

Risk Management Chemical Hazard Edition March 2015

Introduction

Monash University's Victorian campuses are all governed by the Victorian OHS Act 2004 and its subordinate regulations and codes of compliance. An inherent part of all OHS legislation is the requirement for workplaces to control the hazards its activities may pose to the health and safety of staff, visitors, contractors and students.

This version of the Risk Management Program is designed to assist users identify hazards, assess the risks and determine the controls to reduce the risk associated with chemical hazards. For general risk assessments, please see the Risk Management Program.

The occupational health and safety risks must be identified and eliminated where possible or otherwise minimized. When the hazard cannot be eliminated, a combination of primary and secondary controls provides the safest option for reducing the risk of exposure to a hazard. Reduction of risk is best done following the Hierarchy of Controls.

Primary controls are those which make the environment safer by controlling or restricting the impact of the hazard on those associated with the work activity. Primary controls are described in the top section of the hierarchy and include Substitution, Isolation and Engineering.

Secondary controls assist the worker to be safer, in the case of Administrative controls or act as the last layer of protection to those exposed to the hazard in the case of Personal Protective Equipment. These are less reliable than primary controls, but still improve safety.

The primary aim of the risk assessment process is to ensure the safety of all tasks in the workplace. The end result of a risk assessment is the implementation and maintenance of appropriate risk controls.

When to do a chemical risk assessment at Monash

A risk assessment must be undertaken for all activities that involve chemical hazards.

How to do a risk assessment at Monash

If the risk you are assessing is a common risk at Monash University there may be a pre-existing risk assessment available to use as guidance.

To do a Risk Assessment, this step by step process should be followed:

1. Establish what process is being assessed. If there is a Standard Operating Procedure for the task, make it available.
2. Involve people that know about the process and the hazards associated with it.
3. Print out or open an electronic copy of the Risk Assessment Worksheet.
4. Fill in the details of at the top of the worksheet, and enter the names of the people involved as the Risk Assessment Team.
5. Identify what hazards are associated with the process. There are many hazards listed on the worksheet, but there may be additional hazards. Take into account hazards associated with:
 - a. Installation;
 - b. Operation;

- c. Waste generation;
- d. Associated equipment, tasks or activities that may need to occur as part of the process; and
- e. Decommissioning.

Enter the hazard in column 1 of the second page of the Risk Assessment Worksheet and the identified hazards in column 2. More rows can be added as required.

6. Seek information on the hazards identified. Some examples of places to look are your Risk Assessment Team, Supervisor, Safety Officer, knowledgeable colleagues, Monash OH&S website, [OHS Consultant/Advisor](#), other organisations with similar operations, Victorian WorkCover Authority, Safe Work Australia, Australian Standards, and the internet.

For calculating risks associated with inhalation of chemicals please skip down to the Chemical Inhalation Risk section.

For calculating risks associated with chemical storage, spills, waste and exposure to chemical splash please use the following instructions:

7. Identify what controls are in place to reduce the likelihood and consequences. Enter these controls under column 2.
8. Assess the risk by referring to risk matrix on Table 1. Estimate the likelihood of an injury or negative outcome occurring. Enter this in column 3. Estimate the consequences of the injury or negative outcome occurring. Enter this in column 4. Using risk matrix on Table 1 and the estimates of likelihood and consequences, calculate the risk. Enter the risk on column 5. For additional inform on Chemical, Radiation and Biological hazards, please refer to the appendix.
9. If possible, eliminate the hazards associated with the process. If all hazards are eliminated then you have finished your risk assessment.
10. Determine controls to reduce the risk. There are many suggested controls listed in the OHS documentation found on the [Risk Management](#) section of the Monash OH&S website. Also refer to your resources listed in step 6.
11. List the proposed controls on column 6 of the risk assessment worksheet.
12. Nominate a person to implement each control. Enter the responsible person in column 7.
13. Repeat the process of risk assessment in section 8 with the controls implemented.

Table 1

		Consequences				
		Near Hit/Miss - No Injury	First aid treatment required for minor	Medical treatment may be required	Serious injury requiring admission	Fatality or permanent
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	High	Extreme
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Medium	Medium

Chemical Inhalation Risk (Standard)

7. Determine consequences of chemical exposure from the most severe Risk Phrase, which can be found on the MSDS of the chemical. The MSDS can be found on [Chemwatch](#).

Consequences				
Insignificant	Minor	Moderate	Major	Catastrophic
		Risk Number		
R36	R20	R23	R26	R40
R38	R21	R24	R27	R43
	R22	R25	R28	R45
		R29	R32	R49
		R31	R39	
		R34	R48/23	
		R35	R48/23/24	
		R37	R48/23/24/25	
		R39	R48/23/25	
		R41	R48/24	
		R42	R48/24/25	
		R43	R48/25	
		R48/20	R60	
		R48/20/21	R61	
		R48/20/21/22	R62	
		R48/20/22	R63	
		R48/21		
		R48/21/22		
		R48/22		

Risk Phrase	Skin Notation	Risk Number	Risk Phrase	Skin Notation	Risk Number
Insignificant			Major		
Irritating to eyes	S	R36	Very toxic by inhalation		R26
Irritating to eyes and skin	S	R36/38	Very toxic by inhalation and in contact with skin	S	R26/27
Irritating to skin	S	R38	Very toxic by inhalation, in contact with skin and if swallowed	S	R26/27/28
Risk Phrase	Skin Notation	Risk Number	Very toxic by inhalation and if swallowed		R26/28
Minor			Very toxic in contact with skin	S	R27
Harmful by inhalation		R20	Very toxic in contact with skin and if swallowed	S	R27/28
Harmful by inhalation and in contact with skin	S	R20/21	Very toxic if swallowed		R28
Harmful by inhalation, in contact with skin and if swallowed	S	R20/21/22	Contact with acids liberates very toxic gas		R32
Harmful by inhalation and if swallowed		R20/22	Very toxic: danger of very serious irreversible effects through inhalation		R39/26
Harmful in contact with skin	S	R21	Very toxic: danger of very serious irreversible effects through inhalation and in contact with skin	S	R39/26/27
Harmful in contact with skin and if swallowed	S	R21/22	Very toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed	S	R39/26/27/28
Harmful if swallowed		R22	Very toxic: danger of very serious irreversible effects through inhalation and if swallowed		R39/26/28
Risk Phrase	Skin Notation	Risk Number	Very toxic: danger of very serious irreversible effects in contact with skin	S	R39/27
Moderate			Very toxic: danger of very serious irreversible effects in contact with skin and if swallowed	S	R39/27/28
Toxic by inhalation		R23	Very toxic: danger of very serious irreversible effects if swallowed		R39/28
Toxic by inhalation and in contact with skin	S	R23/24	Possible risks of irreversible effects		R40 - Carc cat 3 effects
Toxic by inhalation, in contact with skin and if swallowed	S	R23/24/25	Toxic: danger of serious damage to health by prolonged exposure through inhalation		R48/23
Toxic by inhalation and if swallowed		R23/25	Toxic: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin	S	R48/23/24
Toxic in contact with skin	S	R24	Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed		R48/23/25
Toxic in contact with skin and if swallowed	S	R24/25	Toxic: danger of serious damage to health by prolonged exposure in contact with skin	S	R48/24
Toxic if swallowed		R25	Toxic: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed	S	R48/24/25
Contact with water liberates toxic gas		R29	Toxic: danger of serious damage to health by prolonged exposure if swallowed		R48/25
Contact with acids liberates toxic		R31	May impair fertility		R60

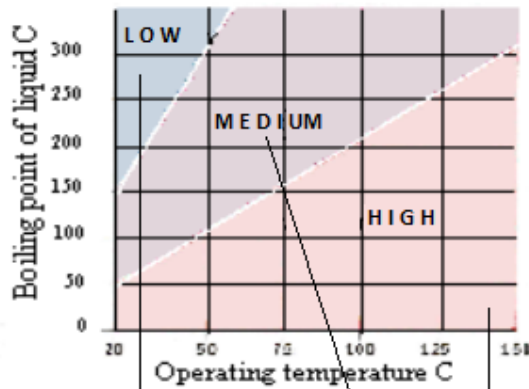
gas					
Causes burns	S	R34	May cause harm to the unborn child		R61
Causes severe burns	S	R35	Possible risk of impaired fertility		R62
Irritating to eyes and respiratory system	S	R36/37	Possible risk of harm to the unborn child		R63
Irritating to eyes, respiratory system and skin	S	R36/37/38	Risk Phrase	Skin Notation	Risk Number
Irritating to respiratory system		R37	Catastrophic		
Irritating to respiratory system and skin	S	R37/38	Harmful: possible risk of irreversible effects through inhalation		R40/20
Toxic: danger of very serious irreversible effects through inhalation		R39/23	Harmful: possible risk of irreversible effects through inhalation and in contact with skin		R40/20/21
Toxic: danger of very serious irreversible effects through inhalation and in contact with skin	S	R39/23/24	Harmful: possible risk of irreversible effects through inhalation, in contact with skin and if swallowed		R40/20/21/22
Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed	S	R39/23/24/25	Harmful: possible risk of irreversible effects through inhalation and if swallowed		R40/20/22
Toxic: danger of very serious irreversible effects through inhalation and if swallowed		R39/23/25	Harmful: possible risk of irreversible effects in contact with skin		R40/21
Toxic: danger of very serious irreversible effects in contact with skin	S	R39/24	Harmful: possible risk of irreversible effects in contact with skin and if swallowed		R40/21/22
Toxic: danger of very serious irreversible effects in contact with skin and if swallowed	S	R39/24/25	Harmful: possible risk of irreversible effects if swallowed		R40/22
Toxic: danger of very serious irreversible effects if swallowed		R39/25	Possible risks of irreversible effects		R40 Mut cat 3
Risk of serious damage to eyes	S	R41	May cause sensitisation by inhalation		R42
May cause sensitisation by skin Contact	S	R43	May cause sensitisation by inhalation and skin contact		R42/43
Harmful: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin	S	R48/20/21	May cause Cancer by inhalation		R49
Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed	S	R48/20/21/22	May cause cancer		R45
Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed		R48/20/22	May cause Cancer by inhalation		R49
Harmful: danger of serious damage to health by prolonged exposure in contact with skin	S	R48/21	May cause cancer		R45
Harmful: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed	S	R48/21/22			
Harmful: danger of serious damage to health by prolonged exposure if swallowed		R48/22			

Hazard Phrase	H Code	Hazard Phrase	H Code
Insignificant		Major	
Causes skin irritation	H315	Causes damage to organs	H370
		May cause allergy or asthma symptoms or breathing difficulties if inhaled	H334
		May cause genetic defects	H340
Hazard Phrase	H Code	Causes damage to organs	H372
Minor		May damage fertility or the unborn child	H360
Harmful if inhaled	H332	Suspected of damaging fertility or the unborn child	H361
Harmful in contact with skin	H312	Suspected of causing genetic defects	H341
Harmful if swallowed	H302		
Hazard Phrase	H Code	Hazard Phrase	H Code
Moderate		Catastrophic	
Toxic if inhaled	H331	Fatal if Inhaled	H330
Toxic in contact with skin	H311	Fatal if inhaled	H330
Toxic if swallowed	H301	Fatal in contact with skin	H310
Causes severe skin burns and eye damage	H314	Fatal if swallowed	H300
Causes severe skin burns and eye damage	H314	Suspected of causing cancer	H351
Causes serious eye irritation	H319	May cause cancer	H350
May cause respiratory irritation	H335	May cause cancer	H350
Causes serious eye damage	H318	May be fatal if swallowed and enters airways	H304
May cause an allergic skin reaction	H317	May cause drowsiness and dizziness	H336
May cause damage to organs	H373		
May cause harm to breast-fed children	H362		
May cause damage to organs	H371		

8. Determine the likelihood of exposure to the chemical from the volatility or dustiness of the chemical. The boiling point of the chemical can be found on the MSDS of the chemical. The MSDS can be found on [Chemwatch](#).

Dust or Aerosol potential			
	Low	Medium	High
Properties	Block and pellet like solids that remain intact.	Crystalline, granular or flakey solids. Dust visible but settles out quickly. Dust remains on surfaces.	Fine, light powders. Dust clouds can be seen. Remains in air for several minutes.
Examples	PVC pellets, waxed flakes, pills, solids in H ₂ O or under oil	Soap Powder	Cement, carbon black, chalk dust
Particle size	> 200 micron	10-200 micron	< 10 micron

Graph to select volatility of liquid



Dust or Aerosol potential & Volatility					
	Low Dust or Aerosol potential & Volatility	Medium Dust or Aerosol potential	Medium Volatility	High Dust or Aerosol potential & Volatility	
Amount	High (tonne or m ³)	Possible	Likely	Likely	Almost Certain
	Medium (kg or litre)	Possible	Possible	Likely	Likely
	Small (g or ml)	Unlikely	Unlikely	Possible	Possible
	Very Small (mg or µl)	Rare	Rare	Unlikely	Unlikely
	Micro (<µg or <µl)	Rare	Rare	Rare	Unlikely

9. Determine what controls are currently in place, record these in column 2. Reduce the consequences and likelihood in line with existing controls and record the value for the likelihood in column 3 and the consequences in column 4.

10. Assess the risk using the risk matrix. Enter this value in column 5.

		Consequences				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	High	Extreme
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Medium	Medium

11. Determine controls to reduce the risk. There are many suggested controls on the following table.

Chemical	
Isolation	Use glove box
Engineering	Controlled ventilation where air is removed by a powered fan.
	Where possible use Fume hood or cupboard or extraction
	Place lids on containers immediately after use
Administration	Cold rooms typically have full recirculation of air and thus are not suitable as a work area for some chemicals
	Ensure all staff are provided with information regarding the hazards associated with the substance/s in use
	Ensure those using substances have completed a Dangerous Goods & Hazardous Substances training course
	Ensure good housekeeping standards are practiced at all times and ensure all containers are affixed with a compliant label (product name, concentration, DG code if applicable, date and decanter's name)
	Consult the Material Safety Data sheet (MSDS) before commencing work
	Store chemicals in accordance with the Monash Chemical Storage Guidelines and ensure spill kits are suitable for the type and quantity of substances in use.
	Ensure Safe Operating Procedures/Safe Work Instructions are developed
	Dispose of all wastes as per the MSDS and waste disposal guidelines where applicable
	Ensure comprehensive training on the process to be undertaken has been given/received and documented
	Health Surveillance.
	Consider whether after hours work will be required and if so, develop and after hours procedures as per Work & study during times when emergency response is limited
	Ensure all requirements for licenses, permits or notification to use the chemical are met
	All staff/students must be confident and competent before being allowed to perform tasks unsupervised
Personal Protective Equipment (PPE)	A fit tested respirator may be used for individuals when fumecupboard is not appropriate.
	Minimum PPE to be worn at all times -laboratory coat/dust coat/coveralls, safety-glasses, closed toe footwear and gloves (Ansell Glove Chart)
	Ensure Personal Protective Equipment (PPE) is appropriate for the task and chemical

12. List the proposed controls on column 6 of the risk assessment worksheet.

13. Nominate a person to implement each control. Enter the responsible person in column 7.

14. Estimate the reduction in likelihood (record on column 8) and consequences (record on column 9) provided by the controls, and record the value (high, medium or low) on column 10.

		Consequences				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	High	Extreme
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Medium	Medium

15. Once the risk assessment worksheet is completed, you can give it to your supervisor, Health and Safety Representative or Safety Officer for review.
16. After taking their comments into consideration give it to your supervisor for authorisation.
17. All OHS controls and the method for maintaining the controls must be included in the documentation for the process being assessed.

Summary

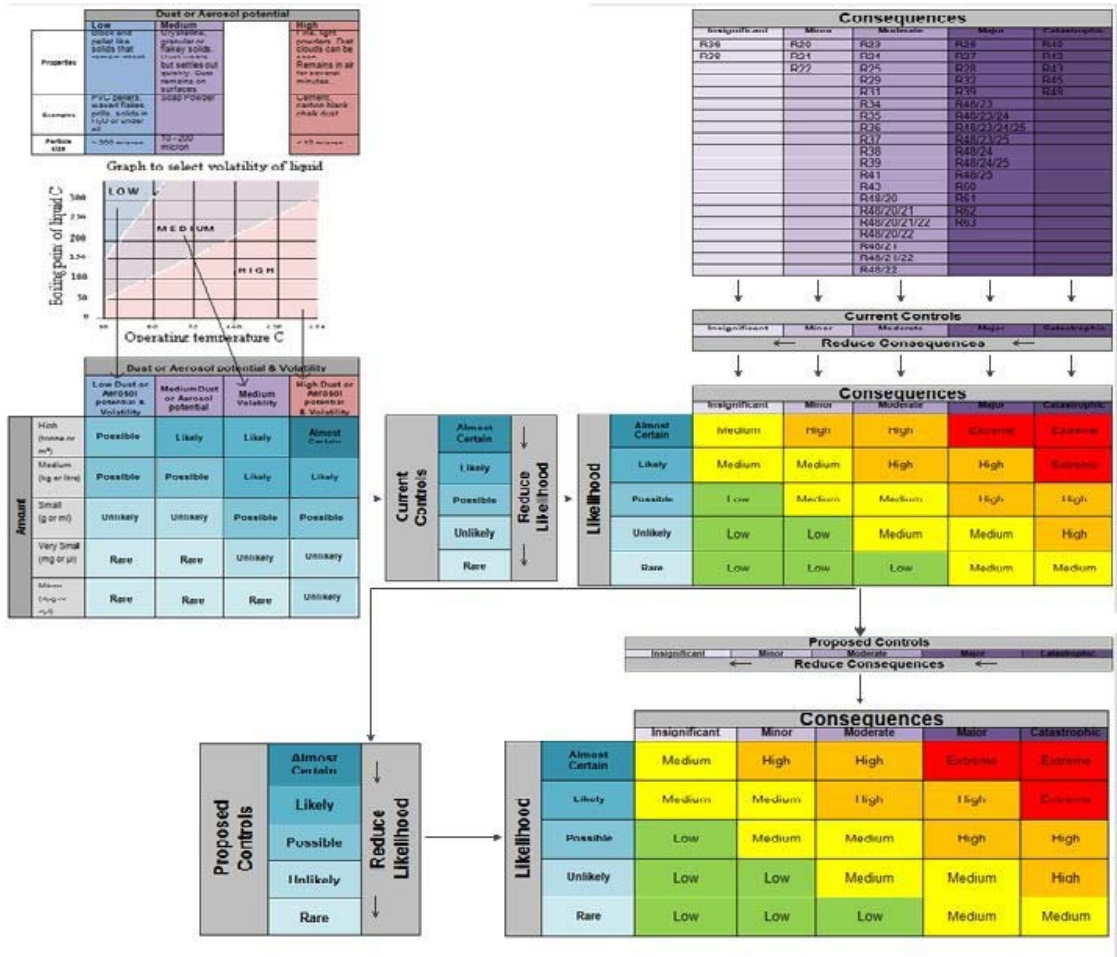


Table 3

The Hierarchy of Control

<i>Primary Controls</i>	
Elimination	Regulations supporting the <i>OHS Act</i> require the elimination of risks as the first step in risk control.
Substitution	Substitution of a less hazardous alternative.
Isolation	Enclosing or isolating the hazard from the people.
Engineering Controls	Changing processes, equipment or tools e.g.: <ul style="list-style-type: none"> • Machinery guards • Ventilation • Mechanical aids
If risk remains above acceptable levels, then administrative controls should be applied. If these are still not adequate, then personal protective clothing and equipment should be worn. Secondary control should be used in conjunction with primary controls, and should not be relied upon.	
<i>Secondary Controls</i>	
Administrative Controls	Information, training and procedures e.g.: <ul style="list-style-type: none"> • Job rotation • Limiting access • Permit systems • Safe operating procedures • Training • Signage
Personal Protective Equipment	Laboratory coat, safety glasses, closed shoes/steel capped boots, hearing protection.

RISK ASSESSMENT WORKSHEET

Risk Assessment Title:					
Details of Process:					
Risk Register:			Risk Assessment Number:		
Campus		Faculty/Division		School/Department/Centre	
Building		Room No.		Assessment Date	

Risk Assessment Team						
Name	Signature	Date		Name	Signature	Date

Hazard Categories applicable to this Risk Assessment

Animal/Insect/Vegetation <input type="checkbox"/>	Equipment/Machinery/Vehicles <input type="checkbox"/>	Manual Handling/Ergonomics <input type="checkbox"/>
Biological <input type="checkbox"/>	Outdoor Hazards <input type="checkbox"/>	Psychological/Social <input type="checkbox"/>
Chemical <input type="checkbox"/>	Water/Gases/Liquids <input type="checkbox"/>	Physical Hazards <input type="checkbox"/>
Hazardous Areas <input type="checkbox"/>	Radiation <input type="checkbox"/>	Other <input type="checkbox"/>

Approval Supervisor

Name:	
Signed:	Date:

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AS APPROPRIATE

Hazard	Current Controls	Likelihood	Consequences	Current Risk	Proposed Controls	Responsible Person	Likelihood	Consequences	Residual Risk
1	2	3	4	5	6	7	8	9	10