



# WORKING WITH CARCINOGENS

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## 1 INTRODUCTION

Some chemicals are known or suspected to cause cancer in humans following exposure. These are referred to as carcinogens. Due to the nature of work carried out by the University some staff and students occasionally handle known and suspected carcinogenic substances. This work must be well planned and carried out to protect the safety of those involved.

## 2 PURPOSE

Faculties, schools, research groups and professional services units are encouraged to use this document as a primary reference when developing local procedures for the management of carcinogens.

This guideline has been developed in support of the University's [Chemical Safety Standards](#).

## 3 CLASSIFICATION OF CARCINOGENS

Chemicals labelled as carcinogens have different levels of cancer-causing potential. Some chemicals are known to cause cancer in humans, others are suspected of causing cancer. Some chemicals not identified as causing cancer now, may be classified as carcinogens in the future.

The risk of developing cancer following exposure to a carcinogen is dependent on many factors including the route of exposure, the length and intensity of exposure, and the individual's genetic makeup, age and general health status. If there are negative health effects these are often delayed with symptoms appearing months or years after exposure.

The Globally Harmonised System for the classification and labelling of chemicals (GHS) depicts carcinogenicity with specific pictograms and hazard statements (Table 1).


Pictogram	Hazard Class	Signal word	Hazard Statement
	Category 1A	Danger	H350 May cause cancer
	Category 1B		
	Category 2	Warning	H351 Suspected of causing cancer

Table 1 GHS classification of carcinogenicity

The [International Agency for Research on Cancer](#) (IARC) categorises carcinogenic chemicals according to the following groups:

Category	Description
Group 1	Sufficient evidence in humans or sufficient evidence in animals and strong mechanistic data in humans
Group 2A	Limited evidence in humans and sufficient evidence in animals
Group 2B	Limited evidence in humans and less than sufficient evidence in animals
Group 3	Inadequate in humans and inadequate or limited in animals
Group 4	Lack of carcinogenicity in humans and in animals

Approximate equivalence between GHS and IARC

IARC	GHS
Group 1	Cat. 1A
Group 2A	Cat1 B
Group 2B	
Group 3	
Group 4	

The IARC lists known or suspected carcinogens and periodically updates these lists as new information becomes available. Data about whether a chemical might cause cancer is obtained through laboratory and epidemiological studies.

Examples of some common carcinogens used in the workplace include benzene (Cat. 1A); chromium (VI) compounds e.g. chromium oxide (Cat 1A), potassium dichromate (Cat 1B); nickel compounds e.g. nickel (II) chloride (Cat. 1A); cadmium salts e.g. cadmium chloride (Cat. 1B) and formaldehyde (Cat. 2)

## 4 RISK ASSESSMENT FOR CARCINOGENS

In the first instance every effort should be made to eliminate the use of carcinogens. Investigation of alternative methods or the use of an alternate chemical is recommended. If an alternative is not possible then a [risk assessment](#) must be completed in consultation with the workers who could be exposed.

The risk assessment aims to identify the potential for exposure during the planned activity and detail the control measures proposed to manage the risk, including training and supervision requirements. Once agreed and approved, control measures must be adhered to as a condition of use.

Whenever assessing the risk associated with an activity or task, various risk factors must be considered including the:

- Nature of the chemicals involved and other hazards;
- Work environment;
- Physical activities required to complete the task;
- Psychological demands of the task; and
- Individual workers involved in the activity.

In situations where the risk of exposure is unknown, the supervisor may consider the need for environmental monitoring (e.g. air monitoring or wipe testing of work surfaces) to help evaluate the effectiveness of the current or proposed risk controls.

## 5 SAFE WORK PROCEDURES

Safe work procedures (SWP) must be documented for tasks involving the use of all known carcinogens. Some of the general requirements for working with carcinogens are outlined below.

### 5.1 GENERAL

- Workers must consult the relevant safety data sheet (SDS) when planning the work.
- Work with carcinogens requires a risk assessment and approval by the relevant supervisor.
- Work with prohibited and restricted carcinogens requires a documented risk assessment, SWPs and approval by the head of the relevant organisation unit.
- Risk assessments and safe work procedures must be regularly reviewed by the Supervisor.
- Workers must be provided with relevant information, training in the general hazards, specific SWPs, emergency procedures and use of personal protective equipment (PPE).
- Access to areas where carcinogens are used must be restricted and segregated from general work areas.
- Work areas must be regularly cleaned by workers trained to remove potential contamination.

### 5.2 STORAGE AND TRANSPORT

- Containers must be clearly labelled to identify the hazards and specific handling requirements.
- Carcinogens must be stored securely and segregated from other general chemicals.

- Secondary containment must be used when transporting carcinogens outside the immediate work area (e.g. laboratory).

### 5.3 HANDLING

- All work involving dusts, vapour or aerosols should be carried out in a fume cupboard.
- Where practical, spill trays should be used as a means of secondary containment.
- Bench coat may be used to avoid the contamination of work surfaces, but must be regularly replaced.
- PPE must be chosen specifically to provide protection from the particular carcinogen.
- PPE including laboratory coats and gowns must remain in the work area.
- Where animals are being treated with carcinogenic chemicals, care must be taken to avoid exposure when handling the animal, cages and bedding.
- Workers must wash hands thoroughly before leaving the work area.

### 5.4 DISPOSAL

- Dispose of a carcinogenic waste, including chemically contaminated solid material via the [University hazardous waste program](#).
- If a carcinogen is no longer required, dispose of it as soon as possible.

## 6 PROHIBITED AND RESTRICTED CARCINOGENS

The NSW Work Health and Safety (WHS) Regulation 2017 prohibits and restricts the purchase, use, storage or handling of some specific carcinogens. These are described in the regulations as:

- Prohibited carcinogens; and
- Restricted carcinogens.

The list of prohibited and restricted carcinogens can be found in [Schedule 10 of the WHS Regulations](#) and Appendix A of this document.

### 6.1 SAFEWORK NSW AUTHORISATION TO USE, HANDLE OR STORE

Prohibited and restricted carcinogenic substances can only be supplied to people with written authorisation from SafeWork NSW. Legislation permits prohibited and restricted carcinogens to be used for 'genuine research and analysis'<sup>1</sup> provided that SafeWork NSW has issued an authorisation.

An application for authorisation can be made by completing the [SafeWork NSW Application form to handle or store a prohibited or restricted carcinogen](#).

Guidance to completing the application is provided at:

[SafeWork NSW Applicants guide for authorisation to use handle or store prohibited or restricted carcinogens](#)

#### Steps to obtain authorisation

1. Supervisor completes a detailed risk assessment for the activity involving the carcinogen in consultation with all workers who will undertake the activity.
2. The SafeWork NSW application for authorisation is prepared by the supervisor.

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<sup>1</sup> *Genuine Research and Analysis* is defined in the NSW WHS Regulations 2011 as the systematic investigative or experimental activities that are carried out for either acquiring new knowledge or creating new or improved materials, products, devices, processes or services.

3. The draft risk assessment and SafeWork NSW application form is submitted to [Safety Health and Wellbeing](#) for review.
4. The completed risk assessment is submitted to the head of the relevant organisational unit for approval.
5. If approved, the supervisor lodges the completed application for Authorisation with SafeWork NSW.
6. SafeWork NSW will review the application either issue or refuse authorisation.
7. If the activity is authorised by SafeWork NSW an authorisation letter will be sent to the supervisor.
8. The supervisor must provide a copy of the SafeWork NSW authorisation letter to [Safety Health & Wellbeing](#) and the head of the relevant organisational unit.

The authorisation is of unlimited duration, unless cancelled by SafeWork NSW. If there is a change in the nature of use or any information within the original application, SafeWork NSW must be notified by resubmitting an application form. There is no fee associated with an application.

Work without a valid SafeWork NSW Authorisation is a breach of the WHS Regulation and may result in regulatory action.

## 6.2 PURCHASING RESTRICTED AND PROHIBITED CARCINOGENS

A prohibited or restricted carcinogen must not be purchased until SafeWork NSW has issued an authorisation for the relevant supervisor to use the specific carcinogen.

Chemical suppliers may require a copy of the SafeWork NSW authorisation and completion of an end user declaration (EUD) to verify how the chemical will be used and that the use of the chemical has been approved by the organisation.

The carcinogen arriving at the University must be stored in a secure location until pick up and promptly collected by the purchaser.

## 6.3 INCIDENTS WITH POTENTIAL EXPOSURE TO A RESTRICTED OR PROHIBITED CARCINOGEN

If there is an incident involving suspected exposure to a prohibited or restricted carcinogen, the details of the incident must be immediately reported to Safety Health & Wellbeing and recorded in [Riskware](#). The incident will be investigated by Safety Health & Wellbeing to assess the likelihood of exposure and determine the need for, and availability of, relevant health monitoring.

## 6.4 STATEMENT OF EXPOSURE

Workers involved in an incident where there was a known or suspected exposure must be provided with all the relevant details of the exposure. Following the incident investigation, Safety Health & Wellbeing will issue the worker with a *Statement of exposure* authorised by the Director, Human Resources.

The statement of exposure includes the:

- Full name, date of birth and current address of the worker
- Name of the prohibited or restricted carcinogen involved
- Date and time that the worker may have been exposed
- Information about how and where the worker may obtain further records of the incident
- Advice about the need for regular health checks (where relevant).

## 6.5 RECORD OF WORK WITH A PROHIBITED OR RESTRICTED CARCINOGEN

When a worker finishes a project or period of work using a prohibited or restricted carcinogen they must be provided with a record of their work with that specific carcinogen.

The record of work is prepared by the organisational unit using the *Record of work with a prohibited or restricted carcinogen* template (Appendix B). The record of work must be signed by the relevant head of school or faculty dean and authorised by Safety Health & Wellbeing prior to being issued to the worker.

The record of work includes:

- The full name, date of birth and current address of the worker
- The name of the prohibited or restricted carcinogen involved
- The period of time (start date/finish date) when the worker used or handled the prohibited or restricted carcinogen
- How and where the worker may obtain further records about the work undertaken.

## 6.6 RECORDKEEPING

All documents relating to work with prohibited and restricted carcinogens must be retained and kept in accordance with the [University's Recordkeeping Policy](#) for a period of 30 years after the SafeWork NSW authorisation to use, handle or store the specific carcinogen has been terminated.

The head of the relevant organisation unit must ensure that copies of the following documents are retained.

- SafeWork NSW authorisations to use, handle or store a prohibited or restricted carcinogen
- Risk assessments relating to work with prohibited and restricted carcinogens
- Safe Work Procedures relating to work with prohibited and restricted carcinogens
- Statements of exposure issued to workers
- Records of work with a prohibited or restricted carcinogen

Safety Health & Wellbeing will maintain a University database of SafeWork NSW authorisations to use, handle or store a prohibited or restricted carcinogen and will attached statements of exposure to relevant RiskWare WHS incident records.

## 7 REVIEW AND EVALUATION

Performance standards and the associated procedures and guidelines will be reviewed by Safety Health & Wellbeing at least once every two years to identify and implement opportunities for improvement.

## 8 REFERENCES

1. NSW Work Health and Safety Regulation, 2017.
2. NHMRC Guidelines for laboratory personnel working with carcinogenic or highly toxic chemicals, 1990..
3. [Guide to managing risks of exposure to carcinogens in the workplace](#), Safe Work Australia, 2016 [Accessed June 2016].

## 9 DOCUMENT CONTROL

<b>Acknowledgements</b>	
<b>Related Documents</b>	WHS_CHE_STD_1_Chemical Safety Standards



Version Control	Date released	Author/s	Custodian	Approved by	Amendment
1.0	5/1/16	WHS Specialist (Chemical)	Manager, Work Health & Safety Services	Director, Safety Health & Wellbeing	Original
1.1	12/9//17	WHS Specialist (Chemical)	Manager, Work Health & Safety Services	Director, Safety Health & Wellbeing	Addition and update of references

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## APPENDIX A: PROHIBITED AND RESTRICTED CARCINOGENS

(Extract from Schedule 10 - Work, Health and Safety Regulations 2017)

**Table 10.1 Prohibited carcinogens**

Item	Prohibited carcinogen [CAS number]
1	2-Acetylaminofluorene [53-96-3]
2	Aflatoxins
3	4-Aminodiphenyl [92-67-1]
4	Benzidine [92-87-5] and its salts (including benzidine dihydrochloride [531-85-1])
5	bis(Chloromethyl) ether [542-88-1]
6	Chloromethyl methyl ether [107-30-2] (technical grade which contains bis(chloromethyl) ether)
7	4-Dimethylaminoazobenzene [60-11-7] (Dimethyl Yellow)
8	2-Naphthylamine [91-59-8] and its salts
9	4-Nitrodiphenyl [92-93-3]

**Table 10.2 Restricted carcinogens**

Item	Restricted carcinogen [CAS Number]	Restricted use
1	Acrylonitrile [107-13-1]	All
2	Benzene [71-43-2]	All uses involving benzene as a feedstock containing more than 50% of benzene by volume  Genuine research or analysis
3	Cyclophosphamide [50-18-0]	When used in preparation for therapeutic use in hospitals and oncological treatment facilities, and in manufacturing operations  Genuine research or analysis
4	3,3'-Dichlorobenzidine [91-94-1] and its salts (including 3,3'-Dichlorobenzidine dihydrochloride [612-83-9])	All
5	Diethyl sulfate [64-67-5]	All
6	Dimethyl sulfate [77-78-1]	All
7	Ethylene dibromide [106-93-4]	When used as a fumigant  Genuine research or analysis





Item	Restricted carcinogen [CAS Number]	Restricted use
8	4,4'-Methylene bis(2-chloroaniline) [101-14-4] MOCA	All
9	3-Propiolactone [57-57-8] (Beta-propiolactone)	All
10	o-Toluidine [95-53-4] and o-Toluidine hydrochloride [636-21-5]	All
11	Vinyl chloride monomer [75-01-4]	All
14	Nickel and its compounds	For abrasive blasting at a concentration of greater than 0.1% as nickel
15	Nitrates	For wet abrasive blasting
16	Nitrites	For wet abrasive blasting
17	Radioactive substance of any kind where the level of radiation exceeds 1 Bq/g	For abrasive blasting, so far as is reasonably practicable
18	Tetrachloroethane	For spray painting
19	Tetrachloromethane (carbon tetrachloride)	For spray painting
20	Tin and its compounds	For abrasive blasting at a concentration of greater than 0.1% as tin
21	Tributyl tin	For spray painting



## APPENDIX B: RECORD OF WORK WITH A PROHIBITED OR RESTRICTED CARCINOGEN

This document is a record of work undertaken by an individual with a restricted or prohibited carcinogen during their course of their work at The University of Sydney. An authorised copy is given to the worker when work is finalised.

### WORKER INFORMATION

Full Name:		Date of Birth:	
Current Address:			
Staff or Student ID:		<input type="checkbox"/> Employee <input type="checkbox"/> Student <input type="checkbox"/> Affiliate <input type="checkbox"/> Volunteer	
Supervisor:		Period of Engagement:	<b>to</b>

### PROHIBITED OR RESTRICTED CARCINOGEN DETAILS

Name of carcinogen		CAS Number	
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### ACCESS TO FURTHER INFORMATION

Records of an actual exposure to a worker of a restricted or prohibited carcinogen are kept within Riskware. These records can be accessed by contacting Safety, Health and Wellbeing at The University of Sydney.

SafeWork NSW authorisation reference:

For copies of the relevant risk assessments, safe work procedures or other related documents contact:

### HEALTH ASSESSMENTS

No ongoing health assessments are required or recommended.

Ongoing health assessments are recommended.    Type of health Assessment:

Head of School/Area Organisational Unit	Authorised by (Safety Health & Wellbeing Representative)
Signed: _____  Date: _____	Signed: _____  Date: _____