulse) Tier 2 Training: ANU WHS Risk Management Training (WHSO03, Pulse) Tier 2 Training: Flammable Substances (WHSO16, Pulse) First Aid Equipment located in gowning area. Signage on lab door indicating Chemical hazards in the space. Chemical Register up to date (Chemwatch) Chemical storage containers to be appropriately labelled. PPE <ul style="list-style-type: none"> Enclosed shoes; Clean room suits; Gloves; safety goggles | Rare | Minor | Low |

| Risk Assessment | | | | | | | |
|---|---------------|-------------|-------------|---|---------------|-------------|-------------|
| Hazards Also list where and when can the hazards present? | Inherent Risk | | | Control Measures When designing controls, follow the Hierarchy of Controls Principle, assigning the most effective controls before less effective controls (see Table 4). <i>List the control category and the controls for each hazard below. For any controls that are not in place, fill in the Actions table on the next page.</i> | Residual Risk | | |
| | Likelihood | Consequence | Risk rating | | Likelihood | Consequence | Risk rating |
| Chemical ➤ Parylene dimer | Unlikely | Minor | Medium | Engineering <ul style="list-style-type: none"> Room access limited to inducted workers through Cardex/Salto. Administration <ul style="list-style-type: none"> Tier 3 Induction (160_L3_P3.51_Induction) Tier 2 Training: Hazardous Substances (WHSO11, Pulse) Tier 2 Training: ANU WHS Risk Management Training (WHSO03, Pulse) First Aid Equipment located in gowning area. Signage on lab door indicating Chemical hazards in the space. Chemical Register up to date (Chemwatch) Chemical storage containers to be appropriately labelled. Parylene powder container must be stored in appropriate cabinet. Parylene boat will be filled by authorised person only. Clean up spills with vacuum cleaner. PPE <ul style="list-style-type: none"> Enclosed shoes; Clean room suits; Gloves; safety goggles | Rare | Minor | Low |
| Ergonomics and Manual Tasks ➤ Repetitive or sustained forces ➤ Repetitive movements ➤ Long duration of the same posture (e.g., standing, sitting) | Unlikely | Minor | Medium | Administration <ul style="list-style-type: none"> Tier 3 Induction (160_L3_P3.51_Induction) Tier 2 training: Setting up your workstation (WHSO29, Pulse). Tier 2 Training: Manual Tasks at ANU (WHSO22, Pulse) Regular movement breaks. | Rare | Minor | Low |

| Actions | | | |
|--|---------------------------|-----------|----------------|
| <p>The activity must not be commenced until all controls are in place. List below which controls are currently not in place, who will implement them and by when. Add additional rows as needed.</p> | | | |
| List of Controls not in place | Who is to implement them? | Timeframe | Date Completed |
| | | | |

If the level of residual risk is assessed as high or extreme,

1. Stop the activity immediately; AND
2. Tag out the plant/equipment; and/or
3. Secure any chemical; and
4. Implement, or seek advice from WHS Officer or Subject Matter Experts to implement, additional controls to reduce the residual risk further to medium [Supervisor signature required];
5. If the above is not possible, seek approval from relevant authority (High – School/Division Director/College Dean; Extreme – COO). **NOTE: Approval will only be granted in exceptional circumstances after consultation with Associate Director, WEG and/or a Subject Matter Expert.** See Chapter 3.1 for details.

| Approval required | | | | | |
|---------------------|--------------------|--------------------|----------------------|--------------------|--------------------|
| Worker conducted RA | | | Student conducted RA | | |
| Residual Risk Level | Authority required | Signature and date | Residual Risk Level | Authority required | Signature and date |
| Low | Author of RA | | Low | Supervisor | |
| Medium | Supervisor | | Medium | Supervisor | |
| High | School Director | | High | School Director | |
| Extreme | COO | | Extreme | COO | |



Table 1. Likelihood Table

| Ranking | Description | Probability or frequency of event happening |
|----------------|--|---|
| Almost certain | The hazard is expected to lead to an event in most circumstances at the University | A daily to monthly occurrence |
| Likely | The hazard could lead to an event in most circumstances at the University | Between monthly to yearly occurrence |
| Possible | The hazard has led to an event at some time at the University | Occurs once between 1 to 5 years |
| Unlikely | The hazard could lead to an event at some time | Occurs once between 5 to 20 years |
| Rare | The hazard may lead to an event in exceptional circumstances | Occurs once between 20+ years |

Table 2. Consequences Table

| Ranking | Injury, Illness or Disease | Plant, Equipment, and materials | Environment |
|---------------|---|---|---|
| Catastrophic | Fatality / fatalities or permanent disability. Permanently unable to work | Destroyed or cannot be reused | Long term permanent effect to ecosystems. Significant intervention required to remediate |
| Major | Requiring extensive medical treatment such as hospitalisation as in patient and possibly a Notifiable Incident LTI >1 week | Damage requiring repairs/rebuild and possible recertification prior to reuse, lost use for one or more days | Notification to environmental agency, ecosystem will need time to recover, intervention required to remediate |
| Moderate | Minor medical treatment injury, such as treated by a health professional, hospital outpatient, no potential to be a Notifiable Incident LTI < 1 week and can return to normal duties | Damage requiring a repair/service by a trade/technician within the day | Contamination event that does not impact on ecosystem. Short impact does not need intervention |
| Minor | Injury needing significant first aid treatment and can return to work within shift | Equipment able to be reset or gotten back into operation by the operator | Minor contained contamination ceasing when the short event is over, can remediate (e.g., spill kit) |
| Insignificant | Report only, no injury OR minor first aid (e.g., Band-Aid); short-term discomfort | Report only, no damage | Report only, no contamination |

Table 3. ANU WHS Risk Matrix

| | Insignificant | Minor | Moderate | Major | Catastrophic |
|----------------|---------------|------------|--------------|--------------|--------------|
| Almost certain | Medium (10) | High (14) | Extreme (21) | Extreme (22) | Extreme (25) |
| Likely | Medium (7) | High (13) | High (16) | Extreme (20) | Extreme (24) |
| Possible | Low (4) | Medium (9) | High (15) | High (18) | Extreme (23) |
| Unlikely | Low (2) | Medium (6) | Medium (8) | High (17) | High (19) |
| Rare | Low (1) | Low (3) | Low (5) | Medium (11) | Medium (12) |

Table 4. Hierarchy of Controls

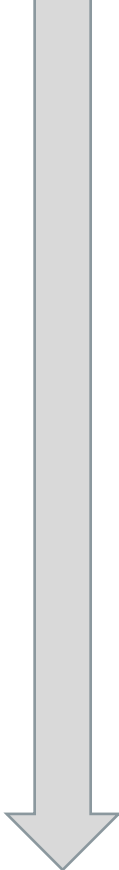
| Level | Examples | Effectiveness |
|-------------------------------------|--|---|
| Elimination | <ul style="list-style-type: none"> Remove the hazards completely Cease the activity Dispose of unwanted hazardous chemicals or plant etc | <p style="text-align: center;">Most Effective</p>  <p style="text-align: center;">Least Effective</p> |
| Substitution | <ul style="list-style-type: none"> Use less hazardous chemicals Use safer plant equipment Use handset instead of telephone Move smaller weight loads instead of large weight | |
| Isolation | <ul style="list-style-type: none"> Physical separation from the hazard by distance or complete shielding Install guard rails around edges and holes to floors Move workers to a new room away from hazardous noise | |
| Engineering Control | <ul style="list-style-type: none"> Use ventilation system Use fume cupboard when working with hazardous chemicals Install guarding around rotating and crushing parts Use trolley or hoist to lift heavy loads Use duress alarm system while doing home interview or offsite field work | |
| Administrative Control | <ul style="list-style-type: none"> Use Safe Work Procedures [See section 3.1.3.1] or instructions Induction and WHS information Training [See Handbook Chapter 3.2] Contingency Planning and Testing [See section 3.1.3.2] Permit to Work system [See section 3.1.3.3] Signage | |
| Personal Protective Equipment (PPE) | <ul style="list-style-type: none"> Lab coat Safety glasses/face shield Gloves/cryogenic gloves Respirators/Masks Personal hearing protectors | |

Table 5. Risk Assessment and SWP review timeframe

Use this Table to determine review timeframe and frequency for the risk assessment and any safe work procedures.

| Residual Risk | Review Frequency | | What to do during the review. |
|---------------|------------------|--|---|
| Extreme | 6 months | And/or <ul style="list-style-type: none"> After an incident where deficiencies in identifying or controlling hazards have been observed When changes to the activity need to occur When significant changes (e.g., renovation) to the workplace occur When HSRs request a review | Stop work. Review the control measures and introduce additional control measures to reduce the residual risk to Medium as a maximum. |
| High | 1 Year | | |
| Medium | 2 Years | | Review the control measures. |
| Low | 3 Years | | |