Code of Practice for

School

Exempt Laboratories

HSNO CoP 15-1

Code of Practice for School Exempt Laboratories

Preface

This Code of Practice is approved pursuant to Sections 78 and 79[1] of the Hazardous Substance and New Organisms Act. The Environmental Risk Management Authority (ERMA) has delegated the power to approve Codes of Practice to the Chief Executive of the Authority, and this Code is approved in accordance with that delegation. It is confirmed that the requirements of Sections 78 and 79 have been met.

This code has been developed by the New Zealand Association of Science Educators (NZASE) and is intended primarily for the use of school science laboratories. However, it may also be applied to other areas within schools that use hazardous substances for teaching purposes.

Notice of approval of this Code will be published in the Gazette dated 18 Jan 2007.

Pursuant to Section 80(1)(a) of the Act, the Code may be inspected on request at the Wellington office of ERMA New Zealand. Pursuant to Section 80(1)(b) of the Act, a copy of the Code may be downloaded free of charge from either the ERMA New Zealand web-site or NZASE web-site.

Approved this day of

Rob Forlong
Chief Executive

[1] Sections 78 & 79 empower the Authority to issue, amend or revoke codes of practice to implement Regulations under the Act.

Table of Contents

Summary 2
1. About this Code 3
1.1 Introduction 3
1.2 Scope and Application 5
1.3 Definitions 6
2. Management of Laboratories 10
2.1 Appointment of Laboratory Managers by Board of Trustees/Governors 10
2.2 Laboratory Manager's responsibilities 10
2.3 Skill and Knowledge Requirements for Laboratory Manager 11
2.4 Skill and knowledge requirements for persons in charge 11
2.5 Duties of Persons Handling Hazardous Substances 13
3. Security 15
3.1 Access 15
3.2 Signage 16
4 Use of hazardous substances in teaching 18
4.1 Substances that are listed in this code of practice as MOE-allowable or MOE-forbidden for use in schools 18
Boxed Section 4.1: Decision key to decide if substances can be used in schools 19
4.2 Substances that are not on the list of MOE-allowed or MOE-forbidden substances for use in schools 20
Table 4.2. Examples of the classification for different aqueous solutions of corrosives 25
5 Operational Requirements 26
5.1 Basic Safety Rules 26
5.2 Inventory, information, labelling and containers 27
5.3 Storage and handling 28
5.4 Emergency Planning 31
5.5 Design requirements 32
5.6 Disposal 34
6. Safe Methods of Use 35
Safe Method of Use for Class 3 Flammable liquids 36
Significant Hazards 36
Required Safety Controls 36
Disposal 38
Emergency Information 38
Safe Method of Use for Class 4 Flammable Solids 40
Significant Hazards 40
Required Controls 40
Safe Method of Use for Class 4.3, Dangerous when wet 42
Significant Hazards 42
Required controls 42
Emergency Information 43
Safe Method of Use for Class 5.1. oxidisers 44
Significant Hazards 44
Required Controls 44

Emergency Information 45
Safe Method of Use for Class 6.1, Acute Toxicity 46
Significant Hazards 46
Required Controls 46
Storage 46
Disposal 47
Emergency Information 47
Safe Method of Use for Sub-classes 6.3 to 6.5, Irritants and Sensitisers 48
Significant Hazards 48
Required Controls 48
Emergency Information 49
Safe Method of Use for Sub-classes 6.7 to 6.9, Chronic Toxicity 51
Significant Hazards 51
Required Controls 51
Emergency Information 53
Safe Method of Use for Class 8 Corrosives 54
Significant Hazards 54
Required Controls 54
Emergency Information 55
Appendix 1. Maximum total quantities of hazardous substances that may be stored in schools 57
Appendix 2. Substances allowed to be used in schools (*MOE-allowable*) 60
Classification 60
Appendix 3. Specific substances prohibited for use in schools (*MOE-forbidden)* 71
Appendix 4: Substances and materials incompatible with class 2, 3, and 4 substances 72
Appendix 5: UN Labels & GHS Pictograms 74
Examples of UN labels and GHS pictograms: 74
Appendix 6: Disposal 77
Cross Reference with the Hazardous Substances (Exempt Laboratories) Regulations 2001 79
References 80
New Zealand Government Publications 80
Standards 80
Codes and Regulations 80
Other Sources 81

Summary

This code provides practical guidance on how schools should comply with the Hazardous Substances and New Organisms Act and the Exempt Laboratory Regulations.

The code applies only to the small-scale use of hazardous substances in teaching or research.

The scope of the code and definitions are given in Section 1.

Section 2 discusses the management of laboratories. The key requirements are that:

- Each school must appoint one (or more) member(s) of staff to be a "laboratory manager" who is in charge of hazardous substances in the laboratory areas of the school. The laboratory manager must be suitably qualified and the appointment must be in writing.
- Parts of this role ***may*** be delegated to named individuals, for example other teaching staff are in charge of hazardous substances used in their classes; laboratory technicians ***may*** be in charge of keeping an inventory.
- Examples of role descriptions are given in boxed sections within the text. The examples in the text ***may*** be edited to suit particular schools.

Section 3 lists procedures that schools ***shall*** adopt to ensure:

- Security of hazardous substances. Laboratory and Prep Rooms ***shall*** be locked when not supervised.
- Suitable signs ***shall*** be erected at the entrance to the laboratory and to inform emergency services of the type of hazard contained within particular areas.

Section 4 stipulates steps that ***should*** be taken to ensure the safety of teachers and students when hazardous substances are used for teaching. For example:

- Some classes of substances are forbidden for use in schools (S4.2).
- Some substances are forbidden for use in schools (Appendix 3).
- A method is given to assess the hazard of new substances.

Section 5 lists the operational requirements for handling hazardous substances. For example:

- Closed shoes and safety glasses ***shall*** be worn when handling corrosive substances.
- Flammable liquids ***shall*** be stored safely.

Section 6 gives broad guidelines for the safe handling of general classes of hazardous substance.

The appendices list technical information, an inventory of allowable substances and other reference material.

1. About this Code

1.1 Introduction

Why have a code of practice?

The Hazardous Substances and New Organisms (HSNO) Act controls the use, transportation storage and disposal of all hazardous substances in New Zealand. S33 of the Act provides that small scale use of hazardous substances for research and teaching is exempt from the provisions of the Act, provided the use occurs in a laboratory that meets the prescribed requirements. The Ministry of Education clearly states[2], "This exemption applies to school laboratories. Such laboratories, however, must comply with the "Hazardous Substances (Exempt Laboratories) Regulations 2001."

These prescribed requirements are set out in the Hazardous Substances (Exempt Laboratory) Regulations 2001. These regulations further refer to other regulations (for example Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001. Although schools use limited quantities of hazardous substances for teaching, school personnel are unlikely to have the resources to independently comply with the provisions of the Act and Regulations.

How do schools find the prescribed requirements?

S78 of the HSNO Act provides that ERMA ***may*** approve Codes of Practice as a method of implementing any specified requirement included in the regulations. Codes of Practice ***should*** provide clear guidance for different users, and compliance with an approved Code of Practice ***may*** be used as a defence to prosecution for a breach of the HSNO Act or Regulations (section 117(3) of the HSNO Act).

The intention of this Code of Practice is to provide practical guidance on the steps schools ***should*** take in order to comply with relevant sections of the HSNO Act and Regulations. Schools ***should*** work through the Code of Practice and ensure that policies and procedures conform to the relevant sections of the code. A school that conforms with the Code of Practice ***shall*** be deemed to meet the requirements of part (a) of section 33 of the HSNO Act, and be in compliance with the Hazardous Substances (Exempt Laboratories) Regulations 2001.

Schools are not obliged to follow this Code of Practice. However, if a school board chooses not to adopt the code of practice, then the board ***shall*** ensure that management of hazardous substances fully complies with all sections of Hazardous Substances and New Organisms Act and Regulations. Methods of compliance ***should*** be documented.

[2] "The implications of the HSNO Act for property aspects of school laboratories." Ministry of Education 03 April 2006.

Formal sections of the Code of Practice are indicated by the use of serif font (Times New Roman). The degree of conformance required is indicated by the words, ***shall***, ***should*** and ***may***, and are defined in Section 1.3. Means of conforming to formal statements are given either:
– as notes in italics below the formal statement, or
– in boxed sections written in san serif font (Arial).

Schools are encouraged to use these sections by incorporating the boxed sections within school procedures and policies, adapting the language to suit the particular circumstances. An electronic version of the Code ***may*** be downloaded from the NZASE (*www.nzase.org.nz*) or the ERMA New Zealand website (www.ermanz.govt.nz).

The Code of Practice is not a teaching or science-safety manual. The Code of Practice is limited to compliance with the HSNO Act and Regulations and does not cover other potential hazards such as radioactivity, biohazards or health issues. As such, schools ***should*** use the information in the Code of Practice in conjunction with other documentation. For example Safety in Science. 2000: Ministry of Education, Wellington.

Most schools use a limited range of hazardous substances in small quantities. This simplifies the compliance and operational management issues. For example, schools ***should*** not store or use more than 10 Litres in total of class 3.1A flammable liquids. This is below the quantity that activates hazardous substance location requirements[3]. This does not imply that schools are exempt from controls; flammable liquids ***shall*** be stored in flammable liquids cabinets or appropriate dangerous goods stores that meet building regulations. Nor does the exemption preclude seeking technical advice from ERMA approved test certifiers. The limitations on quantity do mean that a location certificate is not required for small quantities of hazardous substance. The maximum quantities of each class of hazardous substance that ***may*** be stored in schools are listed in Appendix 1.

An inventory of allowable substances is given in Appendix 2. Schools do not have to purchase these substances, but ***may*** do so if the substances are required for teaching purposes, provided that the substances are handled in accordance with safe methods of use.

Where classes or hazard categories are referred to in this Code of Practice, they refer to the HSNO classification system[4] unless another classification system is specified.

This document ***shall*** be updated or amended as necessary. If amendments are considered necessary please advise the New Zealand Association of Science Educators which will coordinate the process for re-submission of the Code of Practice for approval by ERMA.

[3] As listed in the Hazardous Substances (Classes 1 to 5 Controls) 2001, as amended in 2004, (Table 4 of Schedule 3). See also Appendix 1.
[4] Summary User Guide to HSNO Thresholds and Classifications ER-UG--0-4-1- 6-01 may be downloaded from www.ermanz.govt.nz

1.2 Scope and Application

This Code of Practice is applicable to the use of hazardous substances in all New Zealand schools using hazardous substances for the teaching of science, technology or related subjects.

There are two categories of substances that ***may*** be used in schools exempt laboratories:

- ERMA-approved hazardous substances. These substances are listed in Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice, New Zealand Gazettes Number 35[5] (March 2004) 128 (October 2004), 72 (June 2006) or subsequent transfer notices.
- ERMA-unapproved hazardous substances.

The word *approved* has a different meaning from the amalgamated list of hazardous substances allowed by the Ministry of Education for use in schools (Appendix 2). Not all *ERMA-approved* substances ***may*** be used in schools, and some substances that ***may*** be used, are not *approved* by ERMA.

For clarity:

Approved (in italics) substances ***shall*** mean gazetted for use in New Zealand by ERMA.

Where a substance is forbidden for use in schools by the Ministry of Education, it will be referred to as a *MOE-forbidden* substance.

Where the substance is not forbidden for use in schools, then the substance will be referred to as a *MOE-allowable* substance.

This Code of Practice does NOT apply:

a) To the storage and use of fuels or agricultural chemicals for grounds maintenance or schools operational purposes other than teaching.

b) To any hazardous substance produced for sale, or used to produce any substance for sale.

c) To any new substance created as part of original research within the school laboratory.

d) If the use creates or involves a hazardous substance for which any application for approval has been declined for approval by the Environmental Risk Management Authority (ERMA).

e) If the hazardous substance is being evaluated in field trials. Field trials are considered to be research in containment and are subject to section 31 of the HSNO Act.

[5] All NZ Gazettes are available in pdf format from www.dia.govt.nz. Further details are listed in the references.

f) If the use of the substance creates or involves a persistent organic pollutant (as defined by the Hazardous Substances and New Organisms (Stockholm Convention) Amendment Act 2003).

The definition of a laboratory (S1.3) is given a very broad meaning by the inclusion of the word "structure". Any structure that:

a) Can meet the design requirements for a laboratory.
b) Is used for teaching.
c) Uses hazardous substances.
d) Can be managed as an exempt laboratory.

Therefore schools can use this code to organise the management of hazardous substances in art or technology rooms, horticulture classes, farm pens or wherever else teaching uses small quantities of hazardous substance.

1.3 Definitions

Act – means the Hazardous Substances and New Organisms (HSNO) Act 1996, referred to as "the Act" in this document.

Apparatus – Apparatus and equipment can be used interchangeably.

Approved hazardous substance – means a hazardous substance that has been granted an approval for release by the Environmental Risk Management Authority, and includes substances approved under Part V or Part 6A of the Act, and substances granted deemed approvals via the transfer process.

Authorised person in relation to an Exempt Laboratory – means any person authorised to enter the laboratory by the Laboratory Manager.

Bunding – Small retaining wall to contain liquid spills.

Classification System – means the classification system used in the Hazardous Substances (Classification) Regulations 2001, unless otherwise indicated.

Documentation – documentation ***shall*** be accorded its widest interpretation and includes electronic records.

Emergency response plan – means an emergency response plan referred to in Regulation 16 of the Hazardous Substances (Exempt Laboratories) Regulations 2001. These requirements are covered in section 5.3 of this Code of Practice entitled Emergency Response Plans.

Entrance in relation to a HSNO Laboratory Facility or Laboratory – means a door, gate, or passage that is a point of entry into the HSNO Laboratory Facility or Laboratory.

Equipment – Apparatus and equipment can be used interchangeably.

ERMA– means the Environmental Risk Management Authority.

Exempt laboratory – means a laboratory that meets the requirements of the Hazardous Substances (Exempt Laboratories) Regulations 2001. These facilities are generally a building (or a part thereof) that contains multiple laboratory rooms.

Fire Cell – Any space within a building, including a group of contiguous spaces on the same or different levels, which is enclosed by any combination of fire separations (as defined in clause A2 of the building code), external walls, roofs, and floors. A prep room and laboratory together would normally be one fire cell.

General Knowledge – means a knowledge of the hazards associated with each HSNO class of substance and general precautions required to mitigate these hazards.

General Technical Knowledge – means sufficient knowledge to carry out duties/responsibilities specified in this code of practice.

GHS – means the Globally Harmonized System for the Classification and Labelling of Chemicals.

Hazardous Substance – means, unless expressly provided otherwise by regulations, any substance with one or more of the following intrinsic properties:

- Explosiveness
- Flammability
- A capacity to oxidise
- Corrosiveness
- Toxicity (including chronic toxicity)
- Ecotoxicity, with or without bioaccumulation; or
- which on contact with air or water (other than air or water where the temperature or pressure has been artificially increased or decreased) generates a substance with any one or more of the properties specified in this definition.

The Hazardous Substances (Minimum Degrees of Hazard) Regulations 2001 define what constitutes a hazardous substance for each hazardous property. There is a level below which a substance is not considered hazardous under this legislation.
*Note: Dilute hazardous substances **may** no longer meet the threshold for the particular hazardous property, that is, are no longer hazardous.*

Laboratory – means a vehicle, room, building, or any other structure set aside for teaching science and equipped for scientific experiments or research.

Laboratory Manager – is responsible for one or more laboratories (rooms) and has specified duties and functions in respect to this Code of Practice.

Locking – means that when a laboratory is not supervised a person can only enter the laboratory by using a tool, a key, or any other device used to operate a lock. This would include magnetic swipe cards and combination locks (including the push button type).

MOE-allowable – Any hazardous substance that is on the ERMA *approved* or *unapproved* list but is not on the MOE-forbidden list of specific substances or forbidden classes.

MOE-forbidden – Any hazardous substance listed in Section 5.1 of Safety In Science, 2000: Ministry of Education or that meets any of the criteria listed in 4.2.2 of this code, and includes the specific substances prohibited for use in schools listed in Appendix 3.

May – implies a discretionary statement.

Person in Charge – means a person delegated by a Laboratory Manager to have control and responsibility for hazardous substances in part or all of an exempt laboratory.

Place – place is not defined in the Act or Regulations except that it includes any vehicle, ship, aircraft or other means of transport. In the context of this Code of Practice, a place can range from a specific point in a room, to a group of rooms.

Pooling substance – means a hazardous substance that is in fluid form or is likely to liquefy in a fire.

Requirements for disposal, in relation to a Hazardous Substance– means the relevant disposal controls described in this Code of Practice.

Safe Method of Use (SMU) – a method of use that meets the requirements of Section 6.

Safety Data Sheets (SDS) – Material Safety Data Sheets (MSDS).

School – means any place approved by the Ministry of Education for the teaching of science.

Secondary containment system, in relation to a place;

- means a system or systems in which pooling substances *will* be contained if they escape from the container or containers in which they are being held; and

- from which they can, subject to unavoidable wastage, be recovered.

Secondary container – means any container into which any substance is poured, for example a class set of dilute acid.

Shall – implies a mandatory statement.

Should –implies an advisory statement.

Small container – means:

- a container in which a Hazardous Substance is being held before or during use in a laboratory, in quantities typically used for that purpose; and

- includes any laboratory equipment in which any Hazardous Substance remains after that use.

Storage cabinet – means a cabinet or cupboard, with close fitting door(s), intended for the storage of Hazardous Substances. Specific guidance on storage cabinet construction can be obtained from AS/NZS 2982 'Laboratory design and construction or AS 1940 'The storage and handling of flammable and combustible liquids'.
*Note: Schools are not expected to retain these standards but **should** purchase cabinets meeting the standards. A critical part of the design is that the cabinets have double walls and containment for spilt liquids.*

Substance means-

- Any element, defined mixture of elements, compounds, or defined mixture of compounds, either naturally occurring or produced synthetically, or any mixtures thereof;

- any isotope, allotrope, isomer, congener, radical, or ion of an element or compound which has been declared by the Authority, by notice in the Gazette, to be a different substance from that element or compound;

- any mixtures or combinations of any of the above;

- any manufactured article containing, incorporating, or including any Hazardous Substance with explosive properties.

Teacher – has the normal common-sense meaning

Teacher in Charge – means a teacher authorised by a Laboratory Manager to use hazardous substances to instruct students.

Threshold – means a level of hazardous property, for example flash point, pH, toxicity used to define the category for any hazardous class. (See ERMA Summary Guide to Hazardous Substances ER-UG-04-1).

Total pooling potential, in relation to a place, means the aggregate quantity of all pooling substances held in the place.

Unapproved hazardous substance – is a substance that does not have a HSNO approval, i.e. it has not been approved by the Environmental Risk Management Authority for (general) use in New Zealand. However, such substances may be imported, manufactured or used by a laboratory that complies with the Exempt Laboratory Regulations, as provided by s33 of the HSNO Act.

2. Management of Laboratories

When a school uses hazardous substances in one or more areas of the school, for the purposes of teaching, these areas ***shall be*** classified as laboratories.

2.1 Appointment of Laboratory Managers by Board of Trustees/Governors

a) The School Board of Trustees/Governors ***shall*** designate one or more, suitably qualified (see section 2.3), member(s) of staff to be Laboratory Manager(s).

b) The terms and conditions of the designation ***shall*** be recorded in writing, and specify the areas under the control of the Laboratory Manager(s).

2.2 Laboratory Manager's responsibilities

a) A Laboratory Manager (boxed section 2.1) ***shall*** have overall responsibility for the management of all Hazardous Substances contained within the designated area.

b) ***may*** nominate any other suitably-qualified, appropriate person (technicians, other teachers, relievers) to be "in charge" in his or her absence (boxed sections 2.2 and 2.3).
E*xamples:*
*- One person **may** be nominated to be in charge of the DG store.*
*- A reliever with suitable qualifications **may** be in charge of a laboratory*.

c) ***may*** delegate some of their functions to "persons in charge" of a laboratory, but cannot delegate their responsibility.
The teacher in the room is in charge of all hazardous substances for the teaching period.

d) ***shall*** ensure that the hazardous substances in the laboratory are under the direct supervision of a nominated person in charge whenever any person is in the designated area.

e) ***shall*** ensure that hazardous substances in the designated area are secure at all times that the area is not directly supervised by a Laboratory Manager or Person in Charge.
Examples:
*If a room is to be used by an extramural class, without the direct supervision of a nominated person, then all hazardous substances **shall** be secured.*
*If a class is to be supervised by a relieving teacher who does not have the appropriate skill and knowledge requirements, then all hazardous substances **shall** be secured.*

f) ***shall*** ensure that the provisions of this Code of Practice are adhered to. This includes the organization or delegation of emergency planning, inventory control and the implementation of safe methods of use for hazardous substances.

g) ***shall*** ensure that approved and unapproved hazardous substances are handled and stored in the way required under the Hazardous Substances Control (Classes 1 to 5 Controls) and (Classes 6, 8 and 9 Controls) Regulations (see section 4 and 5).
*For example, flammable liquids **shall** not be stored adjacent to oxidisers.*

h) ***shall*** ensure that appropriate Protective Equipment is available, and that such equipment is maintained (see section 5).

i) ***shall*** ensure that information on the use and maintenance of equipment, as required in Section 5 is available to all persons using hazardous substances.

j) ***shall*** ensure that procedures for the disposal of Hazardous Substances are included in the Laboratory Safety/Procedures manual or other appropriate documentation. The procedures ***shall*** comply with requirements specified in Appendix 6 of this code.

2.3 Skill and Knowledge Requirements for Laboratory Manager

A person designated as a Laboratory Manager ***shall*** have –

a) a general technical knowledge[6] of the physical and chemical properties of all substances used in the Laboratory for which they are responsible;

b) a general knowledge of the precautions for handling those Hazardous Substances;

c) a general knowledge of the disposal of those substances in accordance with this Code of Practice;

d) a general knowledge of the most recent version of this code of practice.
Laboratory Managers or designated persons should be familiar with this code of practice.

e) specific knowledge of emergency actions for their laboratory;

f) specific knowledge of the correct operation and maintenance of equipment using hazardous substances;

g) specific knowledge of where to find additional information that might be required to support general knowledge requirements.
A Safe Method of Use that meets the requirements specified in Section 6 of this code, for the categories of hazardous substances they are handling is sufficient information.

2.4 Skill and knowledge requirements for persons in charge

A person who is nominated to be "in charge" of a laboratory by a Laboratory Manager

a) ***shall*** assume the responsibilities of the Laboratory Manager during the period they are in charge.

b) A person designated as a "person in charge" ***shall*** have all the knowledge requirements of a Laboratory Manager, for the specific teaching session or laboratory under their charge.

c) If a relieving teacher is required to handle hazardous substances, then the laboratory manager ***shall*** ensure that the relieving teacher has the appropriate skill and knowledge to handle the hazardous substances.

[6] A New Zealand Certificate of Science Level 5, National Diploma in Science Level 6, Science degree or equivalent qualification that has included papers on physical, chemical and toxic properties of the substances being handled, or at least five years relevant laboratory experience, shall be regarded as sufficient general knowledge.

Boxed Section 2.1. Example Role Description for School Laboratory Manager

Reporting to:

Principal (copy to Board of Trustees, Health and Safety Committee).

Scope of Role:

1. Designated person as manager of exempt laboratory under S33 of Hazardous Substances and New Organisms Act.
2. To co-ordinate hazardous substances management, (safe work policies and procedures) in a XXXX science laboratories
3. Delegate responsibility for laboratory management when Laboratory Manager is absent from the laboratory.

Responsibilities

1 Take all practicable steps to implement Exempt Laboratories Regulations.

2 Ensure that a classified inventory is kept of hazardous substances stored in the laboratory.

3 Ensure that the hazardous properties of any new substances brought into the school are checked.

4 Ensure that all containers of hazardous substances are labelled to show the identity and concentration of the substance, and a hazardous substance icon.

5 Ensure information on emergency procedures and paper copies of Safety Data Sheets for Category A and B hazardous-substances are kept in a laboratory folder, which is readily available to all persons in the laboratory within 10 seconds.

6 Ensure that persons in the laboratory are able to access hazardous-substance safety data sheets for other Category hazardous-substances via the Internet or electronic format (if available) within reasonable time.

7 Ensure that all handling of hazardous substances complies with Class 1-5 and Class 6-9 control regulations.

8 Ensure that signs warning of the nature of hazards are posted at the entry of the laboratory that warn that only authorized persons are permitted inside the laboratory.

9 Ensure that hazardous substances are appropriately handled and stored in the laboratory. In particular:

– Flammable goods shall be stored within a flammable goods cabinet.
– Incompatible chemicals shall be segregated.
– Appropriate Personal Protective Equipment is available (e.g. gloves safety glasses, lab coats).
– Fume hoods shall not be used for storage.
– Appropriate first aid material is available within the laboratory.
– All containers of hazardous substances are labelled with name and concentration of the substance and a class icon indicating the nature of the hazard.

10 Ensure that procedures for disposal of hazardous substances comply with Hazardous Substances (Disposal) Regulations 2001.

11 Ensure visitors and contractors to the laboratory are aware of the hazardous substances in the laboratory and the emergency procedures to be followed.

12 Introduce new staff to the laboratory and the safety measures within the laboratory on their first day at work.

13 Ensure that all persons handling hazardous substances within the exempt laboratory have appropriate training.

2.5 Duties of Persons Handling Hazardous Substances

a) All persons handling hazardous substances ***shall*** comply with the requirements specified in this Code of Practice.
*In particular, persons **should** apply the Safe Methods of Use in Section 6.*

b) Before introducing any new substance into a laboratory, the person intending to introduce the substance ***shall*** determine if the substance is hazardous and the Safe Methods of Use, Laboratory Safety Procedures or the Emergency Response Plan are appropriate to the substance.
See section 4 on how to check whether a substance is hazardous.

c) If the substance is hazardous and the existing Safe Method of Use is not appropriate to control the substance, that person ***shall*** inform the Laboratory Manager and agree a safe method of use for that substance.
*The SMU **should** be in writing and signed off by the laboratory manager. A copy of email or requisition/order form can be considered a form of written notification*

d) Prior to using any hazardous substance, the person handling the hazardous substance ***shall*** check actions required under the Laboratory's Emergency Response Plan in the event of an accident or accidental exposure to the substance.

Boxed Section 2.2. Example Role for School Laboratory Technician

Reporting to:

Head of Department

Scope of Role:

Designated person in charge of prep-room in Block XX.

Responsibilities

1 Keep prep room locked in the absence of teaching or technical staff.

2 Keep an inventory of hazardous substances laboratory XX and the dry store.

3 Keep paper copies of Safety Data Sheets for Category A and B hazardous substances in a laboratory folder, so that persons are able to access the information.

4 Ensure that:
– Flammable substances are stored within a flammable goods cabinet at the end of each day.
– Incompatible chemicals are segregated.
– That there are enough protective gloves, safety glasses, and other personal protective equipment for the next week's work and the eye wash bottle water is full and is changed at the beginning each week.
– The fume hood is cleared of storage.

5 Ensure that procedures for disposal of hazardous substances comply with Hazardous Substances (Disposal) Regulations 2001.

6 Report all accidents to the Laboratory Manager.

7 Conduct regular safety checks at appropriate intervals on significant hazards.

8 Report maintenance requirements to the Head of Department.

Boxed Section 2.3. Example Role Teacher in charge of course work using hazardous substances.

Reporting to:

Head of Department

Scope of Role:

Designated person in charge of year 13 chemistry projects.

Responsibilities

1 Check the hazardous properties for chemicals to be used by students.

2 Ensure that the procedures proposed are appropriate to the levels of skill of the students.

3 Ensure that the students and other users have read the Safe Methods of Use for the class of substances being used.

4 Ensure that appropriate safety equipment is available and used.
For example, the appropriate disposable gloves.

5 Ensure that the students and other users know where paper copies of Safety Data Sheets are kept and understand the information in the Safety Data Sheets.

6 Ensure that procedures for disposal of hazardous substances comply with Hazardous Substances (Disposal) Regulations 2001.

7 Report all accidents to the Principal.

3. Security

3.1 Access

a) The Laboratory Manager (or person in charge) of a laboratory ***shall*** ensure that hazardous substances in the laboratory are secured at all times when the laboratory is not directly supervised by a laboratory manager or person in charge (section 2.2(e) above) by:

   i. locking access to the room or area being used as a laboratory or containing hazardous substances; or

   ii. securing hazardous substances within a sub-area (e.g. prep room) or secure cabinet (e.g. lockable flammable liquids or corrosives cabinet.)
   *Note: This requires that hazardous substances, for example concentrated acids, **shall not** be left out in an unsecured area.*
   *In general, laboratories **should** be secured when not under direct supervision of a person in charge or authorised person.*

b) Persons (such as visitors, cleaners, maintenance workers) ***may*** enter the laboratory without direct supervision provided:

   i. all such persons are made aware of the hazards associated with the hazardous substances that are in the area where they are to carry out their functions; and

   ii. they have been instructed in and understand the emergency procedures to follow; and

   iii. they are given written approval and instructions on the actions allowable within the laboratory.
   *For example, the written instruction to the cleaners **may** state that they **should** empty waste paper bins and clean the floor in one room, but are forbidden from cleaning the prep room.*

   iv. arrangements have been made to isolate such persons from the hazardous substances at the area.
   For example, by locking hazardous substances in the flammable liquids, corrosives cabinet or prep room.

c) Students ***shall*** not be present in a laboratory containing hazardous substances unless under direct supervision of a person in charge.

3.2 Signage

The Laboratory Manager ***shall*** ensure that all entrances to an area designated as a laboratory *are* marked with a sign prohibiting unauthorised access and indicating the nature of hazards within the laboratory.

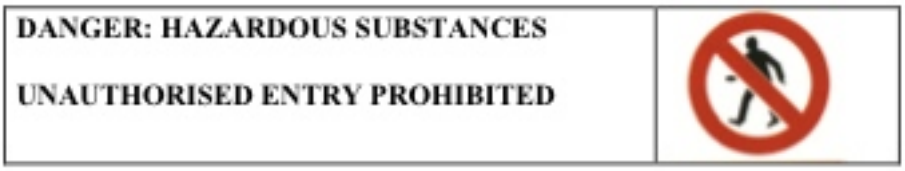
Explanatory Note

Signage is required by several pieces of legislation.

- *The Hazardous Substances (Identification) Regulations (S52) require specific signs where total quantity exceeds quantities specified in Schedule 3 of the regulations. In most schools, the quantities of hazardous substances are unlikely to meet quantity limits specified in Schedule 3 of the Hazardous substances (Identification) Regulations 2001.*
- *Hazardous substances (Exempt Laboratory) Regulations (S8).*
  "Entry to a laboratory … must be clearly marked by signs that
  (a) warn that only authorised persons are permitted inside the laboratory
  (b) meet the requirements for comprehensibility and clarity of signage specified in Part 3 of the hazardous substances (Identification) Regulations 2001"
- *Health and Safety in Employment Act 1992 (S12 and S16) requires information for employees generally and requires persons in control of workplace to identify significant hazards. Signage is an acceptable form of providing immediate information for significant hazards.*

Therefore, this code suggests that schools follow the following scheme:

- *At the entrance to any discrete building, facility or floor that is used as an exempt laboratory. A sign consistent with Appendix N of ERMA Approved COP 2-1, Signage for Premises Storing Hazardous Substances and Dangerous Goods.*



- *At the entrance to any laboratory or containment areas containing hazardous substances or significant hazards, hazard icons indicating significant hazards within the laboratory e.g. laser, flammable liquids, UV light. Examples of acceptable signs are given in Appendix 5.*
- *At the entrance to any external Dangerous Goods Store, a HAZCHEM code by agreement with the local fire brigade (usually 2WE).*

- *On storage areas such as cupboards, flammable liquids cabinets or fridges containing hazardous substances:*
    i) *Hazardous substance icons indicating the nature of the hazards contained.*
    ii) *Any restrictions on hazardous substances contained within (e.g. no flammable liquids, no food for human consumption).*
- *In suitable positions within laboratory areas, or as agreed as part of an approved Fire Evacuation Plan:*
    i) *Exit signs*
    ii) *Emergency Alarms*
    iii) *Names of Fire Wardens*
    iv) *Emergency Actions*
- *Labels on Secondary Containers of hazardous substances*

4 Use of hazardous substances in teaching

For any teaching that requires the use of any substance, the teacher in charge ***shall*** take all practicable steps to establish the hazardous properties (if any) and classification of the substance.

To decide if a substance **may** be used in a school, follow the key in the boxed section 4.1

There are two general cases:

- Substances that are listed as MOE-allowable or MOE-forbidden in this code (Section 4.1 below).
- Substances that are not listed as MOE-allowable or MOE-forbidden in this code (Section 4.2 below).

4.1 Substances that are listed in this code of practice as MOE-allowable or MOE-forbidden for use in schools

a) Substances that are listed in Appendix 2 ***may*** be used in schools with appropriate precautions.

b) Substances of the classes listed in Table 4.1 (page 26) ***shall not*** be used or stored in schools unless they are listed in Appendix 2.

c) Substances listed in Appendix 3 ***shall not*** be used or stored in schools.

d) If the substance is classified as a hazardous substance under Hazardous Substance (Classification) Regulations 2001 *(there is a classification in column 3 of Appendix 2*) then the teacher in charge ***shall*** ensure that the substance is handled and stored in a manner which meets the applicable provisions of the Hazardous Substances (Classes 1 to 5 Controls) 2001 and Hazardous Substances (Class 6, 8, and 9 Controls) Regulations 2001.

An acceptable method of meeting these controls is to ensure that the substances are handled and stored in a way that meet the provisions of the Safe Methods of Use contained in Section 6 of this code.

Note that more than one Safe Method of Use ***should*** *be consulted for some substances. For example, Acetic Acid HSNO codes are* 3.1B 6.1D 6.9B 8.1A 8.2B 8.3A 9.1D 9.3C *in other words, flammable liquid, toxic substance, skin and eye corrosive, and ecotoxin. The most hazardous properties are flammability (during storage) and as a skin and eye corrosive in handling.*

e) The teacher in charge ***shall*** ensure that secondary containers of the substance prepared for class use are labelled with:
– the identity of the hazardous substance.
– the concentration of the hazardous substance.
– an icon warning of the hazardous properties of the substance being used (see Section 5.2(f) for guidance on labelling).

See example under section 5.1.4. An acceptable method of labelling small containers ***shall*** *be to affix a postage-stamp size icon (see Appendix 5). If the container is smaller than this, e.g. test tube, a warning* ***shall*** *be fixed to the test tube rack or holding tray.*

Boxed Section 4.1: Decision key to decide if substances can be used in schools

1 Is the substance on the allowable list in Table 1 Appendix 2?	Yes	Check the safe method of use for that class of substance.
	No	Go to 2.
2. Is the substance on the forbidden list Appendix 3?	Yes	It is forbidden to use the substance in schools.
	No	Go to 3.
3 Is the substance on the ERMA list of transferred substances? Read boxed section 4.2.	Yes	Follow box 4.2, and write down Classification. Go to 4.
	No	Follow box 4.3. and print off safety data sheet. Go to 4
4. Is the substance listed in any of the Classes in Table 4.1?	Yes	It is forbidden to use the substance in schools.
	No	Classify the substance by completing the questionnaire in section 4.2.3.

4.2 Substances that are not on the list of MOE-allowed or MOE-forbidden substances for use in schools

If a substance is not listed as an allowed or forbidden hazardous substance (Appendices 2 and 3), the teacher in charge ***shall*** take all practicable steps to check the hazardous properties of the substance before the substance is procured and comply with any requirements stipulated by the safe method of use for *MOE-allowed* hazardous substances with similar hazardous properties.

There are two general cases:

- *ERMA-approved* means a hazardous substance that has been granted an approval for release by the Environmental Risk Management Authority, and includes substances approved under Part V or Part 6A of the Act, and substances granted deemed approvals via the transfer process.
- *ERMA-unapproved* means a substance that does not have a HSNO approval, i.e. it has not been approved by the Environmental Risk Management Authority for (general) use in New Zealand. However, such substances may be imported, manufactured or used by a laboratory that complies with the Exempt Laboratory Regulations, as provided by s33 of the HSNO Act, provided that the substance is not on the MOE-forbidden list of substances.

4.2.1 ERMA-approved Substances

a) In the first instance, the teacher ***shall*** check to see if the substance has been classified by ERMA NZ under the Hazardous Substance (Classification) Regulations 2001. *Use Box 4.1 on page 22.*

b) If the substance is approved by ERMA for use in New Zealand, but any of the classifications match the classification listed in Table 4.1 on page 26, then the substance ***shall*** not be used in schools.

c) If the substance is approved by ERMA for use in New Zealand and the classification is not listed in Table 4.2 below, then the teacher in charge ***shall*** ensure that the substance is handled and stored in the same way as any substance of similar classification on the list of chemicals MOE-approved for use in schools.
An acceptable method of meeting these controls is to ensure that the substances are handled and stored in a way that meet the provisions of the Safe Methods of Use contained in this code (Section 6).

Box Section 4.2: How to check if a substance is an ERMA-approved hazardous substance.

1 This information is available from ERMA New Zealand Register of approved hazardous substances at www.ermanz.govt.nz/search/registers.html. [Note: The substance1.cfm link redirects to registers.html.]

2. For example, sodium nitrite.
(i) Go to http://www.ermanz.govt.nz/search/registers.html.
(ii) Enter sodium nitrite in the hazardous substance box.
(iii) Click on the Hazardous Substance Button at the bottom of the page.
(iv) Press search.

3. Search results page.
Click on “Nitrous Acid, sodium salt”.

4. Nitrous Acid Sodium Salt page:
Click on “Controls Word” or “Controls PDF”.

5. This gives you the information page (HSR001286), which includes the CAS number, the HSNO classification, if approved or not. This document will tell you that sodium nitrite is an ERMA approved substance and has been classified as 5.1.1C, 6.1C, 6.4A, 6.6B, 6.9B, 9.1A, and 9.3B.

6. Check this classification against the summary table in ER-UG-04-1.

   This will show that sodium nitrite is a mild oxidizer, an acute toxin, eye irritant, mutagen, suspected human target organ toxicant, aquatic ecotoxin and terrestrial vertebrate toxin.

7. Use the Safe Method of Use for Acute and Chronic toxins, and ensure that you dispose of the surplus substance appropriately.

4.2.2 ERMA-unapproved Substances

a) If the substance is not yet classified under the Hazardous Substance (Classification) Regulations 2001, and the substance is not on the MOE list of substances approved for use in schools (Appendix 3), then the teacher in charge ***shall*** determine the likely classification under HSNO.
An acceptable method of determining the likely classification is to refer to a manufacturer’s or publicly available Safety Data Sheets (SDS) and compare the manufacturer's specifications of hazardous properties data with the Threshold Limits specified under the Hazardous Substance (Classification) Regulations 2001. This information can be found in Summary User Guide to HSNO Thresholds and Classifications ER-UG-0-4-1 6-01 which can be downloaded from www.ermanz.govt.nz.
See Boxed Section 4.4: Hazard assessment process

b) The teacher in charge ***shall*** keep a paper copy of the SDS for the substance and hazard assessment in the laboratory or teaching folder. Any substance not on the list of chemicals allowable for use in schools, which would, if it were classified, meet the thresholds for the sub-classes and categories in Table 4.1 ***shall*** be forbidden for use in schools.

c) For every substance that is not on the allowable list but ***may*** be used in schools, the teacher in charge ***shall*** ensure that the substance is handled and stored in the way in which a similar quantity of an allowable hazardous substance with similar hazardous properties is required to be handled under the Hazardous Substances (Classes 1 to 5 Controls) 2001 and Hazardous Substances (Classes 6, 8, and 9) Controls Regulations 2001.
An acceptable method of meeting these controls is to ensure that the substances are handled and stored in a way that meets the provisions of the Safe Methods of Use for the class of substance that would apply if the substance were classified. In other words, if a teacher wishes to use a substance that is not on the allowable list, they ***should*** *classify the substance and ensure it is handled in a similar way to any other substance of the same classification.*

Box Section 4.3: How to find a safety data sheet on the internet.

Safety Data Sheets (SDS) should be available from your supplier. If you have difficulty in obtaining a SDS, safety information is available on the net.
For example, go to the International Labour Organisation (ILO) safety card site.
http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/index.htm
If you cannot find a safety card for a substance, go to the Safety Information and Resources Incorporated (SIRI) at:
http://www.hazard.com/msds/index.php.

You will also find information on the meaning of Risk and Safety Codes, Packing Group, UN Numbers and CAS numbers at SIRI and many other sites.

Table 4.1: HSNO Sub-classes and Categories of Hazardous substance that are forbidden from use in schools unless specifically listed in Appendix 2 as MOE-allowable hazardous substances.

Sub Class	Description	Categories
1.1	Mass explosion	all
1.2	Projection explosion	all
1.3	Fire and Minor blast	all
2.1.2	Flammable aerosol	all
3.1	Flammable liquid	A
3.2	Liquid Desensitised Explosive	all
4.1.2	Self Reactive	all
4.1.3	Solid Desensitised Explosive	all
4.2	Spontaneously combustible	A
4.3	Dangerous when wet	A
5.1.1	Liquid/solid oxidisers	A
5.1.2	Gas oxidisers	A
5.2	Organic Peroxide	A and B
6.1	Acutely Toxic	A
6.6	Mutagen	A
6.7	Carcinogen	A
6.8	Reproductive or Developmental toxicant	A
6.9	Target organ systemic toxicant	A
8.2	Skin Corrosive	A
8.3	Eye Corrosive	A

Reference: ERMA Summary User Guide to HSNO thresholds and Classifications of Hazardous Substances ER-UG-04-1 6-01

Boxed Section 4.4: Hazard Assessment Process

1 Obtain Safety Data Sheets from manufacturer or other reputable supplier.
2 Check the CAS number to ensure you are dealing with the right substance.
3 Complete the following table below.

Information Collection

Substance Name	
Substance CAS number	
Dangerous Goods Code	
Packing Group	
Risk Codes	
Safety Phrases	
Specific Warnings	
Occupational exposure limits	
Flash Point	
Physical Properties	
Boiling Point	

	Yes	No
Does the substance have explosive properties? DG 1	□	□
Is the flash point of the substance <23 ^{o}C and initial boiling point < 35 ^{o}C?	□	□
Is the substance a flammable solid (Class 4.1.1) packing group II?	□	□
Is the substance classified as a Dangerous Goods packing group I?	□	□
Is the pH of the substance less than 2 or greater than 11.5?	□	□
Is the substance listed with Risk Code 45 (***may*** cause cancer) or Risk Code 46 (***may*** cause heritable genetic damage)?	□	□
Does toxicity meet any of the criteria for category A toxic property listed on page 38 ER-UG-O4-1 6-01?	□	□

If the answer to any of these questions is Yes, then the substance is forbidden for use in schools.

Assessment completed by:.....

Date .....

Note:
*Having assessed the substance and found that the substance is not forbidden for use in schools, the teacher in charge **shall** assign a safe method of use for the substance.*

Note:
The classification of hazardous substances changes with dilution or modification. Table 4.2 shows different classifications for aqueous solutions of common corrosives.

In many cases it **may** not be possible to accurately classify dilute solutions of hazardous substances. Teachers and laboratory managers **should** use their professional judgment, and err on the side of caution.

Table 4.2. Examples of the classification for different aqueous solutions of corrosives

Sodium Hydroxide	Sulfuric Acid	Hydrochloric Acid	Nitric Acid
(>5%) 6.1D, 8.1A, 8.2B, 8.3A, 9.1D	(>10%) 6.1D, 6.7A, 6.9A, 8.1A, 8.2B, 8.3A, 9.1D	(>25%) 6.1B, 8.1A, 8.2B, 8.3A, 9.1D, 9.3C	(>70%) 5.1.1C, 6.1D, 6.9B, 8.1A, 8.2A, 8.3A, 9.1D
(2-5%) 6.1E, 8.1A, 8.2C, 8.3A	(5-10%) 6.1E, 6.9B, 8.1A, 8.2C, 8.3A, 9.1D	(10-25%) 6.1D, 8.1A, 8.2B, 8.3A, 9.3C	(10-70%) 6.1D, 6.9B, 8.1A, 8.2B, 8.3A
(0.5-2%) 6.1E, 6.3A, 6.4A	(0.5-5%) 6.1E, 6.3A, 6.4A, 8.1A, 9.1D	(2-10%) 6.1E, 8.1A, 8.2C, 8.3A	(0.5 - 10%) 6.1E, 6.9B, 8.1A, 8.2C, 8.3A
		(0.25 - 2%) 6.1E, 6.3A, 6.4A	

5 Operational Requirements

5.1 Basic Safety Rules

5.1.1 Students

a) Students ***shall*** be supervised at all times in any area where hazardous substances are available for use.

b) Students ***shall*** be dressed appropriately for hazardous substance being handled.

c) Non-slip footwear, appropriate to the risk, ***shall*** be worn where hazardous substances are handled. Footwear ***should*** prevent any part of the foot from contacting the floor during sudden or unusual movement. Open sandals ***shall*** not be permitted for any procedure that requires students to handle Class 8.2A or 8.2B substances. □
Notes:
*- Jandals **shall not** be permitted in laboratories.*
- Class 8.2A and 8.3A are skin and eye corrosives with a pH of less than 2 or greater than 11.5. This includes most concentrated acids.

d) Students ***shall not*** bring food or drink (including sipper bottles) into laboratories where hazardous substances are handled.

e) Students ***shall*** wear safety glasses at all times when handling hazardous substances.

f) Schools ***may*** include a requirement that students wear lab coats or aprons.

Boxed Section 5.1: Example Dress Code for Students.

Students undertaking science courses may, from time to time, handle hazardous substances such as dilute acids and solvents. To keep safe, students shall keep to the following dress code.

1. You must wear closed shoes or roman sandals with the heel strap correctly fitted. Jandals or shoes that allow any part of the foot to come into contact with the floor are forbidden.
2. Tops should cover all of the torso and be tucked into your trousers or skirt*. [Note: this will conflict with some schools' uniform, e.g. some have a fitted over-blouse, i.e. not tucked in.]*
3. Long hair must be tied back.
4. Head coverings are permitted but should be of cotton or flame resistant material. The head covering must be secured so that the material cannot come into contact with any part of the bench or science apparatus.
5. Your science teacher may require you to wear an apron or lab coat.
6. You must wear safety glasses at all times for any practical science activity.

5.1.2 Teaching Staff

a) Appropriate protective clothing and equipment ***shall*** be worn when handling hazardous substances of the following hazard classifications: 6.1A-6.1D, 6.3A, 6.4A, 6.5A/B, 6.6A/B, 6.7A/B, 6.8A-C, 6.9A/B, and class 2, 3, 4, 5 and 8 substances. However, it is recommended that eye protection and a laboratory coat, overalls or similar protection ***should*** be worn at all times when working in the laboratory.

b) Staff ***shall*** wear closed footwear when handling any Class 8.2A or 8.2B hazardous substance.

c) Protective clothing ***should*** only be worn in any area where hazardous substances are handled.

d) Laboratory coats ***shall*** be removed when exiting a laboratory area.

5.1.3 General Safety Rules

a) Food intended for human consumption ***shall not*** be consumed or stored where hazardous substances are handled.

b) Food or drink for human consumption ***shall not*** be stored in a refrigerator used to store laboratory materials.

c) Skin that has come into contact with hazardous substances (irrespective of the concentration) ***shall*** be washed.

d) Hands ***should*** be washed after handling hazardous substances and before leaving the area where the hazardous substances were handled or used.

5.2 Inventory, information, labelling and containers

a) A laboratory folder or file ***shall*** be kept in any area where hazardous substances are used. The folder ***shall*** keep information on the hazardous properties of the substances being used, safe methods of use, emergency information, and equipment required to handle the hazardous substance.

b) The folder ***shall*** be stored so that any person in the laboratory is able to access the information within three minutes.

c) The Laboratory Manager ***shall*** ensure that an accurate inventory is kept for of the location and quantity of all hazardous substances used in the laboratory.
An acceptable method is to keep a classified inventory, which is updated annually, for each location where hazardous substances are stored. A copy of any orders for hazardous substances ***should*** *be kept with the inventory or laboratory folder.*

d) A copy of this information ***should*** be held at a second suitable location outside of the laboratory.

e) Secondary containers of hazardous substances ***shall*** be labelled with:
– the identity of the substance,
– the concentration of the hazardous substance,
– and an icon indicating the hazardous properties of a substance (see Appendix 5 for guidance),

– and, if possible, an indication of the precautions required when handling the substance.

f) To avoid excessive labelling, follow the rules in ERMA NZ 2006: Labelling of Hazardous substances: Hazard and precautionary Information[7].
The following classifications[8] ***shall*** be labelled:
(i) Subclass 1.1, 1.2, 1.3 and 1.4; and
(ii) hazard classification 3.1A, 3.2A, 4.1.2A, 4.1.2.B, 4.1.3A, 4.2A, 5.1.1A, 5.1.2A. 5.2A, 5.2B, 6.1A, 6.1B, 6.1C, 8.2A, 8.3A, 9.1A, 9.2A, 9.3A and 9.4A
Although either Transport of Dangerous Goods or GHS Pictograms may be used, GHS pictograms are preferred.

An example of a container label is shown below.

Acetic Acid

2 mol.L^{-1}

Wear Safety Glasses

g) All containers of hazardous substance ***shall***:
– be able to contain the hazardous substance under normal operational conditions.
– be resistant to the hazardous substance.
– prevent entry by any organism capable of transporting the substance out of the laboratory.

5.3 Storage and handling

5.3.1 General Considerations

a) Quantities of hazardous substances in the laboratory **should** be kept to a minimum and ***shall*** **not** exceed the total quantities listed in Appendix 1.

b) The laboratory manager ***shall*** ensure that chemicals are segregated so that incompatible chemicals are separated (see Appendix 4 for list of incompatible classes).

7 http://www.ermanz.govt.nz/hs/groupstandards/standards/ss/hplabelling.pdf
8 Hazardous Substances (Exempt Laboratories) Regulations 2001 S10(3)(c). Note that class 1, 2.1.2A, 3.2A, 3.2B, 3.2C, 4.1.2A to G, 4.1.3A to C, 5.2A and 5.2B are forbidden for use in schools (see Table 4.1 page 26 and Appendix 1, page 60)

c) Winchesters of liquids ***shall*** be stored as near to ground level as practicable. Secondary containment **should** be provided.
An acceptable method of providing secondary containment is to place plastic-trays underneath corrosive substances and metal-trays under organic solvents. The trays should be capable of containing at least 25% of largest container, i.e. 625 mL if storing 2.5 L Winchesters of chemical.

d) Shelving and cabinets **should** be secured to prevent toppling during moderate earthquakes.

e) Shelves **should** have lips or some other arrangement to prevent containers from falling off the shelves during an earthquake.
Lips should be 20-35 mm high, and can be made by any suitable method, e.g. curtain wire, Perspex lip screwed to shelf.

f) All hazardous substances ***shall*** be stored on impervious surfaces.
An acceptable method of producing impervious surface is to use several coats of good quality Acrylic (non latex) paint, plastic coating or other impervious surface.

g) A fume hood or fume cupboard or other means of ventilation, isolation or extraction ***shall*** be used when working with highly toxic, corrosive, volatile or odoriferous substances, or particulate/dusty matter.

h) Safety carriers or trolleys (for large containers) ***shall*** be used for transporting plastic or glass containers of hazardous substances with a capacity of 2 litres or more.
Note that incompatible substances ***shall*** **not** be carried in the same safety carrier and should be separated by trays on a trolley.

Boxed Section 5.2. Chemical segregation

The purpose of segregation is to prevent inadvertent mixing of incompatible substances that might lead to a dangerous reaction. The distance required for segregation depends on the quantity of incompatible substances, their mobility and the method of storage.

An acceptable method of segregation is to ensure that:

1 Class 3 Flammable liquids are stored in a flammable liquids cabinet meeting the requirements of AS 1940, separated from oxidisers, gases and aerosols by at least 3 metres, unless the incompatible chemicals are also stored in separate corrosives or chemical cabinet meeting AS 1940. (AS 1940-2004**:** The storage and handling of flammable and combustible liquids).

2 Class 4 flammable solids (e.g. sodium) may be stored in a locked wooden cupboard in suitable secondary containment, but must also be segregated from incompatible substances by at least 3 metres.

3 Class 6 toxic substances should be kept within a secured cupboard in impervious containers.

4 Containers of other solid substances may be kept in alphabetical order on earthquake-protected shelves.

5 Class sets of diluted hazardous substances, for example 0.1 $mol.L^{-1}$ HCl may be kept on trays on earthquake-protected shelves.

Note: Appendix 4 lists hazard classes that are legally incompatible under HSNO control regulations. Further information and guidance on storage are available in "AS 2243:10 Safety in Laboratories: Storage of chemicals" or "AS 2982 Laboratory Construction" or in standard references.

5.2.2 Flammable Gases

a) Portable LPG cylinders (for heating purposes) ***shall not*** be stored or used in school science laboratories.

b) Flashback arresters ***shall*** be fitted to regulators attached to flammable gas cylinders.

c) Cylinders of flammable gases ***should*** only be stored in areas provided with adequate ventilation to ensure any leaked gas does not accumulate to levels that exceed 10% of the Lower Explosive Limit (LEL).

d) Cylinders of all compressed gases ***shall*** be secured to a wall or fixed structure. A recommended method of securing cylinders is by two chains, at about 1/3 below the valve and at the base, to a wall bracket.

e) Oxygen cylinders ***shall*** be separated from any Class 2 Flammable gas by at least 3 metres.

5.3.2 Flammable Liquids

a) Unless a flammable liquids cabinet meeting AS 1940 is available, a maximum of 20 litres aggregate total of all Class 3.1A to D substances ***shall*** be stored in any fire cell.
Notes:
– A laboratory and prep room together would normally be one fire cell.
– Ethanol, Isopropyl Alcohol and Methanol are Class 3.1.B down to about 50 % dilution with water.

b) Up to 100 Litres of Class 3.1A to D ***may*** be stored in a flammable liquids cabinet meeting AS 1940 (but must not exceed the total volumes for each class of substance as specified in Appendix 1 of this code).

c) The opening and decanting of all flammable liquids ***should*** be carried out in a suitable fume cupboard.

d) If a fume cupboard is not available, the "*person in charge"* ***shall*** ensure that all flammable liquids ***shall*** only be opened and poured:
– in a well-ventilated location where flammable vapours ***shall*** not accumulate.
– potential ignition sources are controlled.

e) Containers ***should*** be opened for as short a time as possible and never near any source of ignition.

f) In any one place, the duration that any container of flammable liquid is opened ***shall not*** exceed 10 minutes and the volume ***should not*** exceed 1500 mL decanted volume of any class 3.1A to 3.1C flammable liquid.

5.4 Emergency Planning

The Laboratory Manager ***shall*** ensure that information on the location, quantity and type of hazardous substances is included with the school Emergency Response Plan[9] by:

a) Keeping a copy of the Hazardous Substance Inventory(s) (S5.1.4) with the emergency plan.

b) Mapping the location of hazardous substance stores and locations in a way that can readily be located by emergency services.

c) Keeping paper copy of Safety Data Sheets for Class 6.1A, B and C (Acutely toxic substances) Class 6.3A (Skin Irritant), 6.4A (Eye Irritant), 6.5A and B (Sensitiser), Class 8.2A, B and C (Skin Corrosive), 8.3A (Eye Corrosive).
*Note: The Safety Data sheets **should** contain information on the usual symptoms of exposure and a description of the first aid to be given to the person exposed to the substance.*

d) Keeping paper copy of Safety Data Sheets for Category A Class 9 Ecotoxic substances.
*Note: The Safety Data Sheets for Class 9 **should** contain information on the effect of the substances on the environment and any immediate actions that **may** be taken to prevent the substance from entering the environment.*

e) Ensuring that there is note of where additional information on the substances (for example 24 hour emergency service telephone number or internet URL) contained in a prominent place within the plan.

f) Information in 5.3(a) above ***shall*** be available to emergency services at the location of the hazardous substances and from within one other easily identified location on the school premises (e.g. school reception).

Boxed Section 5.3: Emergency planning

The purpose of emergency planning is to minimise the risk to persons and property in the event of a fire, earthquake, or other calamity.

To this end information on hazardous substances must be available to school and emergency personnel, for example NZ Fire Service.

Templates and guidance for the production of Emergency Response Plan are given on the Ministry of Education Web Site at:

www.minedu.govt.nz. (search for “Emergency Management”)

This code only specifies the information about hazardous substances that must be included in the emergency plan.

[9] Note: There must be a single emergency response plan relating to all hazardous substances held in or reasonably likely to be held in the exempt laboratory. The emergency response plan may be part of any other planning for an emergency.

The Board of Trustees/Governors or property manager ***shall*** ensure that:

a) A HAZCHEM sign approved by the local emergency services is affixed to the outside wall of locations that contain hazardous substances in such a way that the sign can be seen by the emergency services.

b) An appropriate spill kit is kept within 30 metres of any location storing or using hazardous substances.

c) Dry powder (or similar approved type) fire extinguishers are kept within five metres of any location that uses Class 2, 3 or 4 hazardous substances.

d) Instructions are posted on the appropriate responses to:
– Emergency response to fire or chemical spills.
– Evacuation routes and assembly areas.

The principal of every school ***shall*** ensure that:

a) The evacuation of students and the response to fire or other emergency are tested at least once a term.

b) The Emergency Response Plan is reviewed at least once a year.

5.5 Design requirements

The Board of Trustees/Governors ***shall*** ensure, for any room (including prep rooms and storage areas), in which a hazardous substance is to be used that:

a) All parts of the room that could come into contact with any hazardous substances

   i) ***shall*** be made of a material that is treated so that it is not capable of absorbing the hazardous substance; or

   ii) ***shall*** be covered by a disposable material that is capable of absorbing or retaining the substance.

b) Meets any other requirement of the Building Act or Education Act.

5.5.1. Protective Clothing Equipment

a) Appropriate protective clothing and equipment ***shall*** be worn when handling hazardous substances of the following hazard classifications:

   6.1A-6.1D

   6.3A

   6.4A

   6.5A/B

   6.6A/B

   6.7A/B

   6.8A-C

6.9A/B

and class 2, 3, 4, 5 and 8 substances.

b) The following items ***should*** be available in the laboratory:

i. **Disposable Gloves** of material able to provide protection for the substances being used.
Note: A glove chart should be filed in the laboratory folder.

ii. **Eye Protection.**
Note:
*– A safety visor **should** be worn when decanting or handling more than 1 Litre Class 8.3A.*
*– Safety Goggles **should** be worn when decanting or handling less than 1 litre of Class 8.3A substances.*
*– Safety glasses with eye shields **should** be worn when decanting or handling any quantity of 6.4A hazardous substance.*

iii. **Lab Coats** of fire resistant material.
Note: Synthetic material such as acrylic may burn fiercely if soaked in flammable liquids.

iv. **Disposable Dust Masks**. □
*Note: Dust masks **shall** be stored in a sealed bag or container and only be used once*.

v. A **Cartridge Half-Mask Respirator *shall*** be stored in any laboratory that uses a Class 6 substance which has an inhalation hazard.
*For example, a half-mask respirator equipped with acid gas cartridges **shall** be available in any laboratory that uses formalin. Respirators should be stored in sealed boxes, labelled with the user's name, and the cartridges should be dated on opening and replaced six months after opening.*

c) The Laboratory Manager ***shall*** ensure that adequate instruction on the use of protective clothing and equipment is provided to all laboratory personnel handling hazardous substances with classifications listed in 5.4.1(a).

d) The Laboratory Manager ***shall*** ensure that information on the use of protective clothing is kept in the laboratory folder.
Note: This information requirement can be met by providing this information in Laboratory Manuals or in the Safe Method of Use.

e) Safety showers and/or eye wash facilities ***shall*** be provided within 10 m of where Class 8.2A, 8.2B, 8.2C or 8.3A corrosive substances or any category A Class 6 toxic substances are used.

5.5.2 Equipment and Apparatus used with Hazardous Substances

Every person who handles or uses any hazardous substance ***shall*** ensure:

a) That all equipment used to handle or that comes into contact with a hazardous substance is properly maintained and operates so that the equipment does not leak, and

b) that information on the use of the equipment is kept in the laboratory folder and available to all users within ten minutes, and

c) that any equipment failures are reported promptly to the Laboratory Manager.

5.5.3 Fume Cupboards and Local Ventilation

Fume cupboards ***should***:

a) be designed to AS/NZS 2243.8 Safety in Laboratories - Fume Cupboards

b) continue to operate after the hazardous substances have been removed from the cupboard, so that hazardous substances are flushed from the exhaust ducting.

c) have a means to indicate they are operating (such as a 'tell tale').

d) Fume cupboards ***shall not*** be used to store closed containers of hazardous substances.

e) Local ventilation systems ***shall*** be professionally designed to recognised standards and tested periodically to ensure effectiveness.

5.6 Disposal

a) Substances ***shall*** be disposed in accordance with the Safe Method of Use developed for the substance. (Section 6)

b) Waste hazardous substances, containers and packaging ***shall*** be disposed of in an appropriate way (See Appendix 6)

6. Safe Methods of Use

The following Safe Methods of Use (SMUs) are general summaries of factors that should be considered before a class of substance is used in a school laboratory and controls that ***shall*** be in place for safe handling. The SMUs should be copied or printed and filed in a laboratory folder or equivalent, and in one other location where the information ***shall*** be available to emergency services.

The SMUs provide the general information required by section 2.3 (g) of this code. However, laboratory managers and persons in charge of hazardous substances should always seek more detailed information appropriate to the substances and procedures being used.

The teacher in charge ***shall*** provide a written specific Safe Method of Use (where this does not already exist) for any procedure utilising any category A hazardous substance or Class 6.1A to 6.1C hazardous substance.

The specific Safe Method of Use ***shall*** provide information on:

- The significant hazard of the substance (or procedure).
- Any required safety controls for the substance (or procedure).
- The Emergency Procedures for the substance (or procedure).
- The Disposal of the substance or products of the procedure.

Safe Method of Use for Class 3 Flammable liquids

HSNO Classification	Examples
3.1 Flammable Liquids	Acetone, Ethanol
3.2 Liquid desensitised explosives	Prohibited in schools

Significant Hazards

– Fire or explosion.

Required Safety Controls

Fire:

a) Unless a flammable liquids cabinet meeting AS 1940 is available, a maximum of 20 litres aggregate total of all Class 3.1A to D substances ***shall*** be stored in any fire cell.
Notes:
– A laboratory and prep room together would normally be one fire cell.
– Ethanol, Isopropyl alcohol and Methanol are Class 3.1.B down to about 50 % dilution (with water).

b) Up to 100 Litres of Class 3.1A to D ***may*** be stored in flammable liquids cabinets meeting AS 1940 (but must not exceed the total volumes for each class of substance as specified in Appendix 1 of this code).

c) The opening[10] and decanting of all flammable liquids ***should*** be carried out in a suitable fume cupboard.

d) If a suitable fume hood is not available, the "*person in charge"* ***shall*** ensure that all Class 3.1A and 3.1B flammable liquids ***shall*** only be opened and poured:

   i. in a well-ventilated location where flammable vapours ***shall*** not accumulate; and

   ii. potential ignition sources are controlled; and

   iii. containers ***should*** be opened for as short a time as possible and never near any source of ignition.

e) In any one place, the duration that any container of flammable liquid is opened ***shall not*** exceed 10 minutes and the volume ***should*** not exceed 1500 mL decanted volume of any class 3.1A to 3.1C flammable liquid.

f) Before pouring[11], decanting, or pumping any flammable liquid from one metal container to another, connect the two containers and connect to a common earth. The resistance between the containers should not exceed 10 ohms.

[10] Vapour concentrations should not exceed 10% of the Lower Explosive Limit (LEL) at any actual or potential ignition source.

g) The refilling or "topping up" of containers that contain, or have contained, flammable liquids, with a flash point of < 35°C (for example acetone) ***shall***:

   i. be carried out in a fume cupboard; or

   ii. at a location where ventilation ensures that the concentration of flammable vapour does not exceed 10% of the LEL at any actual or potential ignition source[12] [13].

Microbiology

Where flame sterilization is required:

- No more than 50 mL of ethanol ***shall*** be used at any time. The container ***shall*** have a cover.
- The flame ***shall*** be as far as practicable from the ethanol container.
- The flame ***shall*** be turned off before refilling the container.
- A dry powder fire extinguisher ***shall*** be hung within 3 metres of the work area.

General Chemistry

Exposure to solvents will be kept as low as reasonably achievable.

The Laboratory Manager ***shall*** ensure:

- That the work can be completed in an area of adequate ventilation.
- Appropriate grade and material of gloves are available and used.
- That staff wear safety glasses and flame-resistant (e.g. cotton) lab coats at all times whilst using solvents.
- That appropriate masks and filters (e.g. 3M organic vapour) are available for staff.

[11] Note: Static can be generated by swirling, splashing, high flow rates, venturi effects, turbulence, cavitation or micofiltration. Minimising these effects shall reduce the static generated.
Due care should be exercised when subjecting high purity flammable liquids (with low conductivities and a flash point of less than 10°C above ambient temperature) to any process that generates static electricity. [Suggested values are 10 Pico Siemens per metre for low flow rates. The potential for a fire or explosion is higher where there is a flammable atmosphere.]

[12] For example: Less than 0.5 mL of residual ethanol in a 2.5 litre Winchester can produce a saturated air/ethanol vapour mixture. Refilling a 2.5 litre Winchester that has held ethanol at 19°C shall release 2.5 litres of a saturated ethanol vapour/air mixture. This can result in over 42 litres of flammable vapour.
Liquids with a higher vapour pressure and /or lower explosive limit shall produce a larger flammable zone.

[13] Note: Pouring 100mL of ethanol into a clean dry 250 mL beaker produces very little if any flammable vapour, outside of the beaker.

Disposal

- Small volumes of water-soluble flammable liquids (e.g. ethanol,) *may* be diluted (at least 20 x volume) and sent to waste.
- Small volumes (<100 ml) of volatile organic solvents may be left to evaporate within a fume hood.
- Larger volumes should be accumulated and sent to a specialist waste contractor.

Waste Handling

Containers for collecting and storing hazardous substances wastes in laboratories:

- ***Shall*** not exceed 5 litres for category A substances or 20 litres for all other categories.
- ***Shall*** not be placed on the floor unless connected to analytical equipment
- ***Shall*** not be placed between benches, in walkways or corridors.
- ***Should*** be kept in a storage cabinet; safety containers that are self-closing and have a flash arrester are recommended for containers of >4L capacity.
- Containers of > 1L not stored in storage cabinets ***shall*** be provided with secondary containment.

Emergency Information

Health Hazards

Skin	Eye	Inhalation	Ingestion
Wash with copious quantities of soap and water.	Wash with copious quantities of tepid (<25oC) water or saline, preferably aerated water. Seek immediate medical assistance.	Remove victim to fresh air. Provide oxygen if available.	Do not induce vomiting. Seek medical assistance.

Spills or reactivity

Minor Spill (less than 250 mL)	Major Spill (greater than 250 mL)
Ensure there is adequate ventilation. Turn off all sources of ignition.	Ensure there is adequate ventilation. Turn off all sources of ignition.

Absorb onto suitable absorbent and remove absorbent to fume hood or take outside and allow to evaporate	Evacuate building. Call emergency services.

Safe Method of Use for Class 4 Flammable Solids

(except 4.3 Dangerous when wet)

HSNO Classification		Example
4.1.1	Flammable Solids	Aluminium Powder
4.1.2	Self Reactive Flammable Solids	Prohibited in Schools
4.1.3	Desensitised Explosives	Prohibited in Schools
4.2	Spontaneously combustible	Activated carbon, Calcium metal

Significant Hazards

- Ignition and addition to total fuel load.

Required Controls

- Keep quantities within laboratory as low as reasonably achievable.
- Check containers annually (at inventory).
- Restrict use to suitably qualified persons.
- Keep a dry powder fire extinguisher in any area where Class 4 substances are used and ensure that staff have been trained to use the extinguisher.

Personal protective equipment

- Wear safety glasses, gloves and laboratory coat before opening containers.
- Handle solid material with tongs or suitable spatulas.

Storage

- Store below eye level on earthquake-protected shelves or in locked cupboards.
- Store materials as per SDS recommendations.
- Keep segregated from flammable liquids, mineral acids, and oxidisers.
- Small quantities of allowed Class 4 substances ***may*** be stored in a laboratory cabinet or cupboard provided:
    - Containers are stored on a separate tray capable of containing a spill.
    - The containers are segregated from Classes 2, 3, 4.3, 5 substances

– The person in charge must ensure that the substance is not in contact with any substance or material with which it is incompatible (see Appendix 4).

Disposal

Send to specialist company.

Emergency Information

Health Hazards

Skin	Eye	Inhalation	Ingestion
Remove clothing, brush surplus material from skin then rinse with copious quantities of water.	Wash with copious quantities of tepid water for at least 15 minutes. Occasionally lift lids. Seek immediate medical attention.	Remove to fresh air, seek medical attention.	Obtain medical attention.

Spills or reactivity

Spill (fragment)
Remove ignition sources. Recover with tongs, if feasible, otherwise cover with inert material (e.g. sand) and sweep into container. Place in appropriate container under inert atmosphere.

Safe Method of Use for Class 4.3, Dangerous when wet

HSNO Classification	Examples
4.3A (substances dangerous when wet)	Sodium, Calcium Carbide Potassium is **prohibited** for use in Schools

Significant Hazards

- Ignition and addition to total fuel load.

Required controls

- Keep a Dry Powder extinguisher in any area where Class 4.3 substances are used and ensure that staff have been trained to use the extinguisher.
- Keep quantities within laboratory as low as reasonably achievable.
- Check containers annually (at inventory).
- Restrict use to suitably qualified persons.

Personal protective equipment

- Wear safety glasses, gloves and laboratory coat before opening containers.
- Handle metal with tongs.

Storage

- Store below eye level on earthquake-protected shelves or in locked cupboards.
- Store under mineral oil or dried xylene or toluene.
- Keep sodium segregated from mineral acids, halogens, halogenated hydrocarbons, sulphur oxides and phosphorous.
- All class 4.3 substances ***shall*** be segregated from Class 1, 2, 3, 4.1.1, 4.1.2, 4.2, 5, 8 substances and water.

Disposal

- Small quantities may be disposed of by experienced persons. Larger quantities should be sent to industrial chemical disposal company.

Emergency Information

Do **NOT** use water or carbon dioxide extinguishers on any fire or ignition that might involve Class 4.3 substances.

Health Hazards

Skin	Eye	Inhalation	Ingestion
Remove clothing, brush surplus material from skin then rinse with copious quantities of water.	Wash with copious quantities of tepid water for at least 15 minutes. Occasionally lift lids. Seek immediate medical attention.	Remove to fresh air, seek medical attention.	Obtain medical attention.

Spills or reactivity

Spill (fragment)
Remove ignition sources. Recover with tongs, if feasible, otherwise cover with inert material (e.g. sand) and sweep into container. Place in appropriate container under inert atmosphere.

Safe Method of Use for Class 5.1. oxidisers

HSNO Classification	Examples
5.1.1 (Oxidising liquids/solids)	Hydrogen peroxide, nitrates, Nitric Acid
5.1.2 (Oxidising gases)	Oxygen gas

Significant Hazards

- Contact with metals and organic liquids can lead to fire and explosions.
- Accelerant of fires in presence of additional fuel load.
- Trace impurities in hydrogen peroxide can cause violent decomposition on heating.

Required Controls

- Limit the quantity stored in the lab as low as reasonably achievable.
- Use safety shields if using oxidisers in unknown reactions.

Personal protective equipment

- Wear safety glasses with side shields at all times.
- Wear safety goggles if decanting more than 250 mL of liquid oxidiser.
- Wear a full-face safety visor if decanting more than 500 mL of Category A or B liquid oxidiser.

Storage

- Keep segregated from Class 3 and 4.
- Keep segregated from all halides, ammonia, hydrogen, and organic materials.
- Check containers annually (at inventory).

Disposal

- Dependent on specific substances.

Emergency Information

Health Hazards

Skin	Eye	Inhalation	Ingestion
Wash with copious quantities of water.	Irrigate with copious quantities of tepid water or saline, lifting eyelids occasionally. Seek immediate medical attention.	Remove to outside or ventilated area. Seek medical attention.	Do not induce vomiting. Seek medical attention.

Spills or reactivity

Minor Spill (less than 250 mL)	Major Spill (greater than 250 mL)
Control all sources of ignition. Absorb onto pillow of inert material. Remove to outside.	Evacuate area. Control all sources of ignition. Call emergency services.

Safe Method of Use for Class 6.1, Acute Toxicity[14]

HSNO Classification	Examples
6.1 Acute Toxins	Most Acids, metal salts, zinc sulfate, barium and mercury salts. Class 6.1A, B and C substances are prohibited from schools unless specifically listed in Appendix 2 of this code.

Significant Hazards

- Exposure to acutely toxic substances may cause significant harm (even DEATH) from a single exposure. In all cases, rescuers and treatment providers ***SHALL*** ensure their own safety before providing aid.
- Particular care is required where vapour, mist or gaseous hazards may be present (for example, Carbon Monoxide).

Required Controls

The **teacher in charge** for any procedure that uses Class 6 substance(s) ***SHALL*** ensure:

- All persons in the vicinity of the procedure are warned that a toxic substance is being used.
- All persons have the appropriate training (First Aid, Growsafe).
- That appropriate back up procedures are in place and tested before the work begins.
- That all appropriate antidotes are present on site in sufficient quantity.
- Secondary containers for Class 6.1A to 6.1C substances ***shall*** be marked with Class 6.1 Hazsub "Toxic" icon (see Appendix 5 for guidance).

For example:

*Dilution of Sulfuric Acid **shall** only be carried out by a person with appropriate skills and qualifications and wearing correct personal protective equipment.*

Storage

- All Class 6.1A to 6.1C substances ***shall*** be kept in a secure area (e.g. locked cupboard) at all times when not in use.
- Areas of containment (including under-bench cupboards) ***shall*** be marked with the toxic substances icon.

[14] Specific Safe Methods of Use are required for substances having toxicity less than:
Oral toxicity LD50 < 300 mg/kg bw, Dermal LD50 <1000 mg/kg bw, Gas LC50 <2,500 ppm in air, Vapour LC50 < 10 $mg.L^{-1}$ in air, Dusts/Mists LC50 < 1.0 $mg.L^{-1}$ in air

- Containers of Class 6.1A to 6.1C substances ***SHALL*** be stored on impervious surfaces or ***shall*** be covered by a disposable material that is capable of absorbing or retaining the substance.

Disposal

- The teacher in charge ***SHALL*** ensure that the disposal of any toxic substance complies with Hazardous Substances (Disposal) Regulations 2001 and with the conditions of any trade waste licence. Toxic substances ***SHALL*** be treated (e.g. by chemical conversion) so that the substance is no longer a toxic substance.
- Class 6.1A to 6.1C substances that cannot be treated (for example some agricultural chemicals) ***SHALL*** be packaged and disposed of using a recognised chemical disposal company.

Emergency Information

National Poisons Centre: 0800 764 766

Largely dependent on the nature of chemical in use and type of exposure.

For most poisoning, use copious quantities of tepid water for surface exposures; however, some substances require special treatment.

In all cases seek medical help.

Health Hazards

Skin	Eye	Inhalation	Ingestion
Copious quantities of tepid water. Wash for at least 15 minutes.	Copious quantities of tepid (aerated water if available) followed by saline.	Remove from source of exposure. Give oxygen if available	Keep patient calm and quiet. Seek medical help. DO NOT INDUCE VOMITING

Spills or reactivity

Minor Spill (dependent on nature of chemical)	Major Spill
Solids and Liquids: Depending on nature of the chemical, most toxicants can be absorbed onto suitable material and packaged for disposal. For gases and vapours, provide ventilation where feasible.	If in doubt, call emergency services

Safe Method of Use for Sub-classes 6.3 to 6.5, Irritants[15] and Sensitisers[16]

HSNO Code	Examples
6.3 Skin Irritant	Kerosene, organic solvents
6.4 Eye Irritant	Ammonium persulfate
6.5 Sensitiser (respiratory and/or contact)	Potassium dichromate

Significant Hazards

Irritants and Sensitisers may present both acute and chronic hazards depending on nature of the chemical action and the physical form the substances are in.

- Skin Irritants may cause erythema, and oedema.
- Eye Irritants may produce corneal opacity, iritis or conjunctivitis.
- Sensitisers may produce a variety of allergic reactions for example, asthma, urticaria, anaemia and dermatitis.

Required Controls

The **Teacher in Charge** for any procedure that uses sub-class 6.3 to 6.5 substances ***shall***:

- Ensure all persons in charge of hazardous substances are informed of the nature of the hazard and any required control measures.
- Check that appropriate protective equipment, (glove type, safety glasses, respirator and lab coat) is available before work commences.
  For example:
  - Nitrile gloves ***shall*** be worn when handling Acetone, Methanol.
  - Latex gloves ***shall*** be worn when handling Acetaldehyde
- Check that there are no persons with known history of sensitisation or reaction to the substance prior to initiating any procedure using that substance.
- All persons in the vicinity of the procedure are warned that a toxic substance is being used.

[15] Adverse effects of irritants are reversible (normally within 7 to 21 days)
[16] Sensitisation is an immunologically mediated reaction where, after exposure to a substance to which an organism has been previously exposed, the organism is more readily affected by that substance

- All persons have the appropriate training (First Aid).
- That appropriate back-up procedures are in place and tested before the work begins.
- Secondary containers for sub-class 6.3A and 6.4A ***should*** be marked with the GHS Exclamation Mark Pictogram and the signal word "Warning"

- Secondary containers of 6.5A and 6.5B substances ***should*** be marked the with GHS Chronic Toxin Pictogram and the signal word "Danger"

Storage

- All sub-class 6.3A to 6.5B substances ***shall*** be kept within a locked room or cupboard.
- Areas of containment (including under–bench cupboards) ***shall*** be marked with the GHS or UN transport toxic substances icon.
- Containers of Class 6.3A to 6.5B substances ***shall*** be stored on impervious surfaces or on disposable material capable of absorbing or retaining the substance.

Disposal

The teacher in charge ***SHALL:***

- ensure that the disposal of any toxic substance conforms with conditions of any trade waste licence.
- that toxic substances disposed of to waste ***are*** treated so that the substance is no longer a toxic substance. .
- Sub-class 6.3A to 6.5A substances that cannot be treated (for example kerosene) ***SHALL*** be disposed of to a chemical disposal company.

Emergency Information

National Poisons Centre: 0800 764 766

Short term or brief exposure to low concentrations of substances known to cause chronic effects is unlikely to have long term consequences. Twenty cigarettes at age 14 does not guarantee lung cancer at age 40. Nevertheless, every effort should be made to minimise exposures.

In case of contact, use copious quantities of tepid water for surface exposures; in all cases seek medical help.

Health Hazards

Skin	Eye	Inhalation	Ingestion
Copious quantities of tepid water. Wash for at least 15 minutes.	Copious quantities of tepid water (aerated if available) followed by saline.	Remove from source of exposure. Give oxygen if available.	Keep patient calm and quiet. Seek medical help. DO NOT INDUCE VOMITING.

Spills or reactivity

Minor Spill (dependent on nature of chemical)	Major Spill
Solids and Liquids: Depending on nature of chemical, most substances can be absorbed onto suitable material, and packaged for disposal. For gases and vapours, provide ventilation if feasible.	If in doubt, call emergency services.

Safe Method of Use for Sub-classes 6.7 to 6.9, Chronic Toxicity[17]

HSNO Code	Examples
6.6 Mutagens	Lead Nitrate
6.7. Carcinogen	Naphthalene Formaldehyde
6.8 Reproductive/Developmental	Cyclohexanol
6.9 Target Organ Systemic	Ethanal

Significant Hazards

Chronic[18] hazards are grouped together as methods of control and treatment following exposure differs from acute hazards. Some substances (e.g. Ammonium dichromate) are both acute and a chronic toxic substances.

Long term or repeated exposure may cause

- mutations that may be transmitted to progeny,
- cancer,
- adverse effects on developing embryo or foetus,
- reversible or irreversible effects that impair the function of any organ that is not covered by other specific toxic endpoint (for example acute toxicity).

Required Controls

The **Teacher in Charge** for any procedure that uses sub-class 6.7 to 6.9 substances ***shall***:

- Ensure all persons in charge of hazardous substances are informed of the nature of the hazard and any required control measures. In particular, ensure that persons of childbearing age know the control measures required to minimise exposure to Class 6.8 (reproductive/developmental) or 6.6 (mutagenic) substances.

[17] Specific Safe Methods of Use are required Sub-class 6.7A (known or presumed carcinogens) Extreme care should be taken with sub-class 6.8 (known or presumed reproductive or developmental toxicants).

[18] A chronic hazard is presented by a chemical that has the potential to cause long-term damage to health, often as a consequence of repeated or prolonged exposure to it.

- Check that appropriate protective equipment, (glove type, safety glasses, respirator and lab coat) is available before work commences.
  For example:
  - Nitrile gloves ***shall*** be worn when handling Acetone, Methanol.
  - Latex gloves ***shall*** be worn when handling Acetaldehyde.
- Ensure that all persons handling chronic toxicants wear appropriate personal protective equipment.
- All persons in the vicinity of the procedure are warned that a toxic substance is being used.
- All persons have the appropriate training (e.g. selection of personal protective equipment).
- That appropriate back-up procedures are in place and tested before the work begins.
- Secondary containers for sub-class 6.7A to 6.9A substances ***shall*** be marked the with Chronic Toxic icon and the signal word Danger.

Storage

- All sub-class 6.7A to 6.9A substances ***shall*** be kept within a locked room or cupboard.
- Areas of containment (including under–bench cupboards) ***shall*** be marked with the toxic substances icon.
- Containers of Class 6.7A to 6.9A substances ***shall*** be stored on impervious surfaces.

Disposal

The teacher in charge ***SHALL:***

- ensure that the disposal of any toxic substance conforms with conditions of any trade waste licence.
- that toxic substances disposed of to waste ***are*** treated (e.g. by chemical conversion) so that the substance is no longer a toxic substance.
- Sub-class 6.7A to 6.9A substances that cannot be treated ***SHALL*** be disposed of to a chemical disposal company.

Emergency Information

National Poisons Centre: 0800 764 766

Short term or brief exposure to low concentrations of substances known to cause chronic effects is unlikely to have long term consequences. Twenty cigarettes at age 14 does not guarantee lung cancer at age 40. Nevertheless, every effort should be made to minimise exposures.

In case of contact, use copious quantities of tepid water for surface exposures; in all cases seek medical help.

Health Hazards

Skin	Eye	Inhalation	Ingestion
Copious quantities of tepid water. Wash for at least 15 minutes.	Copious quantities of tepid water (aerated if available) followed by saline.	Remove from source of exposure. Give oxygen if available.	Keep patient calm and quiet. Seek medical help. DO NOT INDUCE VOMITING.

Spills or reactivity

Minor Spill (dependent on nature of chemical)	Major Spill
Solids and Liquids: Depending on nature of chemical, most substances can be absorbed onto suitable material, and packaged for disposal. For gases and vapours, provide ventilation if feasible.	If in doubt, call emergency services.

Safe Method of Use for Class 8 Corrosives

Note: Class 8 includes acids and bases

HSNO Class	Examples:
8.2 Skin Corrosives 8.3 Eye Corrosives	Nitric Acid, Sodium Hydroxide Chlorine

Significant Hazards

- Cause severe burns on contact with any body tissue.
- Splashes to the eye may cause irreversible damage to the cornea.
- Inhalation causes severe damage to the respiratory system.

Required Controls

Personnel requirements

- Handling Category A corrosive substances ***shall*** be completed by persons authorised by the Laboratory Manager.
- Decanting or handling quantities > 250 mL of Category A corrosive substances ***should*** only take place in the presence of other suitably qualified persons (do not work alone).

Personal protective equipment

For handling Concentrated Acids or Concentrated Bases (> 10% by concentration)

- Decanting or handling quantities ≤ 100 mL: wear safety glasses with side shields, lab coat, appropriate gloves.
- Decanting or handling quantities > 100 mL < 1000 mL: wear safety goggles, lab coat, appropriate gloves,

or

- Decant within a fume hood and wear safety glasses and gloves
- Decanting or handling quantities > 1000 mL: wear full-face visor, corrosive resistant apron, long flexible gloves (that is, longer than standard disposable gloves, but more flexible than industrial-weight elbow-length gloves).
- Use a bottle carrier to transport any quantity of sub-class 8.2 or 8.3 substances between rooms.
- All areas that use or handle Class 8 substances ***shall*** be equipped with a spill kit capable of handling a 2.5 Litre spill.

For handling dilute acids or bases (<10% by concentration)

- Wear lab coat, safety glasses and disposable gloves.

Storage

- All containers to be stored below eye level, on earthquake-protected shelves.
- All containers to be stored on corrosive-resistant, impermeable trays or shelving.
- Quantities > 20 L (total all corrosives) **should** be stored in Corrosives Cabinets.
- Quantities > 100 L (total all corrosives) to be stored in external dangerous goods store where feasible.

Disposal

Disposal of substances is dependent on nature and type of substance.

- Common inorganic acids and bases, (e.g. HCl, NaOH) and some organic acids may be disposed of to sewage provided that Tolerable Exposure Limit (TEL) is not exceeded (see Appendix 6).
- For other organic acids, waste material ***shall*** be shipped to suitable agency for industrial neutralisation.

Emergency Information

Health Hazards

Eyes	Skin	Ingestion	Inhalation
Wash with water for 15 minutes. Get checked by doctor as soon as possible.	Wash with copious quantities of tepid water. Wash with soapy water, rinse well.	Do not induce vomiting. It may be feasible to neutralise with suitable compound e.g. sodium bicarbonate, milk. In all cases Obtain IMMEDIATE medical assistance.	Go to well-ventilated area away from fumes. Visit a doctor as soon as possible if respiratory problems occur.

Spills or reactivity

For any inadvertent mixing producing fumes, evacuate area and call fire brigade.

Minor Spill (less than 250 mL)	Major Spill (greater than 250 mL)
Depending on chemical knowledge of personnel and reactivity of chemicals, minor spills may be neutralised in house.	Call fire brigade.

Appendix 1. Maximum total quantities of hazardous substances that may be stored in schools [19]

Class and category	Class description	Total regulated quantity for closed containers	Limitation for schools prescribed by this code	Example
1	Explosives	Forbidden in Schools		
2.1.1A and B	Flammable gases	100 kg or 100 m3 where permanent gas	100 kg	Hydrogen
2.1.2A	Flammable aerosols	Forbidden in Schools		
3.1A	Flammable liquids	20 Litre	10 Litre (4 x 2.5 L Winchesters)	Acetaldehyde
3.1B	Flammable liquids	250 Litre (containers up to 5 Litre)	50 Litre (20 x 2.5 L Winchesters	Ethanol, Acetone, Acetic Acid
3.1C	Flammable liquids	1,500 Litres in closed containers	50 Litre (20 x 2.5 Litre Winchester)	Hexanol
3.2A, B and C	Liquid desensitised explosives	Forbidden in Schools		

[19] For Classes 1 to 5, these quantities are less than or equal to the quantities specified in the Hazardous Substances (Classes 1- 5) Amendment Regulations 2004 (Schedule 3 Table 4) Quantities of Class 2,3,4 Substances that activate hazardous substance location requirements. Provided these quantities are not exceeded, a location certificate is not required. However, this does not preclude schools obtaining advice from a HSNO Test Certifier or other Hazardous Substances advisor.
For Classes 6 to 9, these quantities are the same or less than the quantities specified in the Hazardous Substances (Classes 6,8, and 9 Controls) Amendment Regulations 2003, of certain class 6,8, and 9 substances that must be under the control of an approved handler or secured.

Class and category	Class description	Total regulated quantity for closed containers	Limitation for schools prescribed by this code	Example
4.1.1A	Readily combustible	1 kg	1 kg	Aluminium Powder, (P.G. II and III)
4.1.1B	Readily combustible	100 kg	5 kg	Camphor Sulfur
4.1.2A to G	Self Reactive	Forbidden in Schools		
4.1.3A to C	Solid desensitised explosive	Forbidden in Schools		
4.2A	Spontaneously combustible	1 kg	1 kg	Aluminium turnings Magnesium Powder
4.2B and 4.2C	Spontaneously combustible	25 kg	1 kg	Magnesium ribbon
4.3A	Dangerous when wet	1 kg	1 kg	Sodium
4.3B	Dangerous when wet	25 kg	5 kg	Calcium hypochlorite
4.3C	Dangerous when wet	50 kg	1 kg	Calcium Carbide
5.1.1A	Liquid/solid oxidisers	5 kg or 5 L	5 L	Hydrogen Peroxide
5.1.1B	Liquid/solid oxidisers	50 kg or 50 L	10 kg or 10 L	Metal nitrates
5.1.1C	Liquid/solid oxidisers	100 kg or 100 L	10 kg or 10 L	Ammonium nitrate
5.1.2A	Gas oxidisers	50 m^3 or 50kg	1 G size[20] cylinder	Oxygen compressed
5.2A and 5.2B	Organic Peroxides	Forbidden in Schools		
5.2C to 5.2F	Organic Peroxides	None known to be used in schools		

[20] Cylinder capacities are measured in litres water capacity of the cylinder. Approximate equivalent capacities are: E size, 15.4 Litres; F 30.8 Litres, G 46.6 Litres. If oxygen is required it is safer to use smaller cylinders.

Class and category	Class description	Total regulated quantity for closed containers	Limitation for schools prescribed by this code	Example
6.1A to 6.1C	Acute toxic	Must be secured and under the control of Laboratory Manager or person in charge	Keep minimum quantities	Potassium hydroxide
6.3	Skin Irritants	Not regulated	Keep minimum quantities	Kerosene
6.4	Eye Irritant	Not regulated	Keep minimum quantities	Ammonium persulfate
6.5	Sensitiser	Not regulated	Keep minimum quantities	Potassium dichromate
6.6A	Mutagenic	Not regulated	Keep minimum quantities	Chromium trioxide
6.7A	Carcinogenic	10 kg if solid 10 L if liquid	Keep minimum quantities	Potassium dichromate
6.8A	Reproductive / Developmental toxic	Not regulated	Keep minimum quantities	Lead Nitrate
6.9A	Target Organ systemic toxic	Not regulated	Keep minimum quantities	Methanol[21]
8.2A	Skin Corrosive	Any quantity	Keep minimum quantities	Hydrochloric Acid
8.3A	Eye Corrosive	Not regulated	Keep minimum quantities	Nitric Acid
9.1A, 9.2A, 9.3A, 9.4A	Ecotoxic	Any quantity	Keep minimum quantities	Calcium hypochlorite

[21] Most of the example substances have more than one classification. For example, methanol is 3.1B 6.1D 6.4A 6.8B 6.9A 9.3C.

Appendix 2. Substances allowed to be used in schools (*MOE-allowable*)

Notes:
1 Some non-hazardous substances are listed in this inventory. Other non-hazardous substances (for example nylon) ***may*** be used in schools without specific approval.
2. An accurate record ***should*** be kept of all hazardous substances within the school. For the purposes of this code, an accurate record ***shall*** comprise of an inventory having the following information: Chemical Name, CAS Number, Classification, number of packets, maximum quantity contained per packet and location. The inventory ***shall*** be updated annually and a record kept for 12 months.

Chemical Name	CAS Number	Classification	DG class	PG
1 - Iodobutane	542-69-8	3.1C	3	III
1 Chlorobutane	109-69-3	3.1B 6.1E 6.3B 6.4A	3	II
1,2 Di-bromoethane	106-93-4	6.1C 6.3A 6.4A 6.7A 9.1B 9.3A	6.1	II
1,2 Di-chloroethane	107-06-2	3.1B 6.1C 6.3A 6.4A 6.5B 6.6B 6.7B 6.9B 9.1D 9.3B	3,6.1	II
1,4 Di-chlorobenzene	106-46-7	6.1E 6.3A 6.4A 6.7B 6.9B 9.1A	6.1,3	III
1,6 Di-amino hexane	124-09-4	6.1D 6.9B 8.2C 8.3A 9.1D 9.2B 9.3B	8	III
1-Chloro-2-Methylpropane	513-36-0	3.1B	3	II
1-Chlorobutane	109-69-3	3.1B 9.1B	3	II
1,2-Ethanediol (ethylene glycol)	107-21-1	6.1D 6.4A 6.9A 9.3C		
2-Methyl butan-2-ol (tert-amyl alcohol)	75-85-4	3.1B 6.1D 9.3C	3	II
2-Methylpropan-1-ol (iso-butyl alcohol)	78-83-1	3.1C 6.1E 6.3B 6.4A	3	III
2-Methylpropan-2-ol (tert-butyl alcohol)	75-65-0	3.1B 6.1E 6.3B 6.4A	3	II
Acetamide (ethanamide)	60-35-5	6.7B	0	
Acetic acid (ethanoic acid)	64-19-7	3.1C 6.1D 6.9B 8.1A 8.2B 8.3A 9.1D 9.3C	3,8	II
Acetic orcein	not found	6.1D 6.9B 8.1A 8.2B 8.3A 9.1D 9.3C	0	
Acetone	67-64-1	3.1B 6.1E 6.3B 6.4.A	3	II
Acetyl chloride (ethanoyl chloride)	75-36-5	3.1B 6.1D 8.1A 8.2B 8.3A 9.1D 9.3C	3.2,8	II
Acramine yellow	none	6.1C 6.3A 6.4A 6.9B 9.3B	0	
Agar (bacteriological)	9002-18-0	Not hazardous	0	
Aluminium chloride	7446-70-0	6.1D 8.1A 8.2B 8.3A 9.1B 9.3B	8	II
Aluminium foil	7429-90-5	Not hazardous	0	
Aluminium hydroxide	21645-51-2	Not hazardous	0	

Chemical Name	CAS Number	Classification	DG class	PG
Aluminium nitrate	13473 -90-0	5.1.1C 6.1D 6.3B 6.4A 6.8B 9.1B 9.3C	5.1	III
Aluminium oxide	1344-28-1	Not hazardous	0	
Aluminium potassium sulfate	10043-67-1	6.1D 6.3A 6.4A 8.1A 9.1D 9.3C	0	
Aluminium powder	7429-90-5	4.1.1A 6.9.B 9.1D	4.3	II
Aluminium sulfate	10043-01-3	6.1D 6.3A 8.1A 8.3A 9.1B 9.3C	0	
Aluminium turnings	7429-90-5	4.3C	0	
Ammonia (.89)	1336-21-6	6.1D 8.1A 8.2B 8.3A 9.1A 9.3B	8	III
Ammonium acetate	631-61-8	6.3B 6.4A	0	
Ammonium bromide	12124-97-9	6.1E 9.1D	0	
Ammonium carbonate	506-87-6	6.1E 6.3B 6.4A	0	
Ammonium chloride	12125-02-9	6.1D 6.3B 6.4A 8.1A 9.1C 9.3C	0	
Ammonium dichromate	7789-09-05	5.1.1B 6.1B 6.5A 6.5B 6.6A 6.7A 6.8AB 6.9A 8.2C 8.3A 9.1A 9.2B 9.3B	5.1	II
Ammonium dihydrogen phosphate	7722-76-1	6.3B 6.4A	0	
Ammonium iodide	12027-06-4	6.1E 6.3A 6.4A	0	
Ammonium Iron (II) sulfate	10045-89-3	6.3A 6.4A	0	
Ammonium iron III citrate (ferric)	1185-57-5	6.3B 6.4A	0	
Ammonium molybdate	12027-67-7	6.9B	0	
Ammonium nitrate	6484-52-2	5.1.1C 6.1E 6.4A 9.1D	5.1	III
Ammonium oxalate	1113-38-8	6.1D 9.3B	6.1	III
Ammonium persulfate	7727-54-0	5.1.1C 6.1D 6.3A 6.4A 6.5A 6.5B 6.9B 9.1D 9.3C	5.1	III
Ammonium sulfate	7783-20-2	6.1D 9.1D	0	
Ammonium thiocyanate	1762-95-4	6.1D 9.1C 9.3B	0	
Ammonium thiosulfate	7783-18-8	6.1D	0	
Ammonium vanadate	7803-55-6	6.1B 6.4A 9.3A	6.1	II
Amyl acetate (isoamyl acetate)	123-92-2	3.1C 6.3B 6.4A 9.1D	3.3	III
Amyl alcohol	75-85-4	3.1B 6.1D 9.3C	3.2	II
Anti bumping granules	1344-28-1	Not hazardous	0	
Ascorbic acid	50-81-7	6.3B 6.4A	0	
Barium acetate	543-80-6	6.1D 9.3C	6.1	III
Barium carbonate	513-77-9	6.1D 9.3C	6.1	III
Barium chloride	10361-37-2	6.1C 9.3B	6.1b	III
Barium hydroxide (anhydrous)	17194-00-2	6.1D 8.2A 8.3A 9.3B	6.1b	III
Barium nitrate	10022-31-8	5.1.1B 6.1D 6.3B 6.4A 6.9B 9.3B	5.1,6.1a	II
Barium sulfate	7727-43-7	Not hazardous	0	
Bauxite	1318-16-7	Not hazardous	0	
Benzaldehyde	100-52-7	3.1C 6.1D 6.3B 6.5B 9.1D 9.2D 9.3C	0	

Chemical Name	CAS Number	Classification	DG class	PG
Benzoic acid	65-85-0	6.1D 6.4A 6.9B 9.3C	0	
Boric acid	10043-35-3	6.1E 6.3B 6.4A 6.8B 9.1D	0	
Brass	12597-71-6	Not hazardous	0	
Bromine (vials)	7726-95-6	6.1A 8.2A 8.3A 9.1A	8,6.1	I
Bromine (water)	7726-95-6	6.1A 8.2A 8.3A 9.1A	8,6.1	I
Bromobutane (n-Butyl bromide)	109-65-9	3.1B 6.1E 9.1C	3	II
Bromocresol Green (3.8-5.4)	76-60-8	No information found	6.1	
Bromoethane	74-96-4	3.1B 6.1D 6.7B	6.1	II
Bromophenol blue	115-39-9	No information found	0	
Bromothymol blue (6.0-7.6)	76-59-5	No information found	0	
Butan-1-ol (n-Butanol)	71-36-3	3.1C 6.1D 6.3A 8.3A 9.3C	3	III
Butane-2-ol(sec-Butyl alcohol)	78-92-2	3.1C 6.1E 6.4A	3	III
Butanoic acid (n-Butyric acid)	107-92-6	8.2C 8.3A	8	III
Butoxybutane	142-96-1	3.1C 6.1E 6.3A 6.4A 9.1C	3	III
Calcium (Metal) Granular	7440-70-2	4.3B 6.1E 6.3A 6.4A	4.3	II
Calcium acetate (ethanoate)	62-54-4	6.1E	0	
Calcium carbide (CaC2)	75-20-7	4.3A 6.3A 8.3A	4.3	II
Calcium carbonate	471-34-1	Not hazardous	0	
Calcium carbonate (marble chips)	1317-65-3	Not hazardous	0	
Calcium chloride (anhydrous)	10043-52-4	6.1D 6.3A 6.4A 9.3C	0	
Calcium chloride (dihydrate)	10035-04-8	6.1D 6.3A 6.4A	0	
Calcium hydrogen orthophosphate	7789-77-7	Not hazardous	0	
Calcium hydroxide	1305-62-0	8.2C 8.3A 9.1D	8	III
Calcium hypochlorite (bleaching powder)	7778-54-3	5.1.1B 6.1D 8.1A 8.2B 8.3A 9.1A 9.2A 9.3C	5.1	III
Calcium nitrate (anhydrous)	10124-37-5	5.1.1C 6.1D 6.3B 9.3B	5.1	III
Calcium nitrate tetrahydrate	13477-34-4	5.1.1C 6.1D 6.3B 6.4A	5.1	III
Calcium Oxide	1305-78-8	8.2C 8.3A 9.1D	8	III
Calcium sulfate (Plaster of Paris)	7778-18-9	Not hazardous	0	
Camphor	79-92-5	4.1.1B 8.3A 9.1A	4	III
Carbon (activated)	7440-44-0	4.2C	4.2	III
Carbon (charcoal)	7440-44-0	4.2C	4.2	III
Carbon powder (coarse)	7440-44-0	4.2C	4.2	III
Carbon powder (fine)	7440-44-0	4.2C	4.2	III
Carbon powder (graphite)	7440-44-0	4.2C	4.2	III
Carbon dioxide (dry ice)	124-38-9	Non hazardous	9	III
Carmine	1390-65-4	6.5A 6.5B	0	
Castor oil	8001-79-4	Not hazardous	0	
Chromium trioxide (chromic)	1333-82-0	5.1.1B 6.1B 6.5A 6.5B 6.6A 6.7A 6.8A 6.9A 8.1A 8.2A 8.3A 9.1A 9.2B 9.3B	5.1,8	
Chromium (III) chloride	10025-73-7	6.1A 9.1A 9.3B	0	

Chemical Name	CAS Number	Classification	DG class	PG
Chromium (III) potassium sulfate (chromic)	7788-99-0	6.3A 6.4A	0	
Chromium sulfate	10101-53-8	Not hazardous	0	
Citric acid	77-92-9	6.1E 6.3B 6.4A	0	
Clove oil	8000-34-8	6.1D 6.3A 6.4A	0	
Coal	7440-44-0	4.2C	4.2	III
Cobalt (II) chloride	7646-79-9	6.1C 6.3B 6.4A 6.5A 6.5B 6.7B 6.8B 6.9A 9.1B 9.3B	0	
Cobalt (III) oxide	1308-06-1	6.5B 6.7B	0	
Cobalt sulfate	10124-43-3	6.1D 6.3A 6.4A 6.5A 6.5B 6.7B 6.8B 6.9A 9.1A 9.3B	0	
Congo red (3-5)	573-58-0	6.7A 6.8B	0	
Copper (I) chloride	7758-89-6	6.1D 9.1A 9.3C	8	III
Copper (I) oxide (cuprous)	1317-39-1	6.1D 6.4A 6.9B 9.1A 9.3B	0	
Copper (II) carbonate (cupric)	12069-69-1	6.1C 6.3A 6.4A 6.5B 6.9B 9.3B	0	
Copper (II) chloride (cupric)	1344-67-8	No hazards determined	8	III
Copper (II) nitrate	3251-23-8	5.1.1B 6.1D 6.5A 6.8B 6.9A 8.2C 8.3A 9.1A 9.3B	5.1	II
Copper (II) oxide	1317-38-0	6.1D 6.4A 6.9B 9.1A	0	
Copper (II) sulfate	7758-99-8	6.1D 6.3A 6.4A 6.9B 9.1A 9.3C	9	III
Copper foil	7440-50-8	6.4A 6.5B 6.6A 6.9B 9.1A	0	
Copper powder	7440-50-8	6.1B 6.4A 6.5B 6.6A 6.9B 9.1A 9.2D 9.3A	0	
Copper turnings	7440-50-8	6.4A 6.5B 6.6A 6.9B 9.1A	0	
Cresol red (0.1-2.8)	1733-12-6	8.1A	0	
Cyclohexane	110-82-7	3.1B 6.1D 6.3B 9.1B 9.3C	3.1	II
Cyclohexanone	108-94-1	3.1C 6.1C 6.4A 9.2B 9.3C	3.1	II
Cyclohexene	110-83-8	3.1B 6.1D 6.3B 9.1B 9.3C	3.1	II
Cyclohexylamine	108-91-8	3.1C 6.1B 6.5B 6.6B 6.8B 6.9A 8.2B 8.3A 9.1D 9.3A	8,3	II
D-Fructose	57-48-7	Not hazardous	0	
D-Galactose	59-23-4	Not hazardous	0	
Dextrose	50-99-7	Not hazardous	0	
Di Ammonium hydrogen ortho phosphate	7783-28-0	6.1E 6.3A 6.4A 9.1D	0	
Di-amino ethane	107-15-3	3.1B 6.1C 6.5A 6.5B 8.2B 8.3A 9.1D 9.3B	8,3	II

Chemical Name	CAS Number	Classification	DG class	PG
Diatase	8049-47-6	6.3A 6.4A 6.5A 6.5B	0	
Di-chloroethylene	107-06-2	3.1B 6.1C 6.3A 6.4A 6.5B 6.6B 6.7B 6.9B 9.1D 9.3B	3,6.1	II
Di-chlorofluorescein	76-54-0	No hazards determined	0	
Di-chloromethane	75-09-2	6.1D 6.3A 6.4A 6.7B 6.9B 9.3C	6.1	III
Di-methyl-glyoxime	95-45-4	6.1D	0	
di-potassium hydrogen phosphate	7758-11-4	6.1D 9.3C	0	
Dodecan-1-ol	112-40-3	3.1D	3.1	III
EDTA di-sodium salt ethylene diamine acetic acid	139-33-3	6.1E 6.3B 6.4A	0	
Eosin (2-3.5)	17372-87-1	6.4A	0	
Eriochrome black T	1787-61-7	6.4A 9.1B		
Ethanamide	60-35-5	6.7B	0	
Ethane-diol	107-21-1	6.1D 6.4A 6.9A 9.3C	0	
Ethanoic acid (ACETIC ACID)	64-19-7	3.1C 6.1D 6.9B 8.1A 8.2B 8.3A 9.1D 9.3C	8.3	III
Ethanol 100%	64-17-5	3.1B 6.4A 9.1D	3.2	II
Ethanol 95%	64-17-5	3.1B 6.4A 9.1D	3.2	II
Ethyl acetate (see ethyl ethanoate)				
Ethyl ethanoate (acetate)	141-78-6	3.1B 6.1E 6.4A 6.9B	3.1	II
Ethylamine	75-04-7	2.1.1A 6.1C 6.9A 8.2B 8.3A 9.1D 9.3B	2.1	
Fluorescein	2321-07-5	6.1E 6.5B	0	
Formic acid (methanioc acid)	64-18-6	3.1C 6.1C 6.5B 8.1A 8.2B 8.3A 9.1D 9.3C	8	II
Fuchsin	632-99-5	6.7B	0	
Gentian violet (Crystal violet, Methyl Violet)	548-62-9	6.1C 6.3B 8.3A 9.1A 9.3B	0	
Giemsa's stain	51811-82-6	6.1D	0	
Glass wool	none	Not hazardous	0	
Glucose	50-99-7	Not hazardous	0	
Glycerol	56-81-5	Not hazardous	0	
Heptan-1-ol	111-70-6	3.1D 6.4A 9.1D	6.1	III
Hexane	110-54-3	3.1B 6.1E 6.3B 6.4A 6.9A 9.1B	3.1	II
Hexanoic acid	142-62-1	8.2C 8.3A	8	III
Hydrochloric acid	7647-01-0	6.1B 8.1A 8.2B 8.3A 9.1D 9.3C	8	II
Hydrogen (compressed)	1333-74-0	2.1.1A	2.1	I
Hydrogen peroxide 100 vol	7722-84-1	5.1.1A 6.1D 6.9B 8.2A 8.3A 9.1D 9.3B	5.1,8	
Indigo carmine	860-22-0	6.1D 6.4A 6.5A 6.5B 6.6B 9.1D 9.3C	0	
Iodine	7553-56-2	6.1D 6.5B 6.9B 8.2C 8.3A 9.1A 9.3C	8	II
Iodine (vials)	7553-56-2	6.1D 6.5B 6.9B 8.2C 8.3A 9.1A 9.3C	8	II

Chemical Name	CAS Number	Classification	DG class	PG
Iron (II) ammonium sulfate (Ferrous sulfate)	10045-89-3	6.3A 6.4A	0	
Iron (II) sulfate	7782-63-0	6.1D 6.3A 6.4A 9.1D 9.3C	0	
Iron (II) sulfide (ferrous)	1317-37-9	No hazards determined	0	
Iron (III) ammonium sulfate (anhydrous)	10138-04-2	6.1E	0	
Iron (III) chloride (ferric)	7705-08-0	6.1D 6.3A 8.3A 9.1C 9.3B	8	III
Iron (III) nitrate (ferric)	10421-48-4	5.1.1C 6.1D 6.3B 6.4A	5.1,6.1a	
Iron (III) oxide (ferric)	1309-37-1	6.4A	0	
Iron (III) sulfate	10028-22-5	6.1D	0	
Iron filings	7439-89-6	Not hazardous	0	
Iron sand	none	Not hazardous	0	
Iron turnings	7439-89-6	Not hazardous	0	
Iron wool	7439-89-6	Not hazardous	0	
Kerosine	8008-20-6	3.1C 6.1E 6.3B 9.1B	3	
Lactose	63-42-3	Not hazardous	0	
Lavender oil	8000-28-0	6.1E 6.4A	0	
Lead	7439-92-1	6.1C 6.6B 6.7B 6.8A 6.8C 9.1A 9.3C	0	
Lead (II) bromide	10031-22-8	6.1D 6.8A 6.9B 9.1A	6.1	III
Lead (II) oxide (litharge, yellow lead)	1317-36-8	6.1D 6.8A 6.9B 9.1A	5.1,6.1	III
Lead (II/IV) oxide (red lead)	1309-60-0	5.1.1C 6.1C 6.7B 6.8A 6.9A 9.1A 9.3A	6.1	III
Lead (IV) oxide	1309-60-0	5.1.1C 6.1C 6.7B 6.8A 6.9A 9.1A 9.3A	5.1	III
Lead (II) carbonate	1319-46-6	6.1D 6.8A 6.9B 9.1A	0	
Lead (II) chloride	7758-95-4	6.1D 6.8A 6.9B 9.1A	6.1	III
Lead acetate (ethanoate)	301-04-2	6.1C 6.4A 6.6B 6.7B 6.8A 6.8C 6.9A 9.1A 9.3C	6.1	III
Lead nitrate	10099-74-8	5.1.1B 6.1C 6.3B 6.4A 6.6B 6.7B 6.8A 6.8C 6.9A 9.1A 9.3B	5.1,6.1	II
Lithium	7439-93-2	4.3A 6.8A 8.2B 8.3A 9.1C 9.2C	4.3	I
Lithium carbonate	554-13-2	6.1D 6.4A 6.8A 6.9A 9.3B	0	
Lithium chloride (anhydrous)	7447-41-8	6.1D 6.4A 8.2C 9.1D	0	
Lithium nitrate	7790-69-4	5.1.1C 6.3A 6.4A 6.8A	5.1	III
Litmus	none	No hazards determined	0	
Magnesium carbonate	546-93-0	No hazards determined	0	
Magnesium chloride	7791-18-6	No hazards determined	0	
Magnesium hydroxide	1309-42-8	6.4A	0	
Magnesium nitrate	10377-60-3	5.1.1C 6.3B 6.4A	5.1	III
Magnesium oxide	1309-48-4	No hazards determined	0	
Magnesium powder	7439-95-4	4.2B 4.3A 6.1E 9.3C	4.3	II

Chemical Name	CAS Number	Classification	DG class	PG
Magnesium ribbon	7439-95-4	4.1.1B 6.1E 9.3C	4.1	III
Magnesium sulfate (anhydrous)	10034-99-8	No hazards determined	0	
Magnesium turnings	7439-95-4	4.1.1B 6.1E 9.3C	4.1	III
Maleic acid	110-16-7	6.1D 6.3A 8.3A 9.1D 9.3C	0	
Maltose	69-79-4	Not hazardous	0	
Manganese (II) sulfate	7785-87-7	6.1D 6.9A 9.1B 9.3C	0	
Manganese chloride	7773-01-5	6.1D	0	
Manganese dioxide	1313-13-9	6.1B 6.4A 6.8B 6.8C 6.9A 9.3C	0	
Mercury	7439-97-6	6.1B 6.5B 6.8A 6.9A 8.1A 9.1A 9.2B 9.3A	8	III
Mercury (I) chloride	10112-91-1	6.1D 6.3A 6.4A 9.1A 9.3C	6.1	II
Mercury (II) chloride	7487-94-7	6.1B 6.9A 8.2C 8.3A 9.1A 9.3A	6.1	II
Mercury (II) nitrate	10045-94-0	6.1B 6.9A 9.1A 9.3B	6.1	II
Methanoic acid (see formic acid)	64-18-6	3.1C 6.1C 6.5B 8.1A 8.2B 8.3A 9.1D 9.3C	8	II
Methanol	67-56-1	3.1B 6.1D 6.4A 6.8B 6.9A 9.3C	3.2, 6.1	II
Methyl cellulose	9004-67-5	No hazards determined	0	
Methyl orange (2.8-4.6)	547-58-0	6.1C 9.3B	0	
Methyl red (4.2-6.3)	493-52-7	No hazards determined	0	
Methyl salicylate	119-36-8	6.1D 6.3A 6.4A 9.1D 9.2D 9.3C	0	
Methyl Violet	none	6.1D 6.7B 8.3A 9.1A	0	
Methylamine	74-89-5	2.1.1A 6.1C 6.8B 6.9B 8.2B 8.3A 9.2D 9.3B	3.1,8	II
Methylated spirit	none	3.1B 6.1E 6.4A 6.8B 6.9A 9.1D	3,6.1	II
Methylene blue	61-73-4	6.1D 6.4A 9.1C	0	
Naphthalene	91-20-3	4.1.1B 6.1D 6.3B 6.4A 6.7B 6.9A 9.1A 9.3B	4	III
Nickel chloride	7718-54-9	6.1C 6.5B 9.1A 9.3B	6.1	II
Nickel nitrate	13138-45-69	5.1.1C 6.3B 6.4A 6.5A 6.5B 6.7A 9.1B	5.1	III
Nitric acid	7697-37-2	5.1.1C 6.1D 6.9B 8.1A 8.2A 8.3A 9.1D	8	II
Octan-1-ol (octanol)	111-87-5	3.1D 6.1D 6.3A 6.4A 9.1D 9.3C	0	
Oleic acid	112-80-1	6.3A 6.4A	0	
Orcein natural	1400-62-0	No hazards determined	0	
Oxalic acid crystals (ethandioic acid)	144-62-7	6.1D 6.8C 6.9B 8.1A 8.2C 8.3A 9.3B	8	III
Oxygen (compressed)	7782-44-7	5.1.2A	2.2(5.1)	I
Paraffin liquid	8002-74-2	Not hazardous	3	III
Paraffin wax	8002-74-2	Not hazardous	4.1,6.1b	III

Chemical Name	CAS Number	Classification	DG class	PG
1-Pentanol (n-amyl alcohol)	71-41-0	3.1C 6.1C 6.3A 6.4A 9.1D 9.2B 9.3B	3	II
3-Pentanol	584-02-1	3.1C 6.1D 9.3C		
Pepsin	9001-75-6	6.3A 6.4A 6.5A	0	
Petroleum jelly	8009-03-8	No hazards determined	0	
Phenol red	143-74-8	No hazards determined	0	
Phenolphthalein crystals	77-09-8	6.7B	0	
Phenolphthalein solution	77-09-8	6.7B	3.2	II
Phosphoric acid	7664-38-2	6.1D 8.1A 8.2C 8.3A 9.1D 9.3C	8	III
Phosphorous (red)	7723-14-0	4.1.1B 6.1D 6.9A 9.1C	4.1,6.1	III
Phosphorous trichloride	7719-12-2	6.1A 6.9A 8.2A 8.3A	8	II
Potassium aluminium sulfate	10043-67-1	6.1D 6.3A 6.4A 8.1A 9.1D 9.3C	0	
Potassium biphthalate	877-24-7	No hazards determined	0	
Potassium bi-sulfate	7646-93-7	6.1E 8.2C 8.3A	0	
Potassium bromate	7758-01-2	5.1.1B 6.1C 6.3A 6.4A 6.6B 6.7B 6.8B 6.9B 9.3B	5.1	II
Potassium bromide	7758-02-3	6.1D 6.3A 6.4A 6.5B 6.9B 9.1C 9.2C 9.3C	0	
Potassium carbonate	584-08-7	6.1D 6.3A 6.4A 9.3B	0	
Potassium chloride	7447-40-7	6.1D 6.3B 6.4A 9.3B	0	
Potassium chromate	7789-00-6	6.3A 6.4A 6.5B 6.6A 6.7A 9.1A	5.1,8	III
Potassium dichromate	10588-01-9	5.1.1B 6.1A 6.5A 6.5B 6.6A 6.7A 6.8A 6.9A 9.1A 9.2B 9.3B	5.1,6.1a	
Potassium di-hydrogen phosphate	7778-77-0	6.1D 6.4A 9.3C	0	
Potassium ferricyanide (iron III)	13746-66-2	6.1D	6.1	
Potassium ferrocyanide (iron II)	13943-58-3	6.1D	0	
Potassium hydrogen carbonate (Potassium bicarbonate)	298-14-6	No hazards determined	0	
Potassium hydrogen phthalate	877-24-7	No hazards determined	0	
Potassium hydroxide	1310-58-3	6.1C 8.1A 8.2B 8.3A 9.1D 9.3B	8	II
Potassium iodate	7758-05-6	5.1.1B 6.1D	5.1	II
Potassium iodide	7681-11-0	6.5B 9.1B	0	
Potassium nitrate	7757-79-1	5.1.1B 6.1D 6.3B 6.4A 9.3C	5.1	III
Potassium nitrite	7758-09-0	5.1.1B 6.1C 6.3B 6.4A 6.6B 6.9B 9.1A 9.3B	5.1	II
Potassium oxalate	583-52-8	6.1D	6.1,8	II
Potassium permanganate	7722-64-7	5.1.1B 6.1D 6.8B 6.9A 8.2C 8.3A 9.1A 9.2A 9.3C	5.1	II
Potassium phosphate monobasic	7778-77-0	6.1D 6.4A 9.3C	0	
Potassium sulfate	7778-80-5	6.3B	0	
Potassium thiocyanate	333-20-0	6.1D	6.1	

Chemical Name	CAS Number	Classification	DG class	PG
Propan-1-ol (n-propyl alcohol)	71-23-8	3.1B 6.1D 6.4A 9.3C	3.2	II
Propan-2-ol	67-63-0	3.1B 6.1E 6.3B 6.4A	3.2	II
Propane-1,2-diol	57-55-6	Not hazardous	0	
Propionic acid	79-09-4	3.1C 6.1C 8.2B 8.3A 9.1D 9.3B	8	III
Propylene	115-07-1	2.1.1A	2.1	
Pyrogallol	87-66-1	6.1D 6.6B 9.1C 9.3C	0	
Ringers salts	none	No hazards determined	0	
Safranin stain	477-73-6	6.3A 6.4A	0	
Salicylic acid (ortho-hydroxy benzoic acid; 2-hydroxy benzoic acid)	69-72-7	6.1D 6.3A 6.4A 9.1D 9.3B	0	
Sand (purified)	none	Not hazardous	0	
Sebacoyl chloride	111-19-3	6.1D 8.2C 8.3A 9.3C	8	II
Silica gel	63231-67-4	Not hazardous	0	
Silicon	7440-21-3	4.1.1B 6.1E	0	
Silicon dioxide sand	none	Not hazardous	0	
Silver acetate (ethanoate)	563-63-3	6.4A	0	
Silver chloride	7783-90-6	No hazards determined	0	
Silver nitrate	7761-88-8	5.1.1B 6.1D 6.9A 8.2B 8.3A 9.1A 9.2A 9.3A	5.1,6.1a	II
Soda lime Mixture of sodium hydroxide and calcium hydroxide	8006-28-8	8.2C 8.3A	8	III
Sodium (under paraffin)	7440-23-5	4.3A 8.2B 8.A 9.1D	4.3	I
Sodium acetate (anhydrous) (ethanoate)	127-09-3	6.1E 6.4A	0	
Sodium acetate (hydrated)	6131-90-4	No hazards determined	0	
Sodium bisulfate	7681-38-1	8.2C 8.3A	8	III
Sodium borate (anhydrous)	1330-43-4	6.1D 6.4A 6.8B 9.1D 9.3C	0	
Sodium bromide	7647-15-6	6.1E 9.1A	0	
Sodium carbonate (anhydrous)	497-19-8	6.1E 6.3A 6.4A 6.9B	0	
Sodium carbonate (hydrated)	6132-02-1	6.4A	0	
Sodium chloride	7647-14-5	6.1E 6.4A	0	
Sodium chromate	7775-11-3	6.1B 6.3A 6.5A 6.5B 6.6A 6.7A 8.3A 9.1A	6.1	II
Sodium citrate	68-04-2	Not hazardous	0	
Sodium dichromate	10588-01-9	5.1.1B 6.1A 6.5A 6.5B 6.6A 6.7A 6.8A 6.9A 8.2C 8.3A 9.1A 9.2B 9.3B	6.1	II
Sodium di-hydrogen phosphate	7558-80-7	6.1E 6.3B 6.4A	0	
Sodium fluoride	7681-49-4	6.1C 6.3B 6.4A 6.6B 6.8B 6.9A 9.1D 9.3B	6.1	III
Sodium hydrogen carbonate (sod. bicarb)	144-55-8	Not hazardous	0	
Sodium hydrogen sulfate	7681-38-1	8.2C 8.3A	0	

Chemical Name	CAS Number	Classification	DG class	PG
Sodium hydroxide	1310-73-2	6.1D 8.1A 8.2B 8.3A 9.1D 9.3C	8	II
Sodium hypophosphite	7681-53-0	No hazards determined	0	
Sodium hypochlorite	7681-52-9	5.1.1B 6.1E 8.2C 8.3A 9.1A	8	III
Sodium iodide	7681-82-5	6.1E 6.5B 6.9A 9.1A	0	
Sodium lauryl sulfate	151-21-3	6.1C 6.3B 6.4A 9.1D 9.2D 9.3C	0	
Sodium metabisulfite	7681-57-4	6.1D 6.3A 6.5A 6.5B 8.3A 9.1D 9.2B 9.3C	0	
Sodium metavanadate	13718-26-8	6.1C 6.3A 6.4A 9.3A	6.1	III
Sodium molybdate	7631-95-0	6.1E	0	
Sodium nitrate	7631-99-4	5.1.1C 6.1D 9.3C	5.1	III
Sodium nitrite	7632-00-0	5.1.1C 6.1C 6.4A 6.6B 6.9B 9.1A 9.3B	5.1	III
Sodium orthophosphate	7601-54-9	6.1C 8.1A 8.2C 8.3A 9.1D	0	
Sodium orthovanadate	13721-39-6	6.1C 9.3B	0	
Sodium oxalate	62-76-0	6.1D 9.3C	6.1,8	II
Sodium perborate	10486-00-7	6.1D	0	
Sodium peroxide	1313-60-6	5.1.1A 8.1A 8.2A 8.3A 9.1D	5.1	I
Sodium persulfate	7775-27-1	5.1.1C 6.1D 6.3A 6.4A 6.5A 6.5B 9.1D 9.2C 9.3C	5.1	III
Sodium phosphate monobasic	7558-80-7	6.1E 6.3B 6.4A	0	
Sodium potassium tartrate (rochelle salts)	304-59-6	Not hazardous	0	
Sodium salicylate	54-21-7	6.1D 6.3B 6.4A 9.3C	0	
Sodium silicate (anhydrous)	6834-92-0	6.1D 8.1A 8.2C 8.3A 9.3C	8	III
Sodium sulfate (anhydrous)	7757-82-6	Not hazardous	0	
Sodium sulfite	7757-83-7	9.1C	0	
Sodium sulfide	1313-82-2	4.2B 6.1C 8.2C 8.3A 9.1A 9.3B	8	II
Sodium tetraborate	1303-96-4	6.1E 6.4A 6.8B 9.1D	0	
Sodium thiosulfate	7772-98-7	6.3A 6.4A 6.5B	0	
Sorbose	3615-56-3	Not hazardous	0	
Starch (soluble)	9005-25-8	Not hazardous	0	
Stearic acid	57-11-4	Not hazardous	0	
Strontium chloride	10476-85-4	6.1E 6.4A	0	
Strontium nitrate	10042-76-9	5.1.1C 6.1D 6.3A 6.4A 6.9B 9.1A 9.3C	5.1	III
Sudan III	85-86-9	Not hazardous	0	
Sulfur (powder)	7704-34-9	4.1.1B 6.4A	4.1	III
Sulfur (roll)	7704-34-9	4.1.1B 6.4A	4.1	III
Sulfuric acid	7664-93-9	6.1A 6.7A 6.9A 8.1A 8.2A 8.3A 9.1D	8	II
Superphosphate		Not hazardous	0	

Chemical Name	CAS Number	Classification	DG class	PG
Talc	14807-96-6	Not hazardous	0	
Tannic acid	1401-55-4	6.1E 6.4A 9.1C	0	
Tartaric acid	147-71-7	6.4A	0	
Thymol blue(1.2-2.8, 8.0-9.6)	76-61-9	8.3A 6.4A	0	
Tin (II) chloride (stannous)	7772-99-8	6.1D 6.3A 6.4A 6.5B 9.3C	0	
Tin (IV) oxide (stannic)	10026-06-9	8.2C 8.3A	8	III
Tin foil	7440-31-5	Not hazardous	0	
Tin granules	7440-31-5	Not hazardous	0	
Titanium III sulfate sol.	13825-74-6	8.2B 8.3A	0	
Turpentine	8006-64-2	3.1C 6.1D 6.3A 6.4A 6.5B 9.1B	3	II
Universal indicator	mixture	contains alcohol	0	
Urea	57-13-6	6.1D 6.3B 6.4A 9.3C	0	
Wintergreen oil (methyl salicylate)	119-36-8	6.1D 6.3A 6.4A 9.1D 9.2D 9.3C	0	
Witch hazel	68916-39-2	No hazards determined	0	
Zinc acetate (ethanoate)	557-34-6	6.1D 6.3A 6.4A	0	
Zinc carbonate	3486-35-9	No hazards determined	0	
Zinc chloride	7646-85-7	6.1C 8.1A 8.2C 8.3A 9.1A 9.3B	8	III
Zinc foil	7440-66-6	4.3B 6.1E 9.1A	0	
Zinc granules	7440-66-6	4.3B 6.1E 9.1A	0	
Zinc nitrate	7779-88-6	5.1.1B 6.1C 9.1A 9.3B	5.1	II
Zinc oxide	1314-13-2	9.1A 9.3C	0	
Zinc pellets	7440-66-6	4.3B 6.1E 9.1A	0	
Zinc powder pyrophoric	7440-66-6	4.2A 6.1E 9.1A	4.3	II
Zinc sulfate	7733-02-0	6.1D 6.9B 8.3A 9.1A 9.3C	6.1b	
Notes				
1. 0 in the DG column means not classified for transport purposes according to the SDS used				
2, PG = Packing Group. 1 being the highest hazard.				
3. Sources www.ermanz.govt.nz/ search/registers.html www.hazard.com www.jtbaker.com/				

Appendix 3. Specific substances prohibited for use in schools (*MOE-forbidden)*

Chemical
2,4-dinitrophenylhydrazine
Acid green (biological stain)
Aniline
Antimony and its compounds
Aromatic amines
Arsenic and its compounds (except when in commercially available water test kits)
Asbestos (except in mineral form in a sealed container)
Auramine (biological stain)
Benzene
Benzidene
Benzoyl peroxide
Bismuth and its compounds
Cadmium and its compounds
Carbon disulfide
Carbon tetrachloride
Chlorates and perchlorates
Chloroform (use dichloromethane in its place)
Chromic acid
Coal tar and crude petroleum (except in sealed containers)
Cyanides
Dianisidine
Ethidium bromide
Explosives, including fireworks
Formaldehyde (Unless in a sealed container, for the purposes of biological preservation. Formaldehyde is classified as 6.7A, ERMA approval code HSR001162)
Hydrofluoric acid
Magenta I (biological stain)
Nitrobenzene and related compounds
Paris green (biological stain)
Perchloric acid
Phenols and phenolic compounds
Phenylthiocarbamide (PTC) and phenylthiourea (PTU) papers and solutions
Picric acid
Polyacrylamide
Potassium
Prussic acid
Pyridine
Radioactive materials (apart from those specifically mentioned in the section on radioactive materials in Safety in Science, MOE 2000)
Sudan IV (biological stain)
White phosphorus

Appendix 4: Substances and materials incompatible with class 2, 3, and 4 substances

Hazard classification	Incompatible substances and materials
2.1.1	All class 1 substances
	Class 2.1.2 substances
	All class 3 substances
	All class 4 substances
	All class 5 substances
2.1.2	All class 1 substances
	All class 3 substances
	All class 4 substances
	All class 5 substances
3.1	All class 1 substances
	All class 2 substances
	Class 3.2 substances
	All class 4 substances
	All class 5 substances
3.2	All class 1 substances
	All class 2 substances
	Class 3.1 substances
	Class 4.1.2, 4.2, and 4.3 substances
	All class 5 substances
4.1.1 (readily combustible solids)	All class 1 substances
	All class 2 substances
	Class 4.1.2, 4.1.3, 4.2, and 4.3 substances
	All class 5 substances
4.1.1 (those solids which cause fire through friction only)	Any substance likely to cause a spark when struck against a class 4.1.1 substance
4.1.2	All class 1 substances
	All class 2 substances
	Class 3.1 and 3.2 substances
	Class 4.1.3 and 4.2 substances
	All class 5 substances
	Catalytic impurities having a detrimental influence on the thermal stability and hazard
	presented by class 4.1.2 substances

Hazard classification	Incompatible substances and materials
4.1.3	All class 1 substances
	All class 2 substances
	Class 3.1 substances
	Class 4.2 substances
	All class 5 substances
4.2	All class 1 substances
	All class 2 substances
	All class 3 substances
	Class 4.1.1, 4.1.2, 4.1.3, and 4.3 substances
	All class 5 substances
	Air
	Oxygen
4.3	All class 1 substances
	All class 2 substances
	All class 3 substances
	Class 4.1.1, 4.1.2, 4.1.3, and 4.2 substances
	All class 5 substances
	All class 8 substances
	Water

Appendix 5: UN Labels & GHS Pictograms

Examples of UN labels and GHS pictograms:

HSNO Classes 1.1, 1.2, 1.3
(UN Classes 1.1, 1.2, 1.3)

HSNO Class 1.4
(UN Class 1.4)

HSNO Class 1.5
(UN Class 1.5)

HSNO Class 1.6
(UN Class 1.6)

HSNO Class 2.1.1A
flammable gases
(UN Class 2.1)
HSNO Class 2.1.2A:
flammable aerosols
(UN Class 2.1)

FLAMMABLE GAS

HSNO Class 2.1.1B
Flammable gases
(GHS pictogram)

UN Class 2.2: Gases under pressure:

- Compressed gas
- High pressure liquefied gas
- Low pressure liquefied gas
- Dissolved gas & Refrigerated liquefied gas

HSNO Class 3.1A, B & C
flammable liquids
(UN Class 3)
HSNO Class 3.2 liquid
desensitised explosives
(UN Class 3)

FLAMMABLE LIQUID

HSNO Class 3.1D flammable liquid
(GHS pictogram)

HSNO Class 4.1.1A and B readily combustible solids
(UN Class 4.1)
HSNO Class 4.1.2B, C, D, E & F self-reactive (UN Class 4.1)
HSNO Class 4.1.3A, B & C solid desensitised explosives
(UN Class 4.1)

FLAMMABLE SOLID

HSNO Class 4.1.2G self-reactive
(GHS pictogram)

HSNO Class 4.2A spontaneously combustible: pyrophoric liquids and pyrophoric solids
(UN Class 4.2)
HSNO Class 4.2B & C spontaneously combustible: Self-heating substances
(UN Class 4.2)

HSNO Class 4.3 substances which in contact with water emit flammable gases (UN Class 4.3)

HSNO Class 5.1.1A, B & C: Oxidising liquids and solids
(UN Class 5.1)
HSNO Class 5.1.2A Oxidising gases
(UN Class 5.1)

HSNO Class 5.2B, C, D, E & F: organic peroxides
(UN Class 5.2)

ORGANIC PEROXIDE

HSNO Class 5.2 G organic peroxides
(GHS pictogram)

Class 6.1A, B & C acute toxic (UN Class 6.1)

HSNO Class 6.1A, B & C acute toxic where the substance is a gas
(UN Class 2.3)

TOXIC

HSNO Class 6.1D acute toxic
HSNO Class 6.3A & B skin irritant
HSNO Class 6.4A eye irritant
HSNO Class 6.5B sensitisers (dermal)
(GHS pictogram)

CHRONIC TOXIC

HSNO Class 6.5A sensitisers (respiratory)
HSNO Class 6.6 mutagen
HSNO Class 6.7 carcinogen
HSNO Class 6.8 reproductive/developmental
HSNO Class 6.9 target organ/systemic
(GHS pictogram)

HSNO Class 8.1A corrosive to metals (UN Class 8)
HSNO Class 8.2 A, B & C: skin corrosive (UN Class 8)

CORROSIVE

HSNO Class 8.3 eye corrosive (GHS pictogram)

ECOTOXIC

HSNO Class 9.1A, B & C, aquatic ecotoxicity
HSNO Class 9.2A, B & C, soil ecotoxicity
HSNO Class 9.3A & B, terrestrial vertebrate ecotoxicity
HSNO Class 9.4A, B & C, terrestrial invertebrate ecotoxicity
(GHS pictogram).

Appendix 6: Disposal

Note: Disposal of ***Hazardous Substances*** is subject to the Resource Management Act and Council By-Laws in addition to HSNO requirements. The following specify the HSNO requirements only.

In general, substances must be disposed of by treatment using a method that changes the characteristics or composition of the substance so it is no longer a hazardous substance, or by exporting the substance from New Zealand as waste.

A summary of treatment methods is given in the following table. Detailed information is provided after the summary table.

Class	Disposal Treatment Systems	Methods Specifically Excluded
1	Controlled detonation, deflagration, or burning*.	Deposition in landfill or sewage facility
2,3,4	Controlled burning* Controlled environmental discharge (for 2.1.1, 2.1.2, 3.1, or 4.1.1)*	Deposition in landfill or sewage facility
5	Controlled burning* Controlled and segregated landfill*	Deposition in sewage facility
6,8	Environmental discharge provided Tolerable Exposure Limit (TEL) is not exceeded. (N.B. Can exceed TEL if rapidly biodegradable and degradation products are not hazardous) Landfill, sewage, combustion provided these techniques render the substance non-hazardous.	For class 6, dilution prior to discharge. (S8(3)(b) Hazardous substances (Disposal) Regulations 2001
9	Environmental discharge provided Environmental Exposure Limit (EEL) is not exceeded. Landfill, sewage, combustion provided these techniques render the substance non-hazardous. For 9.1 substances that are bio-accumulative and not rapidly degradable, treat before disposal so that the hazardous substance concentration is less than 1% by volume.	Dilution prior to discharge

Packages	Make incapable of containing any substance and dispose of as for the substance it contained taking account of the material the package is made of. Note: These requirements do not apply to packages that contained classes 1 to 5 substances if the contents have been made non-hazardous, or for classes 6, 8 or 9 substances if the contents are diluted to below hazard threshold and the quantity of dilute residue is less than 1% of the volume of the package.	Use for some other substance

* that meets the prescribed requirements of the HSNO (Disposal) Regulations in each case.

Laboratory Treatment

Other techniques for destroying a variety of hazardous chemicals have been documented by Lunn and Sansone (1994)[22]. The methods of destruction described in this publication ***should*** be used only by workers who have received appropriate training and who are thoroughly familiar with the potential hazards and chemistry of the substance to be destroyed and any reagents used for that destruction.

Contracted Treatment

Specialist contractors ***should*** be used for disposal of ***Hazardous Substances*** when laboratory treatment is not feasible.
Disposal of Non-Approved Hazardous Substances
Non-approved hazardous substances ***shall*** be

- Treated so they are no longer hazardous; or
- Exported from New Zealand; or
- Disposed of in a manner that is acceptable for an approved substance with similar properties. A record of the method of disposal, and the justification for using the method particular method of disposal, should be kept.

[22] Lunn, G and E B Sansone 'Destruction of Hazardous Chemicals in the Laboratory'. 1994, 2nd Ed, NY, J Wiley and Sons.

Cross Reference with the Hazardous Substances (Exempt Laboratories) Regulations 2001

Code of Practice	Exempt Laboratory Regulation Numbers
2. Management of Laboratories	8(2), 13, 14, 15
3. Security & Signage	8
4. Use of Hazardous substances in Teaching	9, 10
5 Operational requirements	5, 6, 7, 10, 11, 12, 16
6 Safe Methods of Use	10, 11
Exempt Laboratory Regulation Numbers	**Code of Practice**
5 Parts of Laboratory to be impervious to hazardous substances	5.4
6, 7 Design of laboratory in which hazardous substances are used	5.4
8 Entry to Laboratories	3
9 Recording of hazardous substances	5.1.4
10, 11 Handling and storage	5
12. Specification of containers	5
13, 14 Laboratory Manager	2
15 Knowledge Requirements for person handling hazardous substances	2
16 Emergency Response Plan	5.3

References

New Zealand Government Publications

ERMA NZ 2001: Summary User Guide to the HSNO Thresholds and Classifications of Hazardous Substances. ER-UG-04-1 6-01. Wellington 47 pages.

ERMA NZ 2004 Code of Practice for CRI and University Exempt Laboratories HSNO COP 1-1 06-04. Wellington 60 pages

ERMA NZ 2006: Labelling of Hazardous Substances: Hazard and Precautionary Information. Wellington. 35 pages.

ERMA NZ 2004. NZ Gazette 35 (March 2004) and NZ Gazette 128 (October 2004) Consolidated notices.

New Zealand Gazette 72. June 2006. Hazardous Substances (Chemicals) Transfer Notice 2006.

Practical Guidelines for the Safe Use of Organic Solvents. OSH, Department of Labour 1992 (http://www.osh.dol.govt.nz/order/catalogue/82.shtml)

Working with Organic Solvents. OSH Workplace Health Bulletin (http://www.osh.dol.govt.nz/order/catalogue/240.shtml)

Standards

AS/NZS 2982, 1997: Laboratory Design and Construction

AS/NZS 2243.1, 2005: Safety in Laboratories - Planning and operational aspects.

AS/NZS 2243.2, 2006: Safety in Laboratories - Chemical aspects

AS/NZS 2243.8, 2006: Safety in Laboratories - Fume Cupboards

AS/NZS 2243.10, 2004: Safety in Laboratories - Storage of Chemicals

AS 1940, 2004: The storage and handling of flammable and combustible liquids

Codes and Regulations

Hazardous Substances (Exempt Laboratories) Regulations 2001

Hazardous Substances (Identification) Regulations 2001

Hazardous Substances (Emergency Management) Regulations 2001

Hazardous Substances (Packaging) Regulations 2001

Hazardous Substances (Tracking) Regulations 2001

Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001

Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001

The Hazardous Substances (Minimum Degree of Hazard) Regulations 2001

The Hazardous Substances (Classification) Regulations 2001

The Hazardous Substances and New Organisms (Stockholm Convention) Amendment Act 2003

Fire Safety and Evacuation of Buildings Regulations 1992

Electricity Regulations 1997

Land Transport Rule Dangerous Goods 2005 (Rule 45001/1)

Maritime Rules Part 24A Carriage of Cargoes – Dangerous Goods

New Zealand Civil Aviation Rules Part 92 - Carriage of Dangerous Goods

Other Sources

www.hazard.com/ msds/index.php

www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/index.htm

Lunn G and E B Sansone 'Destruction of Hazardous Chemicals in the Laboratory.' 1994, 2nd Ed, NY, J Wiley and Sons

National Research Council, Prudent Practices in the Laboratory 1995: National Academy Press Washington DC. 426 p.