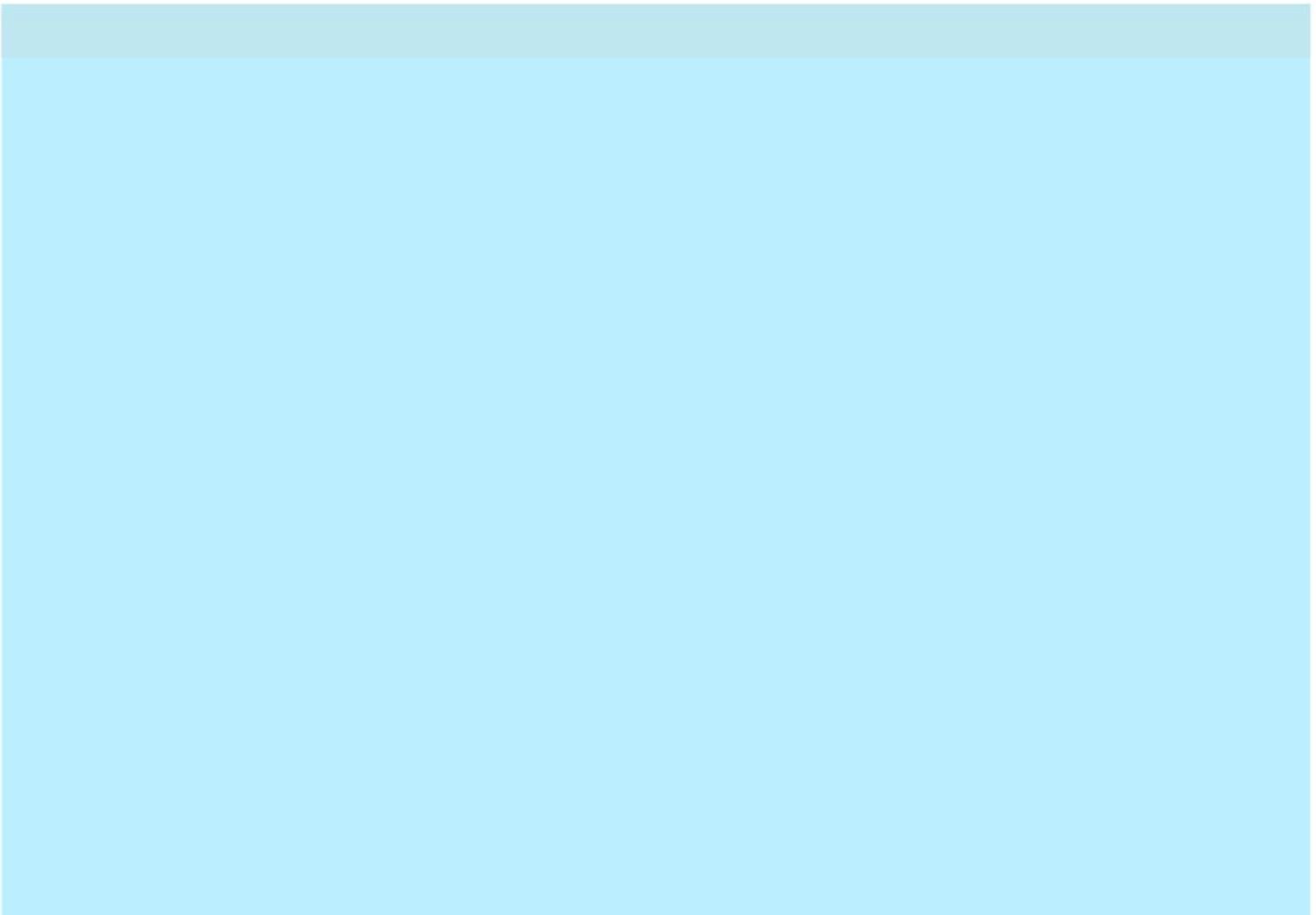




Environmental
Protection Authority
Te Mana Rauhi Taiao

HSNO Control Regulations

FEBRUARY 2012 (AS ORIGINALLY WRITTEN NOVEMBER 2001)



USER GUIDE

Foreword

The Hazardous Substances and New Organisms (HSNO) Act 1996 reformed the law relating to the management of hazardous substances and new organisms in New Zealand. With particular reference to hazardous substances, the HSNO Act replaced the Dangerous Goods Act 1974, the Explosives Act 1957, the Pesticides Act 1979 and the Toxic Substances Act 1979. In doing so, the HSNO Act provides for a co-ordinated and integrated approach to the management of hazardous substances and, in particular, provides a management framework that takes account of all the hazardous properties a substance may have.

The hazardous substances part of the HSNO Act came into force on 2 July 2001. In order to allow for a smooth transition for existing substances, certain provisions of the repealed legislation, together with the Regulations associated with the old Acts, were rolled-over into the transitional provisions of the HSNO Act. Existing substances continue to be controlled by these retained provisions during the course of the transitional period. This period will run for three to five years from the commencement date, during which time existing substances will be gradually transferred over to the HSNO regime. At the end of the transitional period, all existing substances will have HSNO hazard classifications and will be subject to HSNO controls, ie. the previous legislation will be fully replaced by the new HSNO regulatory framework. In the case of 'new' substances introduced into New Zealand after 2 July 2001, the HSNO regulations, which came into force on that date, will apply directly from the date of the substances' approvals.

The HSNO Act provides for a series of regulations to manage the risks associated with hazardous substances. One set of regulations deals with defining a hazardous substance ('Minimum Degrees of Hazard ("Threshold") Regulations') while another provides for the levels of the various types of hazards to be classified ('Classification' Regulations). Detailed explanation and interpretation of these can be found in the EPA User Guide to the HSNO Thresholds and Classifications. A third set of regulations provides for a range of controls to manage hazardous substances in order to minimise adverse effects. This group of regulations covers both controls on the hazardous properties of substances and controls on the lifecycle and infrastructure surrounding the substances. These 'Controls' Regulations are the subject of this User Guide.

Disclaimer:

This User Guide is intended to provide general advice on the controls for hazardous substances under the HSNO Act 1996. It is not to be taken as providing a definitive interpretation of the Act or its Regulations. In particular, many of the controls associated with certain hazard classifications will not apply to all substances that have those classifications, as they are related to particular uses or circumstances of use. It should also be noted that the controls attached to specific substances are those assigned by the Authority during the process of approval of the substance. They do not attach directly from the regulations. The controls assigned to approved substances can be found on the EPA Register of approvals, which is accessible on our website, www.epa.govt.nz

Table of Contents

Record of Amendments	2
Foreword	3
Disclaimer:.....	3
Part A: Background	9
1. How to Use this Guide	9
Summary of the Process	11
Key Definitions.....	12
2. Introduction	13
3. Regulatory Framework	14
HSNO Control Regulations	14
General Exclusion	15
4. Basis of Classification and Control Regulations	16
5. Performance-based Requirements—Best International Practice	18
6. Variation of Default Controls	19
7. Who will be affected?	20
7.1. Manufacturers, Importers and Primary Suppliers	20
7.2. Handlers of Hazardous Substances	21
7.3. Users of Hazardous Substances	21
7.4. Retailers	22
7.5. Disposers of Hazardous Substances.....	22
7.6. Transporters of Hazardous Substances	22
8. Means of Achieving Compliance (Codes of Practice, Test Certificates)	23
9. Relationship to other Acts	24
Table 1: HSNO Hazardous Property Classification Scheme	25
Physical Hazard Classification	25
Biological Hazard Classification	26
Table 2: Classification/Controls Matrix.....	27
Explosive Property Controls	28
Flammable Property Controls.....	35
Oxidising Property Controls.....	39
Toxic Property Controls.....	42
Corrosive Property Controls	44
Ecotoxic Property Controls.....	45

Key to Controls Codes	47
Table 3: Lifecycle Controls Related to Classification Levels.....	55
Table 4 Summary of HSNO Controls	61
Part B: Physical Property Controls.....	65
General Introduction.....	65
Glossary	65
1. Explosive Substances	70
1.1. Introduction	70
1.2. Summary of Controls for Explosive Substances.....	71
1.3. Detailed performance requirements.....	81
1.4. Means of meeting performance requirements	81
1.5. Comparison with previous controls	81
2. Flammable Substances	83
2.1. Introduction	83
2.2. Summary of Controls for Flammable Substances	84
2.3. Detailed performance requirements.....	90
2.4. Means of meeting performance requirements	91
2.5. Comparison with previous controls	91
3. Oxidising substances and organic peroxides.....	92
3.1. Introduction	92
3.2. Summary of Controls for Oxidising Substances (Class 5.1.1 and 5.1.2 Substances).....	93
3.3. Summary of Controls for Organic Peroxides (Class 5.2 Substances)	98
3.4. Detailed performance requirements.....	105
3.5. Means of meeting performance requirements	105
3.6. Comparison with previous controls	105
Part C: Biological Property Controls	107
General Introduction.....	107
Glossary	107
1. Toxic substances	109
1.1. Introduction	109
1.2. Summary of Controls for Toxic Substances.....	109
1.3. Detailed performance requirements.....	115
1.4. Means of meeting performance requirements	115
1.5. Comparison with previous controls	115
2. Corrosive Substances	117
2.1. Introduction	117
2.2. Summary of Controls for Corrosive Substances.....	117

2.3.	Detailed performance requirements.....	119
2.4.	Means of meeting performance requirements	119
2.5.	Comparison with previous controls	119
3.	Ecotoxic Substances	121
3.1.	Introduction	121
3.2.	Summary of Controls for Ecotoxic Substances.....	121
3.3.	Detailed performance requirements.....	126
3.4.	Means of meeting performance requirements	127
3.5.	Comparison with previous controls	127
Part D	Lifecycle Controls	128
	General Introduction	128
	Glossary	128
1.	Packaging.....	129
1.1.	Introduction	129
1.2.	Summary of Controls	130
1.3.	Detailed performance requirements.....	135
1.4.	Means of meeting performance requirements	136
1.5.	Comparison with previous controls	136
2.	Identification	137
2.1.	Introduction	137
2.2.	Summary of Controls	138
2.3.	Detailed performance requirements.....	143
2.4.	Means of meeting performance requirements	143
2.5.	Comparison with previous controls	143
3.	Emergency Management	145
3.1.	Introduction	145
3.2.	Summary of Controls	146
3.3.	Detailed performance requirements.....	152
3.4.	Means of meeting performance requirements	152
3.5.	Comparison with previous controls	153
4.	Disposal.....	154
4.1.	Introduction	154
4.2.	Summary of Controls	155
4.3.	Detailed performance requirements.....	160
4.4.	Means of meeting performance requirements	160
4.5.	Comparison with previous controls	160
5.	Tracking.....	162

5.1.	Introduction	162
5.2.	Summary of Controls	162
5.3.	Detailed performance requirements.....	165
5.4.	Means of meeting performance requirements	165
5.5.	Comparison with previous controls	165
6.	Personnel Qualifications	167
6.1.	Introduction	167
6.2.	Summary of Controls	167
6.3.	Detailed performance requirements.....	173
6.4.	Means of meeting performance requirements	173
6.5.	Comparison with previous controls	173
Part E	Additional Controls	175
	General Introduction	175
	Glossary	175
1.	Exempt Laboratories.....	176
1.1.	Introduction	176
1.2.	Summary of Controls	176
1.3.	Detailed performance requirements.....	181
1.4.	Means of meeting performance requirements	181
1.5.	Comparison with previous controls	181
2.	Small Fireworks	183
2.1.	Introduction	183
2.2.	Summary of Controls	184
2.3.	Detailed performance requirements.....	185
2.4.	Means of meeting performance requirements	185
2.5.	Comparison with previous controls	185
3.	Compressed Gases.....	187
3.1.	Introduction	187
3.2.	Summary of Controls	187
3.3.	Detailed performance requirements.....	187
3.4.	Means of meeting performance requirements	187
3.5.	Comparison with previous controls	187
4.	Road and Rail Tank Wagons for Liquid Hazardous Substances	188
4.1.	Introduction	188
4.2.	Summary of Controls	188
4.3.	Detailed performance requirements.....	188
4.4.	Means of meeting performance requirements	188

4.5.	Comparison with previous controls	188
5.	Bulk Storage Tanks for Liquid Hazardous Substances	189
5.1.	Introduction	189
5.2.	Summary of Controls	189
5.3.	Detailed performance requirements.....	189
5.4.	Means of meeting performance requirements	189
5.5.	Comparison with previous controls	189

Part A: Background

1. How to Use this Guide

This User Guide aims to assist in interpreting the Hazardous Substances controls regulations. It addresses the shaded components of the process summarised in the flowchart below. Information on the unshaded components of this flowchart is provided in the following EPA documents:

- User Guide to HSNO Thresholds and Classifications
- User Guide on Making a Hazardous Substance Application
- Technical Guide on Identifying Risks
- Technical Guide on Preparing Information on Risks, Costs and Benefits
- Protocol No 2 Series 2, Decision Paths

Part A of this Guide contains general introductory and background material on the HSNO regulatory framework for hazardous substances. It provides an overview of the regulatory “toolbox” and the hazardous property classification system, and discusses the linkage between the Hazardous Substances Classification Regulations and the suite of controls regulations, both the hazardous property controls and the lifecycle controls. It includes the EPA classifications/controls Matrix.

The Matrix comprises a set of tables that take the same format as the hazard classification tables. Each classification cell contains sets of alphanumeric codes which indicate which regulatory provisions apply to that classification. A key is provided which assigns each code to a provision from one of the hazardous substance regulations. In some cases, a Matrix code relates to one regulation, whereas in others, related regulatory requirements have been grouped under a single code that describes the overall coverage of that part of the regulations, or, conversely, single regulations have been split into several codes.

The Matrix is intended to provide a general indication only of the linkage between the hazard classification framework and the performance requirements contained in the controls ‘toolbox’. It is not to be taken as providing a definitive assignment of controls to substances with particular hazard classifications. We suggest that you carefully consider the Regulations directly, in relation to specific substances and circumstances, and, if necessary, obtain your own professional advice.

Part A also contains information on the performance standard approach of the control regulations, the ability for the ‘default’ controls (as indicated by the Matrix) to be varied for particular substances and circumstances, the relationship of the HSNO controls with provisions under other legislation, and means of achieving compliance with the HSNO controls. Discussion on the latter point focuses on the ability under the HSNO Act for Codes of Practice to be approved as recognised means of meeting the regulatory requirements.

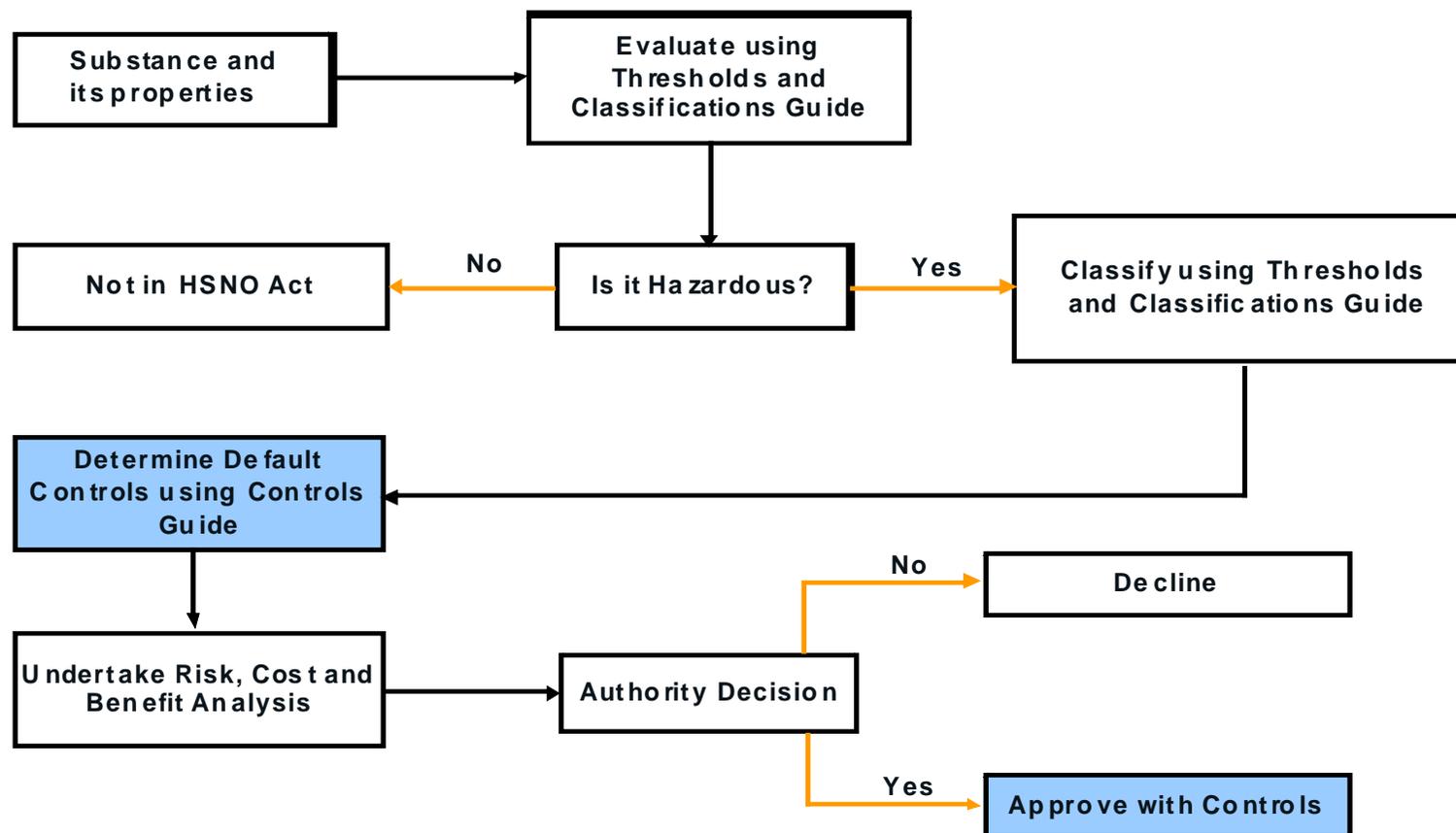
Parts B, C and D of this Guide cover, respectively, the hazardous property controls on the physical hazards (explosiveness, flammability and oxidising capacity), the biological hazards (toxicity, corrosiveness and ecotoxicity) and the lifecycle controls (identification, packaging, disposal, emergency management, tracking, and personnel qualifications).

Each of the sections in these Parts follows the same format. There is a short introduction, generally covering the scope of the relevant regulations, followed by a Summary of the Controls covered by the section concerned. This summary includes the relevant section from the controls Matrix and provides a description of the regulatory provisions covered by each of the codes listed. Next follows detailed information that explains and interprets the performance requirements of the regulatory provisions covered by the section [Note: these parts will be supplied as Phase 2 of the development of this Guide]. The following section, (which will also be supplied as part of Phase 2), gives information on means of meeting the performance requirements covered by this section. This includes a list and brief information on any relevant codes of practice or standards or other material that could be useful as a means of compliance. The final section of these Parts looks at a comparison of the HSNO controls with the controls that prevailed under the previous legislation.

Part E of this Guide covers the regulations that are made under section 140 of the HSNO Act; namely the prescribed requirements for laboratories operating under the exemption provisions of section 33 of the Act, the controls on small fireworks available for sale to the public, and the controls for containers for compressed gases, although this latter section is currently blank as these regulations are yet to be completed. Also to be covered in this Part will be the regulations dealing with road and rail tank wagons for liquid hazardous substances and the regulations for bulk fixed storage tanks for liquid hazardous substances. These sections are also currently empty as these regulations have yet to be finalised.

The layout of the sections in Part E will follow the same format as that described above for Parts B, C and D.

Summary of the Process



Key Definitions

The following key definitions and acronyms which appear in the control regulations include some of those used in the Hazardous Substances (Minimum Degrees of Hazard) Regulations and the Hazardous Substances (Classification) Regulations:

Aggregate water capacity	means the aggregate or cumulative total volume of one or more containers, calculated as the equivalent volume of water at 20oC and at 101.3kPa
Data	includes values that are directly measured, calculated, or estimated for any of the measures given
Gas	a substance that: (a) is completely gaseous at 20oC and at 101.3kPa absolute pressure or(b) has a vapour pressure of more than 300 kPa absolute pressure at 50oC
Liquid	a. a substance with a melting point of less than or equal to 20oC at 101.3 kPa absolute pressure <i>or</i> b. a viscous substance, without a defined melting point (additional criteria apply)
Permanent gas	means a gas that has a critical temperature at or below 0oC, where <i>critical temperature</i> is the temperature above which the gas cannot be liquefied by increasing the pressure
Solid	a substance that is neither a liquid or a gas
UN Manual of Tests and Criteria	3rd revised edition of the Recommendations on the Transport of Dangerous Goods Manual of Tests and Criteria, published in 1999 by the UN (New York and Geneva)
UN Model Regulations	11th revised edition of the Recommendations on the Transport of Dangerous Goods Model Regulations, published in 1999 by the UN (New York and Geneva)

Further definitions used in relation to specific regulations are referenced, as appropriate, at the start of each of Parts B to E.

2. Introduction

This User Guide aims to assist in interpreting the Hazardous Substances controls regulations. In HSNO terms, a substance is considered hazardous if it triggers any one of the threshold levels for any of the following hazardous properties:

- explosiveness
- flammability
- oxidising capacity
- corrosiveness
- toxicity
- ecotoxicity

A substance is also hazardous if it generates a substance with any one or more of these hazardous properties when it comes into contact with air or water (other than air or water where the temperature or pressure has been artificially increased or decreased).

When an application is made to the Authority to import or manufacture a hazardous substance (for release), each hazardous property of the substance will be assessed, and if it triggers a HSNO threshold, it will be assigned a hazard classification. Each hazard classification will trigger a set of 'default' controls from the control regulations whose aim is to manage the hazards associated with the substance throughout its lifecycle. The controls are assigned in accordance with the level of hazard ie more hazardous substances will attract more comprehensive levels of controls. Where the substance has more than one hazard classification, all the relevant controls for all classes will be applied.

If the Authority considers that the positive effects of the substance (benefits) outweigh any negative effects (risks and costs), the application may be approved, subject to controls. These controls may be the default controls triggered directly from the hazard classification as described above. However, under certain circumstances, the Authority may decide to vary the default controls if it considers they are either too stringent or not stringent enough to manage the adverse affects of the substance (see section on Variation of Default Controls). In assigning controls to a hazardous substance, the Authority's approach is to achieve the most cost-effective management of risks for the applicant and the community.

When existing substances are transferred from the transitional provisions of the Act to the new regulatory framework, hazard classifications are similarly assigned on the basis of the hazardous properties of the substance and the default controls also attach to these classifications. In this case, however, the Authority must take into account the controls that applied to the substance under the predecessor legislation and, if necessary, the default controls may be varied accordingly.

3. Regulatory Framework

The Hazardous Substances (Minimum Degrees of Hazard) Regulations 2001 (Threshold Regulations) were established under section 74(b) of the HSNO Act. The hazardous property thresholds specified in these regulations set the level of hazard below which any substance is not considered hazardous for the purposes of the Act. While many substances will trigger only one threshold, many other substances will trigger thresholds for more than one hazardous property. It is therefore necessary to evaluate each substance against the thresholds established for each hazardous property eg a flammable substance must also be evaluated against the toxic and ecotoxic thresholds. This is a change from the approach under the old legislation where the controls under previous Acts generally focussed on only one hazardous property eg flammability under the Dangerous Goods Act.

The Hazardous Substances (Classification) Regulations 2001 were established under section 74(a) of the HSNO Act. The classification scheme detailed in these regulations prescribes for each intrinsic hazardous property a number of degrees and types of hazard. The classification scheme (see Table 1) can be thought of as a matrix comprised of columns that represent the type of hazard, and rows that represent the degree of hazard. In general, for each type of hazard, a higher row in the table represents a higher degree of hazard. The bottom row in the classification scheme equates to the threshold for each type of hazard. The scheme uses the following nomenclature:

- **Class.** A unique identification number that indicates an intrinsic hazardous property (eg class 6 for toxicity)
- **Subclass.** Indicates the specific type of hazard within a class (eg subclass 6.1 for acute toxicity)
- **Category.** A letter which indicates the degree of hazard (eg Category A for the highest degree of hazard)
- **Hazard classification.** The combination of class, subclass and category constitutes the hazard classification of a substance (eg 6.1A = acutely toxic substance of high hazard).

HSNO Control Regulations

Performance based controls are provided for by regulations under section 75 and 76 of the Act. Each hazard classification is linked to a series of 'default' controls. A matrix showing which controls are linked to which hazard classification, and a key to identify the controls denoted by the codes given in the matrix, are presented in Table 2. The controls are applied to each hazard classification in accordance with the level of hazard ie more hazardous substances will attract more comprehensive levels of controls. An indication of how this is will apply is provided in Table 3 for the lifecycle controls.

Controls on hazardous substances are broadly divided into two types:

Hazardous property controls (section 75 of the Act) focus on the management of specific hazardous properties (explosiveness, flammability, oxidising capacity, toxicity, corrosiveness and ecotoxicity) rather than directly on the management of the substances themselves. The controls for substances with physical hazards (explosiveness, flammability, oxidising capacity) are primarily aimed at stopping the hazard from

actually occurring eg keeping ignition sources away from flammable substances. The controls for substances with biological hazards (toxicity, biological corrosiveness and ecotoxicity) are aimed at limiting the exposure of people or the environment to below levels where adverse effects may occur. In general, the hazardous property controls for all types of hazardous property are designed to:

- manage hazards arising from intrinsic hazardous properties
- reduce the likelihood of unintended occurrence of the hazard
- limit the adverse effects arising from (exposure to) the hazard.

Pan lifecycle controls (section 76 of the Act) are system controls which extend across all types of hazardous property and which focus on the lifecycle management of actual substances. These cover the following areas:

- packaging
- identification
- emergency management
- disposal
- tracking
- competency of persons handling highly hazardous substances (approved handlers)

Additional controls: The Act also provides for other controls (section 140 of the Act) not directly related to a substance's hazard classification or lifecycle. They cover areas including:

- requirements for laboratories coming under the exemption for the small-scale use of hazardous substances in research and development or teaching (under section 33 of the Act)
- competency requirements for test certifiers and enforcement officers
- restrictions on fireworks available for public sale
- control of compressed gases, whether hazardous or not, covering the hazard of containers under pressure.

A summary of the various types of HSNO hazardous substance controls is provided in Table 4.

The way in which the threshold, classification and controls elements of the HSNO regulatory framework link together is shown in Figure 1.

General Exclusion

It should be noted that the HSNO hazardous substance regulations generally do not apply to any substance that is required for the motive power or control of a motor vehicle, aircraft or ship while it is contained in the fuel system, electrical system, or control system of the vehicle, aircraft or ship.

Similarly, these regulations do not apply to any fuel gas supplied or used in a gas distribution system, gas installation or gas appliance when they are subject to the Gas Act 1992 and regulations made under that Act.

4. Basis of Classification and Control Regulations

The HSNO Act (section 141(1)(b)) provides for a number of incentives to base regulation on best international practice. Accordingly, the HSNO classification framework and control regulations were derived from recent international harmonisation activities, through which the globally harmonised system (GHS) for hazard classification and communication was developed. This work was initiated as a result of recommendations made at the UN Conference on Environment and Development in Rio de Janeiro (1992), contained in Chapter 19 of Agenda 21. The major technical work in developing the harmonised scheme for classification was undertaken by two groups:

- Work on the physical hazards (explosiveness, flammability and oxidising capacity) was undertaken by the UN Committee of Experts on the Transport of Dangerous Goods (UNCETDG)
- Work on the biological hazards (toxicity, ecotoxicity and corrosiveness) was undertaken by the OECD Advisory Group on Harmonisation of Classification and Labelling (AG-HCL). [Note: The section in the HSNO framework dealing with terrestrial ecotoxicity was derived from USEPA material as this had not been addressed by the AG-HCL at the time of drafting the HSNO regulations.]
- The activities of these two groups were coordinated by the Inter-Organisation Programme for the Sound Management of Chemicals Coordinating Group for the Harmonisation of Chemical Classification Systems (IOMC/CG-HCCS).
- The work on the harmonisation of chemical hazard communication was undertaken by a working group under the aegis of the International Labour Organisation (ILO/WG-HCHC).

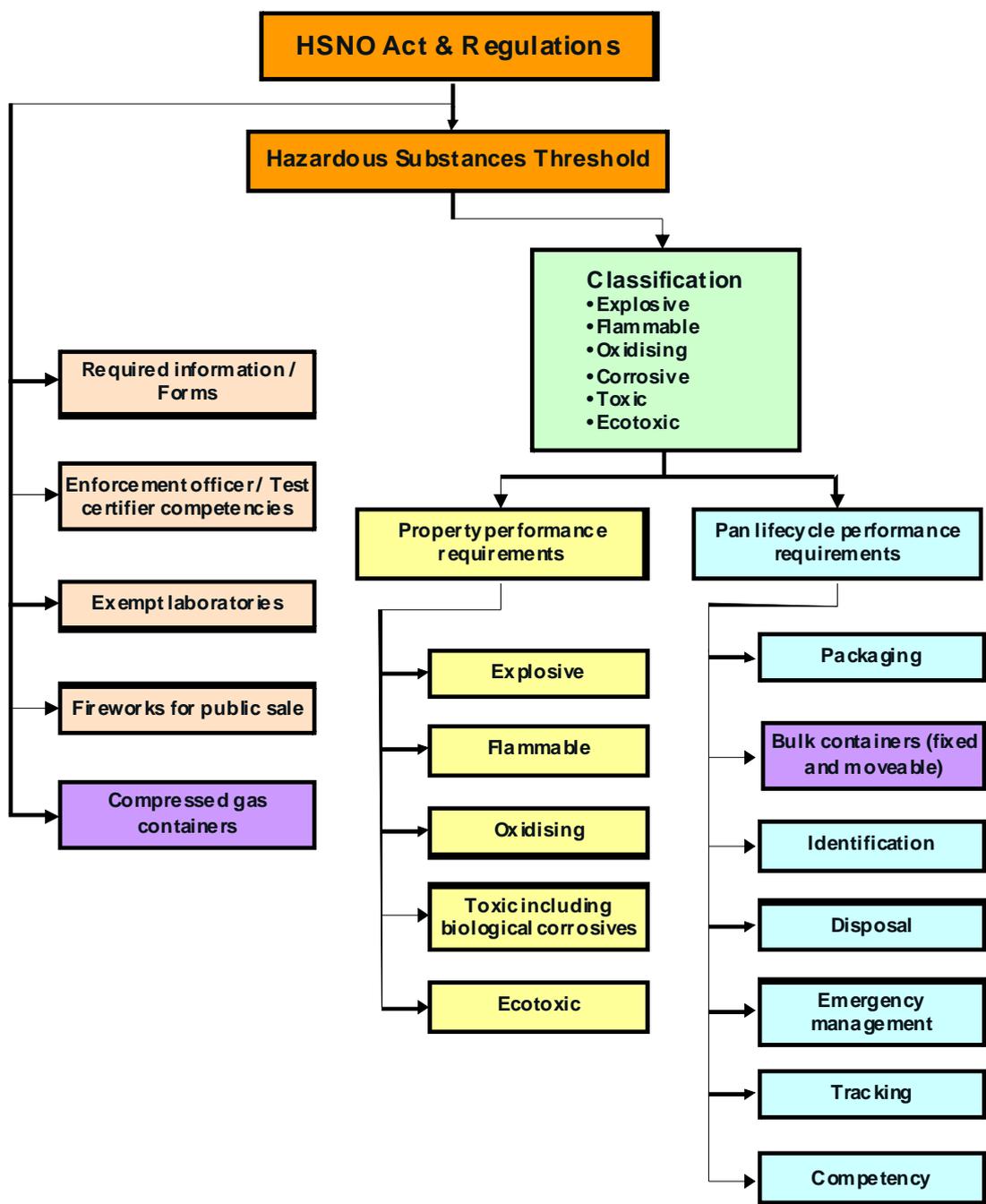


Figure 1 HSNO Regulatory Framework

5. Performance-based Requirements—Best International Practice

The controls are, for the most part, designed to be performance-based. That is, they specify the outcomes that are desired, but do not prescribe how to achieve those outcomes. In using quantifiable performance requirements, the regulations specify requirements to be met in such a way that:

- they do not constrain or limit the particular technical solution employed and
- a person can measure independently (albeit using some equipment or external expertise) whether or not they are in compliance with the requirement.

An example of a performance-based requirement is:

The substance must be packed in a package which is capable of withstanding the impact equivalent to a drop from 1.8 metres onto a rigid, flat surface at any orientation, without losing its ability to retain its entire content.

This requirement defines the objective (ability to withstand being dropped) and provides a means of measuring, ahead of an incident, the performance standard of that objective. However, it does not limit the type of technology (design materials etc) used to construct the package. Specification in this form is designed to both provide certainty about what is required and to provide freedom to adopt new, different, and potentially improved and lower cost technologies. That is, this approach gives flexibility to the user to use a range of existing and new methods without being constrained by regulation.

Use of performance-based requirements also means that most international requirements can be either accurately reflected by, or could be used to conform with, HSNO performance requirements. Consequently, the performance specifications provided in a number of the regulations are taken directly from the UN Recommendations for the Transport of Dangerous Goods Model Regulations.

For example, any of the detailed packaging designs conforming to “UN Specifications” will meet the required HSNO performance specifications. Also, any package design meeting these performance criteria would be able to be approved as a code of practice. This would provide both an ‘off the shelf’ solution for someone not wanting to be involved in package design, and an automatic defence against any charge of failing to package a substance properly.

A second example is that the HSNO performance specifications for identification were designed to comply with labels using major international systems such as the UNRTDG pictograms or EU risk phrase based system, or MSDSs complying with the ISO code.

For users who require some degree of prescription and assistance in meeting the control requirements, the HSNO Act allows for codes of practice to be approved to providing means to achieve this compliance. The EPA is able to issue, amend, approve and revoke codes of practice. Approved codes may come from existing documents such as New Zealand or overseas standards, codes from other government agencies (eg, OSH) or industry guidelines or best-practice documents, or they may be developed specifically to address the HSNO regulatory requirements. (See section on ‘Means of achieving compliance’ below).

6. Variation of Default Controls

The Authority has the discretion, under certain circumstances, to vary the default controls that are attached to the substance. In making these variations, the Authority must ensure that there is consistent control of the risks over the whole lifecycle of the substance. These circumstances include:

- substituting or adding controls where the adverse effects are greater than usual, or where there are less risky alternatives, or where the scientific and technical uncertainty is such that the nature of the effects cannot be accurately identified
- substituting or deleting controls where the adverse effects are less than usual, or where such a variation will enable the benefits of the substance to be retained without a significant increase in adverse effects.

Applicants who wish to have the default controls varied will have to provide sufficient information to support such variation with their application. Once an approval has been given and controls attached, the mechanism for changing controls is via the reassessment provisions of the Act.

7. Who will be affected?

Because the controls on hazardous substances cover their entire lifecycle, everyone involved in any aspect of managing a hazardous substance must be aware of, and comply with, the relevant HSNO controls.

During the transitional phase of the Act, most controls are unlikely to have major effects on people currently involved with hazardous substances for two main reasons:

- the controls applied to most hazardous substances will come in gradually through the transitional period only as substances are transferred to the new regulatory framework
- the HSNO regulatory controls are typically performance-based equivalents of the current prescriptive control regime.

The result is that for many manufacturers and other users of hazardous substances, compliance with previous regimes will most likely equate to compliance with the HSNO requirements. The major effect of the new regulations is that there will be more flexibility to adopt new technologies to achieve compliance with the controls. However, in some areas, the controls will have greater effects on people involved with hazardous substances, especially where New Zealand practice has been behind international best practice, or was out of alignment with international harmonisation activities. In these regards, the HSNO controls will impact to different extents in various sectors, as discussed below.

7.1. Manufacturers, Importers and Primary Suppliers

Much of the HSNO control framework will affect manufacturers of hazardous substances. They will need to comply with the controls relevant to the hazards of the substances they make eg by managing ignition sources for flammable substances, or by restricting workplace exposures for toxic substances. The controls relevant to the life cycle management of the substance will also apply eg:

- appropriate disposal of residual stocks
- emergency management plans
- signage for specified quantities.

Manufacturers will be subject to packaging and information controls that won't apply to end-users, such as:

- supplying the substance in appropriate packaging
- providing identification requirements relating to information immediately available with the substance, such as providing appropriate labels for the substance.

Importers and other primary suppliers of hazardous substances are likely to be less affected by the control framework than manufacturers. The main controls that will affect importers relate to ensuring the appropriate packaging and identification requirements are met. However, in some circumstances, such as where substances are directly handled or quantities of the substance are stored, controls relevant to hazard property and life cycle management may become relevant.

7.2. Handlers of Hazardous Substances

For people handling relatively small quantities of hazardous substances, the main controls relate to specific hazardous properties, such as managing ignition sources for flammable substances or restricting workplace exposures for toxic substances. However, where handlers store significant quantities of hazardous substances, or where operations involve highly hazardous substances, controls relating to the life cycle framework will apply, such as:

- emergency management plans
- tracking systems to locate the substance
- competency requirements for handlers.

Life cycle controls such as packaging and identification do not apply to the same extent as they do to manufacturers and importers. However, handlers will need to ensure that the requirements for packaging and identification are not comprised, for example, that:

- labels are not damaged
- substances are not stored so as to damage packaging, for example by over-stacking.

7.3. Users of Hazardous Substances

People using hazardous substances in manufacturing processes or commercial operations will mainly need to comply with the controls on:

- specific hazardous properties eg managing ignition sources for flammable substances
- restricting workplace exposures for toxic substances
- disposal of substances with hazardous properties .

Life cycle controls will become relevant for operations where significant quantities of hazardous substances are stored or which involve highly hazardous substances. They may need:

- emergency management plans
- tracking systems to locate the substance
- competency requirements for handlers.

For most users, however, life cycle controls will most likely only apply to a limited extent, and will mainly relate to meeting the requirements for packaging and identification, for example by making sure that labels are not damaged, and there is access to MSDS, and substances are not stored in a manner that may damage packaging, for example by over-stacking.

Home users: Domestic use of hazardous substances is not specifically excluded from most of the HSNO Act's control framework. As such, domestic users need to comply with any relevant hazardous property or life cycle controls. However, the low volumes and relatively low hazard of most substances used in the home will make compliance with most controls comparatively easy.

In addition, the competency provisions prescribed by the regulations relating to the need for approved handlers of highly hazardous substances effectively restricts the use of such hazardous substances in the

home. However, hazardous substances for widespread domestic use are required to have specific life cycle controls such as stating the need to restrict access to children and having a permanent marking on containers for toxic substances.

7.4. Retailers

Like end-users, retailers will need to comply with the controls required for the various hazardous properties of the substances they deal with, but since they are not directly using the substances, compliance with packaging and other requirements is likely to be relatively straightforward. Retailers will probably only need to take specific actions if they store significant quantities of hazardous substances or sell highly hazardous substances. Life cycle controls will most likely only apply to a limited extent, and will mainly relate to meeting the requirements for packaging and identification, for example by making sure that labels are not damaged and substances are not stored in a manner that may damage packaging, for example by over-stacking.

7.5. Disposers of Hazardous Substances

People disposing of hazardous substances are most directly affected by the Act's controls on disposal as prescribed in the Hazardous Substances (Disposal) Regulations 2001. The definition of disposal under HSNO is limited to treatment, discharge to the environment, or export from New Zealand. The controls on disposal also cover the disposal or decontamination of containers that have been used with hazardous substances. However, until the hazardous substance is disposed of, all relevant controls for a hazardous property and/or life cycle must be met.

7.6. Transporters of Hazardous Substances

The HSNO Act is concerned with the whole lifecycle management of hazardous substances and there are provisions in the HSNO regulations that impinge on transport. These include controls on packaging and containers, on identification, and competency of handlers and requirements for tracking in the case of more highly hazardous substances.

However, the specific detailed controls relating to the land transport of hazardous substances are to be found in the Land Transport Rule: Dangerous Goods (1999) issued by the LTSA under the Land Transport Act 1998. This Rule clarifies and consolidates the legislation relating to the transport of hazardous substances and is in harmony with the HSNO Act. In most situations, compliance with the requirements of the Rule would also be compliance with the HSNO requirements.

8. Means of Achieving Compliance (Codes of Practice, Test Certificates)

As a consequence of the performance based controls system, there is a large amount of freedom on how to comply with the conditions imposed on hazardous substances. There are also some quite powerful tools to help with compliance:

- Directly for a user, following an approved code of practice is considered to be complying with the relevant regulatory controls, and can also be used as a defence against prosecution under the Act. However, it should be noted that users cannot be prosecuted for failure to follow a particular code of practice.
- Test certificates can be issued to either a location/facility or to an approved handler as a means of confirming compliance. Test certificates are issued by test certifiers, people directly approved by the Authority, who have appropriate expertise and competence in the relevant area. The need for a test certificate will be included, where appropriate, in the default controls set by the Authority. A valid test certificate will verify that the required specification has been met and failure to have a current test certificate is an offence under the Act. The EPA will maintain a register of approved test certifiers which will be available on our website www.epa.govt.nz.

9. Relationship to other Acts

There are two aspects regarding the way in which the HSNO Act relates to other Acts. These stem from the HSNO Act being explicitly designed to provide a basic set of controls to manage the adverse effects of hazardous substances.

The first aspect is with regard to getting the controls “right”. The Authority is required to seek advice from a number of other regulators when setting controls on hazardous substances. These will generally include the Ministry of Health (MOH), Ministry of Agriculture and Forestry (MAF) and the Department of Labour (OSH) but may include others depending on the type of application. In addition, section 142(6) of the Act prescribes that any controls made under any other Act shall not contravene the controls applied under HSNO.

The second aspect is that the HSNO Act requires that (new) Resource Management Act (RMA) consents comply with HSNO controls, but allow for more (stringent) specific “site” conditions to be imposed than under HSNO.

Accordingly, the regulatory toolbox used by the Authority to impose controls on hazardous substance was developed to ensure that:

- it is based on hazardous effects
- it is performance based
- maximum use of is made of internationally accepted best practice regarding the types and degrees of each hazard considered
- the controls on hazardous substances act as part of a whole regulatory structure that includes other components from other legislation such as:
 - the Resource Management Act
 - the Building Act;
 - the Health and Safety in Employment Act; and
 - the transport legislation.

Table 1: HSNO Hazardous Property Classification Scheme
Physical Hazard Classification

Property	Explosiveness						Flammability					Capacity to Oxidise							
Class	Class 1			Class 2			Class 3			Class 4			Class 5						
Subclass	1.1 Mass explosion	1.2 Projection	1.3 Fire & minor blast	1.4 No significant hazard	1.5 Very insensitive	1.6 Extremely insensitive	2.1.1 Gases	2.1.2 Aerosols	3.1 Liquids	3.2 Liquid desensitised explosive	4.1.1 Readily combustible	4.1.2 Self reactive	4.1.3 Desensitised explosive	4.2 Spontaneously combustible	4.3 Dangerous when wet	5.1.1 Liquids/solids	5.1.2 Gases	5.2 Organic peroxides	
Hazard Classification	1.1A						2.1.1A	2.1.2A	3.1A	3.2A	4.1.1A	4.1.2A	4.1.3A	4.2A	4.3A	5.1.1A	5.1.2A	5.2A	
	1.1B	1.2B		1.4B			2.1.1B		3.1B	3.2B	4.1.1B	4.1.2B	4.1.3B	4.2B	4.3B	5.1.1B		5.2B	
	1.1C	1.2C	1.3C	1.4C					3.1C	3.2C		4.1.2C	4.1.3C	4.2C	4.3C	5.1.1C		5.2C	
	1.1D	1.2D		1.4D	1.5D				3.1D			4.1.2D						5.2D	
	1.1E	1.2E		1.4E								4.1.2E						5.2E	
	1.1F	1.2F	1.3F	1.4F								4.1.2F						5.2F	
	1.1G	1.2G	1.3G	1.4G								4.1.2G						5.2G	
		1.2H	1.3H																
	1.1J	1.2J	1.3J																
		1.2K	1.3K																
	1.1L	1.2L	1.3L																
						1.6N													
				1.4S															

Biological Hazard Classification

Property	Toxicity					Corrosiveness					Ecotoxicity				
Class	Class 6					Class 8					Class 9				
Subclass	6.1 Acutely toxic	6.3 Skin irritant	6.4 Eye irritant	6.5 Sensitisation	6.6 Mutagen	6.7 Carcinogen	6.8 Reproductive / developmental	6.9 Target organ	8.1 Metallic corrosive	8.2 Skin corrosive	8.3 Eye corrosive	9.1 Aquatic	9.2 Soil	9.3 Terrestrial vertebrates	9.4 Terrestrial invertebrates
Hazard Classification	6.1A	6.3A	6.4A	6.5A	6.6A	6.7A	6.8A	6.9A	8.1A	8.2A	8.3A	9.1A	9.2A	9.3A	9.4A
	6.1B	6.3B		6.5B	6.6B	6.7B	6.8B	6.9B		8.2B		9.1B	9.2B	9.3B	9.4B
	6.1C						6.8C			8.2C		9.1C	9.2C	9.3C	9.4C
	6.1D											9.1D	9.2D		
	6.1E														

Table 2: Classification/Controls Matrix

Cautionary Notes:

This Matrix is intended to provide a general indication of the linkage between the hazard classification framework and the performance requirements contained in the 'toolbox' of Hazardous Substances Regulations under the HSNO Act 1996. It is not to be taken as providing a definitive assignment of controls to substances with particular hazard classifications. We suggest that you carefully consider the Regulations directly, in relation to specific substances and circumstances, and, if necessary, obtain your own professional advice.

Some important points to note in respect of this Matrix are as follows:

1. The Matrix assigns controls to hazard classifications in accordance with the provisions in the Hazardous Substances Regulations. However, these controls, while they may be regarded as being 'default' sets, do not automatically apply to specific substances that have those classifications. This assignment must be confirmed, on a substance-by-substance basis, in accordance with the provisions of section 77 of the HSNO Act, following the granting of an approval for a new substance by the Authority. A similar process applies to the transfer approvals for existing substances in accordance with the provisions of section 160 of the Act.
2. Several of the controls linked to particular hazard classifications only apply in certain circumstances and are not generally applicable to all substances with that classification. For example, the control denoted by the code T8 in the hazard classifications for the acute toxicity subclass of 6.1 does not apply to all substances classified as 6.1, but only to those that are being laid outdoors for use as vertebrate poisons.
3. The codes used in the Matrix do not necessarily relate to a unique regulation number. In several cases, related regulatory requirements have been grouped under a single code that describes the overall coverage of that part of the regulations. For example, the code I21 relates to regulations 37-39 and 47-50 of the Identification Regulations. This covers the general requirements for provision and content of documentation to be provided in workplaces.
4. Substances will more often than not attract several hazard classification categories. However, it will be seen that there is considerable overlap between the sets of codes for individual categories and these can be combined and condensed to provide the overall set that would be the default set of a particular combination of classification categories. In doing this, it may be found that one hazard category for a substance may require one level of a particular control while another category for the same substance may require a higher level of that control. For example, for a flammable and toxic substance, the flammability classification may require Packing Group II packaging while the toxicity classification may call for Packing Group III packaging. In these circumstances, only the higher level of the control would apply.

Explosive Property Controls

Groupings for Explosive Type and Properties	Divisions for Types and Levels of Explosive Hazard					
	Mass Explosion 1.1	Projection 1.2	Fire & Minor Blast/Projection 1.3	Minor Fire or Projection 1.4	Very Insensitive Mass Explosion 1.5	Extremely Insensitive 1.6
A	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17*,X18* I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2					
B	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM10,EM11,EM12,EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2		X1,X2,X3,X4,X5,X6,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM10,EM11,EM12,EM13 AH1 TR1,TR2		

Groupings for Explosive Type and Properties	Divisions for Types and Levels of Explosive Hazard					
	Mass Explosion 1.1	Projection 1.2	Fire & Minor Blast/Projection 1.3	Minor Fire or Projection 1.4	Very Insensitive Mass Explosion 1.5	Extremely Insensitive 1.6
C	X1,X2,X3*,X4,X5,X6,X7,X9, X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM10,EM11, EM12,EM13 AH1 TR1*,TR2	X1,X2,X3,X4,X5,X6,X7,X9,X 10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2	X1,X2,X3*,X4,X5,X6,X7,X9, X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1*,TR2	X1,X2,X3,X4,X5,X6,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM10,EM11, EM12,EM13 AH1 TR1,TR2		
D	X1,X2,X3*,X4,X5,X6,X7,X8, X9, X10,X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM10,EM11, EM12,EM13 AH1 TR1*,TR2	X1,X2,X3,X4,X5,X6,X7,X9,X 10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2		X1,X2,X3,X4,X5,X6,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM10,EM11, EM12,EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X8,X 9, X10,X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2	

Groupings for Explosive Type and Properties	Divisions for Types and Levels of Explosive Hazard					
	Mass Explosion 1.1	Projection 1.2	Fire & Minor Blast/Projection 1.3	Minor Fire or Projection 1.4	Very Insensitive Mass Explosion 1.5	Extremely Insensitive 1.6
E	X1,X2,X3,X4,X5,X6,X7,X8,X9, X10,X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM10,EM11, EM12,EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X8,X9, X10,X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2		X1,X2,X3,X4,X5,X6,X8,X9, X10,X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM10,EM11, EM12,EM13 AH1 TR1,TR2		
F	X1,X2,X3,X4,X5,X6,X7,X8,X9, X10,X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X8,X9, X10,X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X8,X9, X10,X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X8,X9, X10,X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM10,EM11, EM12,EM13 AH1 TR1,TR2		

Groupings for Explosive Type and Properties	Divisions for Types and Levels of Explosive Hazard					
	Mass Explosion 1.1	Projection 1.2	Fire & Minor Blast/Projection 1.3	Minor Fire or Projection 1.4	Very Insensitive Mass Explosion 1.5	Extremely Insensitive 1.6
G	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X14,X15,X16, X17, X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X14,X15,X16, X17, X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2	X1,X2,X3*,X4,X5,X6,X7,X9, X10, X11,X12,X13,X14,X15,X16, X17, X18 I1,I4,I9,I12,I19,I21*,I24*,I29 P1,P4,PG2* D1,D6,D7*,D8* EM1*,EM3*,EM8*,EM11,EM12, EM13 AH1 TR1*,TR2	X1,X2,X3*,X4,X5,X6,X9,X10, X11,X12,X13,X14,X15,X16, X17,X18 I1,I4,I9,I12,I19,I21*,I24*,I29 P1,P4,PG2* D1,D6,D7*,D8* EM1*,EM3*,EM8*,EM10,EM11*, EM12*,EM13 AH1 TR1*,TR2		
H		X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12, EM13 AH1 TR1,TR2			

Groupings for Explosive Type and Properties	Divisions for Types and Levels of Explosive Hazard					
	Mass Explosion 1.1	Projection 1.2	Fire & Minor Blast/Projection 1.3	Minor Fire or Projection 1.4	Very Insensitive Mass Explosion 1.5	Extremely Insensitive 1.6
J	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2			
K		X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2			

Groupings for Explosive Type and Properties	Divisions for Types and Levels of Explosive Hazard					
	Mass Explosion 1.1	Projection 1.2	Fire & Minor Blast/Projection 1.3	Minor Fire or Projection 1.4	Very Insensitive Mass Explosion 1.5	Extremely Insensitive 1.6
L	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2	X1,X2,X3,X4,X5,X6,X7,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2			
N						X1,X2,X3,X4,X5,X6,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21,I24,I29 P1,P4,PG2* D1,D6,D7,D8 EM1,EM3,EM8,EM11,EM12,EM13 AH1 TR1,TR2

Groupings for Explosive Type and Properties	Divisions for Types and Levels of Explosive Hazard					
	Mass Explosion	Projection	Fire & Minor Blast/Projection	Minor Fire or Projection	Very Insensitive Mass Explosion	Extremely Insensitive
	1.1	1.2	1.3	1.4	1.5	1.6
S				X1,X2,X3*,X4,X5,X9,X10, X11,X12,X13,X17,X18 I1,I4,I9,I12,I19,I21*,I24*,I29 P1,P4,PG2* D1,D6,D7*,D8* EM1*,EM3*,EM8*,EM10,EM 11*,EM12*,EM13 AH1 TR1*,TR2		

Legend: X = explosive property control I = identification P = packaging D = disposal EM = emergency management
 TR = tracking AH = approved handler PG = packing group ■ = none currently authorised in New Zealand

X3* = subject to the exclusions in regulation 13 of the Controls 1 to 5 Regulations

X17* and X18* = Note that class 1.1A substances are not permitted to be transported

I21* and I24* = subject to the entry for class 1 in schedule 2 of the Identification Regulations

EM1* and EM3* = subject to the entry for class 1 in schedule 1 of the Emergency Management Regulations

EM8* = subject to the entry for class 1 in schedule 2 of the Emergency Management Regulations

EM11* and EM12* = subject to the entry for class 1 in schedule 4 of the Emergency Management Regulations

PG2* = subject to provisions in regulation 10 of the Packaging Regulations

D7* = subject to the entry for class 1 in schedule 1 of the Disposal Regulations

D8* = subject to the entry for class 1 in schedule 2 of the Disposal Regulations

TR1* = subject to the entry for class 1 in schedule 1 of the Tracking Regulations

Flammable Property Controls

Degree of Hazard	Nature of Flammable Hazard								
	Gases 2.1.1	Aerosols 2.1.2	Liquids 3.1	Liquid Desensitised Explosives 3.2	Readily Combustible Solids 4.1.1	Self-Reactive Solids 4.1.2	Desensitised Explosives 4.1.3	Spontaneously Combustible 4.2	Dangerous When Wet 4.3
A	F1,F2,F3,F4,F5,F6, F11,F12,F14,F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,CG D2,D6,D7,D8 EM1,EM4,EM8,EM9,EM10,EM11, EM12,EM13 AH1	F1,F2,F3,F4,F5,F6, F11,F12,F14,F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 CG D2,D6,D7,D8 EM1,EM4,EM8,EM9,EM10,EM11, EM12,EM13 AH1	F1,F2,F3,F4,F5,F6, F11,F12,F14,F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P5,PG1 D2,D6,D7,D8 EM1,EM4,EM8,EM9,EM10,EM11, EM12,EM13 AH1 TR1	F1,F3,F4,F7,F10, F11,F12,F13,F15, F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P6,PG1 D2,D6,D7,D8 EM1,EM4,EM8,EM9,EM10,EM11, EM12,EM13 AH1 TR1	F1,F2,F3,F4,F7,F8, F11,F12,F13,F15, F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P3,P7,PG2 D2,D6,D7,D8 EM1,EM4,EM8,EM9,EM10,EM11, EM12,EM13 AH1	F1,F2,F3,F4,F7,F9, F11,F12,F13,F15, F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P2,P8,PG2 D2,D6,D7,D8 EM1,EM4,EM8,EM9,EM10,EM11, EM12,EM13 AH1 TR1	F1,F2,F3,F4,F7,F10, F11,F12,F13,F15, F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P7,PG1 D2,D6,D7,D8 EM1,EM4,EM8,EM9,EM10,EM11, EM12,EM13 AH1 TR1	F1,F2,F3,F4,F7,F11, F12,F13,F15,F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P9,PG1 D2,D6,D7,D8 EM1,EM4,EM8,EM9,EM10,EM11, EM12,EM13 AH1 TR1	F1,F2,F3,F4,F7,F11, F12,F13,F15,F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P10,PG1 D2,D6,D7,D8 EM1,EM4,EM8,EM9,EM10,EM11, EM12,EM13 AH1 TR1
B	F1,F2,F3,F5,F6,F11, F12,F14,F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,CG D2,D6,D7,D8 EM1,EM4,EM8,		F1,F2,F3,F4,F5,F6, F11,F12,F14,F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P3,P5,PG2 D2,D6,D7,D8 EM1,EM4,EM8,	F1,F3,F4,F7,F10, F11,F12,F13,F15, F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P6,PG2 D2,D6,D7,D8 EM1,EM4,EM8,	F1,F2,F3,F7,F8,F11, F12,F13,F15,F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P3,P7,PG3 D2,D6,D7,D8 EM1,EM4,EM8,	F1,F2,F3,F4,F7,F9, F11,F12,F13,F15, F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P2,P8,PG2 D2,D6,D7,D8	F1,F2,F3,F4,F7,F10, F11,F12,F13,F15, F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P7,PG2 D2,D6,D7,D8	F1,F2,F3,F4,F7,F11, F12,F13,F15,F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P3,P9,PG2 D2,D6,D7,D8 EM1,EM4,EM8,	F1,F2,F3,F4,F7,F11, F12,F13,F15,F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P3,P10,PG2 D2,D6,D7,D8 EM1,EM4,EM8,

Degree of Hazard	Nature of Flammable Hazard								
	Gases 2.1.1	Aerosols 2.1.2	Liquids 3.1	Liquid Desensitised Explosives 3.2	Readily Combustible Solids 4.1.1	Self-Reactive Solids 4.1.2	Desensitised Explosives 4.1.3	Spontaneously Combustible 4.2	Dangerous When Wet 4.3
	EM9,EM10,EM11, EM12,EM13		EM9,EM10,EM11, EM12,EM13 AH1	EM1,EM4,EM8, EM9,EM10,EM11, EM12,EM13 AH1	EM9,EM10,EM11, EM12,EM13	EM1,EM4,EM8, EM9,EM10,EM11, EM12,EM13 AH1 TR1	EM1,EM4,EM8, EM9,EM10,EM11, EM12,EM13 AH1	EM9,EM10,EM11, EM12,EM13 AH1	EM9,EM10,EM11, EM12,EM13 AH1
C			F1,F2,F3,F5,F6, F11,F12,F14,F16, F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P3,P5,PG3 D2,D6,D7,D8 EM1,EM4,EM8, EM9,EM10,EM11, EM12,EM13	F1,F3,F7,F10,F11, F12,F13,F15,F16, F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P6,PG3 D2,D6,D7,D8 EM1,EM4,EM8, EM9,EM10,EM11, EM12,EM13		F1,F2,F3,F4,F7, F9, F11,F12,F13,F15, F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P2,P8,PG2 D2,D6,D7,D8 EM1,EM4,EM8, EM9,EM10,EM11, EM12,EM13 AH1	F1,F2,F3,F7,F10, , F11,F12,F13,F15, F16,F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P7,PG3 D2,D6,D7,D8 EM1,EM4,EM8, EM9,EM10,EM11, EM12,EM13	F1,F2,F3,F7,F11, F12,F13,F15,F16, F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P3,P9,PG3 D2,D6,D7,D8 EM1,EM4,EM8, EM9,EM10,EM11, EM12,EM13	F1,F2,F3,F7,F11, F12,F13,F15,F16, F17 I1,I5,I9,I13,I19, I21,I25,I29 P1,P3,P10,PG3 D2,D6,D7,D8 EM1,EM4,EM8, EM9,EM10,EM11, EM12,EM13

Degree of Hazard	Nature of Flammable Hazard								
	Gases 2.1.1	Aerosols 2.1.2	Liquids 3.1	Liquid Desensitised Explosives 3.2	Readily Combustible Solids 4.1.1	Self-Reactive Solids 4.1.2	Desensitised Explosives 4.1.3	Spontaneously Combustible 4.2	Dangerous When Wet 4.3
D			F2,F6,F11,F17 I1,I5,I9,I13,I19,I21,I25,I29 P1,P3 D2,D6,D7,D8 EM1,EM4,EM8,EM9, EM10,EM11,EM12,EM13			F1,F2,F3,F4,F7, F9,F11,F12, F13,F15,F16,F17 I1,I5,I9,I13,I19,I21,I25,I29 P1,P2,P8,PG2 D2,D6,D7,D8 EM1,EM4,EM8, EM9,EM10, EM11,EM12,EM13, AH1			
E						F1,F2,F3,F4,F7, F9,F11,F12, F13,F15,F16,F17, I1, I5, I9, I13, I19, I21, I25, I29, P1, P2, P8, PG2. D2, D6, D7, D8, EM1, EM4, EM8, EM9, EM10, EM11, EM12, EM13, AH1			
F						F1,F2,F3,F4,F7,			

Degree of Hazard	Nature of Flammable Hazard								
	Gases 2.1.1	Aerosols 2.1.2	Liquids 3.1	Liquid Desensitised Explosives 3.2	Readily Combustible Solids 4.1.1	Self-Reactive Solids 4.1.2	Desensitised Explosives 4.1.3	Spontaneously Combustible 4.2	Dangerous When Wet 4.3
						F9, F11, F12, F13, F15, F16, F17 I1, I5, I9, I13, I19, I21, I25, I29, P1, P2, P8, PG2, D2, D6, D7, D8, EM1, EM4, EM8, EM9, EM10, EM11, EM12, EM13, AH1			
G						F1, F2, F3, F7, F9, F11, F12, F13, F15, F16, F17 I1, I5, I9, I13, I19, I21, I25, I29, P1, P2, P8, PG2, D2, D6, D7, D8, EM1, EM4, EM8, EM9, EM10, EM11, EM12, EM13			

Legend: F = flammable property controls
EM = emergency management

I = identification
AH = approved handler

P = packaging
TR = tracking

PG = packing group
CG = compressed gas

D = disposal

Oxidising Property Controls

Degree of Hazard	Nature of Oxidising Hazard		
	Oxidising Liquids/Solids 5.1.1	Oxidising Gases 5.1.2	Organic Peroxides 5.2
A	O1,O2,O3,O4,O5,O6,O7,O8,O9,O10, O11 I1,I7,I9,I15,I19,I21,I27,I29 P1,P11,PG1 D3,D6,D7,D8 EM1,EM5,EM8,EM9,EM10, EM11,EM12,EM13 AH1 TR1	O1,O2,O3,O4,O5,O6,O8,O9,O10,O11 I1,I7,I9,I15,I19,I21,I27,I29 P1,CG D3,D6,D7,D8 EM1,EM5,EM8,EM9,EM10,EM11,EM13 AH1	OP1,OP2,OP3,OP4,OP5,OP6,OP7,OP8, OP9,P11,OP12,OP13,OP14 I1,I6,I9,I14,I19,I21,I26,I29 P1,P12,PG2 D3,D6,D7,D8* EM1,EM5,EM8,EM9,EM10, EM11,EM12,EM13 AH1 TR1
B	O1,O2,O3,O4,O5,O6,O7,O8,O9,O10, O11 I1,I7,I9,I15,I19,I21,I27,I29 P1,P3,P11,PG2 D3,D6,D7,D8 EM1,EM5,EM8,EM9,EM10, EM11,EM12,EM13 AH1		OP1,OP2,OP3,OP4,OP5,OP6,OP7,OP8, OP10,OP11,OP12,OP13,OP14 I1,I6,I9,I14,I19,I21,I26,I29 P1,P3,P12,PG2 D3,D6,D7,D8* EM1,EM5,EM8,EM9,EM10, EM11,EM12,EM13 AH1 TR1
C	O1,O2,O3,O4,O5,O6,O7,O8,O9,O10, O11 I1,I7,I9,I15,I19,I21,I27,I29 P1,P3,P11,PG3 D3,D6,D7,D8 EM1,EM5,EM8,EM9,EM10,		OP1,OP2,OP3,OP4,OP5,OP6,OP7,OP8, OP10,OP11,OP12,OP13,OP14 I1,I6,I9,I14,I19,I21,I26,I29 P1,P3,P12,PG2 D3,D6,D7,D8* EM1,EM5,EM8,EM9,EM10,

User Guide to the HSNO Control Regulations

	EM11,EM12,EM13 AH1		EM11,EM12,EM13 AH1
D			OP1,OP2,OP3,OP4,OP5,OP6,OP7,OP8, OP10,OP11,OP12,OP13,OP14 I1,I6,I9,I14,I19,I21,I26,I29 P1,P3,P12,PG2 D3,D6,D7,D8* EM1,EM5,EM8,EM9,EM10, EM11,EM12,EM13 AH1
E			OP1,OP2,OP3,OP4,OP5,OP6,OP7,OP8, OP10,OP11,OP12,OP13,OP14 I1,I6,I9,I14,I19,I21,I26,I29 P1,P3,P12,PG2 D3,D6,D7,D8* EM1,EM5,EM8,EM9,EM10, EM11,EM12,EM13 AH1
F			OP1,OP2,OP3,OP4,OP5,OP6,OP7,OP8, OP10,OP11,OP12,OP13,OP14 I1,I6,I9,I14,I19,I21,I26,I29 P1,P3,P12,PG2 D3,D6,D7,D8* EM1,EM5,EM8,EM9,EM10, EM11,EM12,EM13 AH1

G

OP2,OP5,OP7,OP8,OP14

I1,I6,I9,I14,I19,I21,I26

P1,P3,P12,PG2

D3,D6,D7,D8

EM1,EM5,EM8,EM9

Legend: O = oxidiser property controls OP = organic peroxide property controls TR = tracking I = identification
 P = packaging EM = emergency management D = disposal CG = compressed gas
 PG = packing group AH = approved handler
 D8* = subject to entry for subclass 5.2 in schedule 2 of the Disposal Regulations.

Toxic Property Controls

Degree of Hazard	Nature of Toxic Hazard							
	Acute Toxicity 6.1	Skin Irritant 6.3	Eye Irritant 6.4	Sensitiser (respiratory & contact) 6.5	Mutagen 6.6	Carcinogen 6.7	Reproductive/ Developmental 6.8	Target Organ Systemic 6.9
A	T1,T2,T3,T4,T5,T6,T7,T8, I1,I8,I9, I16,I17,I18,I19, I20,I21,I28,I29,I30, P1,P13,PG1, D4,D6,D7,D8, EM1,EM6,EM8,EM11, EM12,EM13, TR1, AH1	T1,T2,T4,T7 I1,I9,I16,I19,I21,I28 P1,P3,P13* D4,D6,D7,D8 EM1,EM6,EM8, EM11,EM12	T1,T2,T4,T7 I1,I9,I16,I19,I21,I28 P1,P3,P13* D4,D6,D7,D8 EM1,EM6,EM8, EM11,EM12	T1,T2,T4,T5,T7 I1,I9,I16,I17,I18,I19,I21,I28 P1,P3,P13,PG3 D4,D6,D7,D8 EM1,EM6,EM8, EM11,EM12	T1,T2,T3,T4,T7 I1,I9,I16,I17,I18,I19,I21,I28 P1,P3,P13,PG2 D4,D6,D7,D8 EM8,EM11,EM12	T1,T2,T3,T4,T5,T6,T7, I1,I9,I16, I17, I18,I19,I21,I28, P1,P3,P13,PG2, D4,D6,D7,D8, EM8,EM11,EM12, AH1	T1,T2,T3,T4,T7 I1,I9,I16,I17,I18,I19,I21,I28 P1,P3,P13,PG2 D4,D6,D7,D8 EM8,EM11,EM12	T1,T2,T3,T4,T7 I1,I9,I16,I17,I18,I19,I21,I28 P1,P3,P13,PG2 D4,D6,D7,D8 EM8,EM11,EM12
B	T1,T2,T3,T4,T5,T6,T7,T8, I1,I8,I9,I16, I17,I18,I19, I20,I21, I28,I29,I30, P1,P3, P13,PG2, D4,D6,D7, D8, EM1, EM6,EM8, EM11, EM12,EM13, TR1, AH1	T1,T2,T4,T7 I1,I9,I16,I19,I21,I28 P1,P3,P13* D4,D6,D7,D8 EM1,EM6,EM8, EM11,EM12		T1,T2,T4,T5,T7 I1,I9,I16,I17,I18,I19,I21,I28 P1,P3,P13,PG3 D4,D6,D7,D8 EM1,EM6,EM8, EM11,EM12	T1,T2,T4,T7 I1,I9,I16,I17,I18,I19,I21,I28 P1,P3,P13,PG3 D4,D6,D7,D8 EM8	T1,T2,T4,T7 I1,I9,I16,I17,I18,I19,I21,I28 P1,P3,P13,PG3 D4,D6,D7,D8 EM8,EM11,EM12	T1,T2,T4,T7 I1,I9,I16,I17,I18,I19,I21,I28 P1,P3,P13,PG3 D4,D6,D7,D8 EM8	T1,T2,T4,T7 I1,I9,I16,I17,I18,I19,I21,I28 P1,P3,P13,PG3 D4,D6,D7,D8 EM8
C	T1,T2,T3,T4,T5,T6,T7,T8, I1,I8,I9, I16, I17, I18,I19, I20,I21, I28,I29,I30, P1,P3, P13,PG3, D4,D6, D7,D8, EM1,EM6, EM8,EM11,EM12,EM13, TR1, AH1						T1,T2,T4,T7 I1,I9,I16,I17,I18,I19,I21,I28 P1,P3,P13,PG3 D4,D6,D7,D8 EM8	

D	T1,T2,T4,T7,T8 I1,I8,I9,I16,I17,I18,I19, I20,I21,I28,I29,I30 P1,P3,P13* D4,D6,D7,D8 EM1,EM6,EM8,EM11, EM12,EM13							
E	T1,T2,T4,T7,T8 I1,I8,I9,I16,I19,I21,I28, I30 P1,P13* D4,D6,D7,D8 EM1,EM6,EM8							

Legend: T = toxic property controls I = identification D = disposal EM = emergency management TR = tracking
 AH = approved handler PG = packing group P = packaging P13* = regulation 19(2) and 19(3) only apply

Corrosive Property Controls

Degree of Hazard	Nature of Corrosive Hazard		
	Metallic corrosive 8.1	Skin corrosive 8.2	Eye corrosive 8.3
A	I1,I2,I9,I10,I19,I21,I22,I29, P1,P3,P14,PG3, D4,D6,D8, EM8,EM13	T3,T4,T5,T6,T7 I1,I2,I9,I10,I17,I18,I19,I21, I22,I29,I30, P1,P14,PG1, D4,D6,D7,D8, EM1,EM2,EM8,EM11, EM12,EM13, AH1	T4,T5,T7, I1,I2,I9,I10,I17,I18,I19,I21, I22,I29,I30, P1,P3,P14,PG3, D4,D6,D7,D8, EM1,EM2,EM8,EM11, EM12,EM13
B		T3,T4,T5,T7, I1,I2,I9,I10,I17,I18,I19,I21, I22,I29, I30, P1,P3,P14,PG2, D4,D6,D7,D8, EM1,EM2,EM8, EM11, EM12,EM13	
C		T4,T5,T7, I1,I2,I9,I10,I17,I18,I19,I21,I22,I29,I30, P1,P3,P14,PG3, D4,D6,D7,D8, EM1,EM2,EM8, EM11, EM12,EM13	

Legend: T = toxic property controls I = identification P = packaging PG = packing group
 EM = emergency management D = disposal AH = approved handler

Ecotoxic Property Controls

Degree of Hazard	Nature of Ecotoxic Hazard			
	Aquatic 9.1	Soil 9.2	Vertebrate 9.3	Invertebrate 9.4
A	E1,E2,E5,E6,E7,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM11, EM12,EM13 TR1 AH1	E1,E2,E5,E6,E7,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM13 TR1 AH1	E1,E2,E4,E5,E6,E7,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM13 TR1 AH1	E1,E2,E3,E5,E6,E7,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM13 TR1 AH1
B	E1,E2,E6,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM11, EM12,EM13	E1,E2,E6,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM13	E1,E2,E4,E6,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM13	E1,E2,E3,E6,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM13
C	E1,E2,E6,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM11, EM12,EM13	E1,E2,E6,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM13	E1,E2,E4,E6,E8 I1,I9,I11,I19,I21,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM13	E1,E2,E3,E6,E8 I1,I3,I9,I11,I19,I21,I23,I29 P1,P3,P15,PG3 D5,D6,D7,D8 EM1,EM7,EM8,EM13

D	E1,E2,E6,E8 I1,I9,I11,I19,I21,I29 P1,P3 D5,D6,D7,D8 EM1,EM7,EM8,EM11, EM12,EM13	E1,E2,E6,E8 I1,I9,I11,I19,I21,I29 P1,P3 D5,D6,D7,D8 EM1,EM7,EM8,EM13		
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Legend: E = ecotoxic property controls I = identification P = packaging PG = packing group D = disposal
 EM = emergency management TR = tracking AH = approved handler

Key to Controls Codes

Code	Regulation #	Description
Explosives	Classes 1 to 5 Controls	
X1	Reg 7	General test certification requirements for all class 1 to 5 substances
X2	Reg 8	General public transportation restrictions and requirements for all class 1 to 5 substances
X3	Reg 13	Requirement for explosives to be under the control of an approved handler
X4	Reg 14	General limits on location of explosives
X5	Reg 15	Limits on impact or pressure or shock
X6	Regs 16, 17	Limits on spark energy, heat and fire,
X7	Reg 18	Limits on static electricity in relation to equipment
X8	Reg 19	Protection from stray electrical currents
X9	Reg 20	Protection from electromagnetic radiation
X10	Regs 21 – 25	Segregation of incompatible substances and securing explosive substances
X11	Regs 26 – 29, 31	Controls on hazardous substance locations where explosives are kept
X12	Reg 30	Test certification requirement for hazardous substance locations
X13	Regs 32 – 34	Controls on intended detonation and deflagration of explosive substances
X14	Regs 35 – 39, 41 – 43	Controls on outdoor pyrotechnic displays using class 1 category G explosives, including approved handler requirements
X15	Reg 40	Requirement to obtain test certificate for outdoor pyrotechnic displays using class 1 category G explosives
X16	Regs 44, 45	Controls on indoor pyrotechnic displays using class 1 category G explosives, including approved handler requirements
X17	Regs 46 – 50	Requirements for the transfer of explosive substances
X18	Regs 51 – 52	Requirements for the transportation of explosive substances by public road or rail
Flammables	Classes 1 to 5 Controls	
F1	Reg 7	General test certification requirements for all class 1 to 5 substances

Code	Regulation #	Description
F2	Reg 8	General public transportation restrictions and requirements for all class 1 to 5 substances
F3	Reg 55	General limits on flammable substances
F4	Reg 56	Certain flammable substances to be under the control of an approved handler
F5	Regs 58, 59	Requirements regarding hazardous atmosphere zones for class 2.1.1, 2.1.2 and 3.1 substances
F6	Regs 60 – 70	Requirements to prevent unintended ignition of class 2.1.1, 2.1.2 and 3.1 substances
F7	Regs 71, 72	Limits on ignition sources and temperature for class 3.2 and 4 substances
F8	Reg 73	Requirements to prevent unintended ignition of class 4.1.1 substances
F9	Reg 74	Requirements to prevent unintended ignition of class 4.1.2 substances
F10	Reg 75	Requirements to prevent unintended ignition of class 3.2 and 4.1.3 substances
F11	Reg 76	Segregation of incompatible substances
F12	Regs 77, 78	General requirement for hazardous substance locations for flammable substances
F13	Regs 79, 80	Requirements to control adverse effects of unintended ignition of class 3.2 and 4 substances at hazardous substance locations
F14	Reg 81	Test certification requirements for facilities where class 2.1.1, 2.1.2 or 3.1 substances are present
F15	Reg 82	Test certification requirements for facilities where class 3.2 or 4 substances are present
F16	Reg 83	Controls on transit depots where flammable substances are present
F17	Regs 84, 85	Requirements to control adverse effects of intended ignition of flammable substances, including requirements for protective equipment and clothing
Oxidising substances	Classes 1 to 5 Controls	
O1	Reg 7	General test certification requirements for all class 1 to 5 substances
O2	Reg 8	General public transportation restrictions and requirements for

Code	Regulation #	Description
		all class 1 to 5 substances
O3	Reg 88	General limits on class 5.11 and 5.12 substances
O4	Reg 89	Certain class 5.1.1 and 5.12 substances to be under the control of an approved handler
O5	Reg 91	Requirements to prevent unintended combustion or explosion of class 5.1.1 and 5.1.2 substances
O6	Reg 92	Requirements for equipment and clothing
O7	Reg 93	Requirements to control adverse effects of spills or failure of containers
O8	Regs 94 – 97	Controls on hazardous substance locations where class 5.1.1 or 5.1.2 substances are present, including additional requirements for facilities where these substances are manufactured
O9	Regs 98 – 100	Test certification requirements for hazardous substance locations where class 5.1.1 or 5.1.2 substances are present, including additional requirements for facilities where these substances are manufactured
O10	Reg 101	Controls on transit depots where class 5.1.1 or 5.1.2 substances are present
O11	Reg 102	Requirements to control adverse effects of intended combustion or explosion of class 5.1.1 or 5.1.2 substances, including requirements for protective equipment and clothing
Organic peroxides Classes 1 to 5 Controls		
OP1	Reg 7	General test certification requirements for all class 1 to 5 substances
OP2	Reg 8	General public transportation restrictions and requirements for all class 1 to 5 substances
OP3	Reg 106	General limits on class 5.2 substances
OP4	Reg 107	Certain class 5.2 substances to be under the control of an approved handler
OP5	Regs 109, 110	Requirements to prevent unintended combustion or explosion of class 5.2 substances, including limits on temperature
OP6	Reg 111	Limits on impact or pressure shock
OP7	Reg 112	Requirements for equipment and clothing
OP8	Reg 113	Requirements to control adverse effects of spills or failure of containers
OP9	Reg 114	Requirements to prevent unintended combustion or explosion

Code	Regulation #	Description
		of 5.2A substances
OP10	Reg 115	Requirements to prevent unintended combustion or explosion of class 5.2B, 5.2C, 5.2D, 5.2E or 5.2F substances
OP11	Regs 116 – 119	Controls on hazardous substance locations where class 5.2 substances are present, including additional requirements for facilities where these substances are manufactured
OP12	Regs 120 – 123	Test certification requirements for hazardous substance locations where class 5.2 substances are present, including additional requirements for facilities where these substances are manufactured and requirements for securing class 5.2 substances
OP13	Reg 124	Controls on transit depots where class 5.2 substances are present
OP14	Regs 125 – 126	Requirements to control adverse effects of intended combustion or explosion of class 5.2 substances, including requirements for protective equipment and clothing
Toxic substances (incl biological corrosives)		
Classes 6, 8 and 9 Controls		
T1	Regs 11-27	Limiting exposure to toxic substances; setting values for acceptable daily exposure (ADE)/reference dose (RfD), potential daily exposure (PDE), tolerable exposure limit (TEL); prohibition on use of substances in excess of TEL
T2	Regs 29-30	Controlling exposure in places of work and other 'use' situations; setting of workplace exposure standards (WES)
T3	Regs 5(1), 6	Requirements for keeping records of use
T4	Reg 7	Requirements for equipment used to handle substances
T5	Reg 8	Requirements for protective clothing and equipment
T6	Reg 9	Quantities of toxic substances that require an approved handler
T7	Reg 10	Restrictions on carriage of toxic substances on passenger service vehicles
T8	Reg 28	Controls for vertebrate poisons
Ecotoxic substances		
Classes 6, 8 and 9 Controls		
E1	Regs 32 – 45	Limiting exposure to ecotoxic substances, the environmental exposure limit (EEL) approach
E2	Regs 46 – 48	Restrictions on use of substances in application areas

Code	Regulation #	Description
E3	Reg 49	Controls relating to protection of terrestrial invertebrates eg beneficial insects
E4	Regs 50 – 51	Controls relating to protection of terrestrial vertebrates
E5	Regs 5(2), 6	Requirements for keeping records of use
E6	Reg 7	Requirements for equipment used to handle substances
E7	Reg 9	Quantities of ecotoxic substances that require an approved handler
E8	Reg 10	Restrictions on carriage of ecotoxic substances on passenger service vehicles
Identification	Identification Regulations	
I1	Regs 6, 7, 32 – 35, 36(1) – (7)	Identification requirements, duties of persons in charge, accessibility, comprehensibility, clarity and durability
I2	Reg 8	Priority identifiers for corrosive substances
I3	Reg 9	Priority identifiers for ecotoxic substances
I4	Reg 10	Priority identifiers for explosive substances
I5	Reg 11	Priority identifiers for flammable substances
I6	Reg 12	Priority identifiers for organic peroxides
I7	Reg 13	Priority identifiers for oxidising substances
I8	Reg 14	Priority identifiers for toxic substances
I9	Reg 18	Secondary identifiers for all hazardous substances
I10	Reg 19	Secondary identifiers for corrosive substances
I11	Reg 20	Secondary identifiers for ecotoxic substances
I12	Reg 21	Secondary identifiers for explosive substances
I13	Reg 22	Secondary identifiers for flammable substances
I14	Reg 23	Secondary identifiers for organic peroxides
I15	Reg 24	Secondary identifiers for oxidising substances
I16	Reg 25	Secondary identifiers for toxic substances
I17	Reg 26	Use of generic names
I18	Reg 27	Requirements for using concentration ranges
I19	Regs 29 – 31	Additional information requirements, including situations where substances are in multiple packaging
I20	Reg 36(8)	Durability of information for class 6.1 substances

Code	Regulation #	Description
I21	Regs 37-39, 47-50	General documentation requirements
I22	Reg 40	Specific documentation requirements for corrosive substances
I23	Reg 41	Specific documentation requirements for ecotoxic substances
I24	Reg 42	Specific documentation requirements for explosive substances
I25	Reg 43	Specific documentation requirements for flammable substances
I26	Reg 44	Specific documentation requirements for organic peroxides
I27	Reg 45	Specific documentation requirements for oxidising substances
I28	Reg 46	Specific documentation requirements for toxic substances
I29	Regs 51, 52	Signage requirements
I30	Reg 53	Advertising corrosive and toxic substances
Packaging	Packaging Regulations	Description
P1	Regs 5, 6, 7(1), 8	General packaging requirements
P2	Regs 7(2), (3)	Specific criteria for class 4.1.2 and 5.2 substances
P3	Reg 9	Criteria that allow substances to be packaged to a standard not meeting Packing Group I, II or III criteria
P4	Reg 10	Packaging requirements for explosive substances (class 1)
P5	Reg 11	Packaging requirements for flammable liquids (subclass 3.1)
P6	Reg 12	Packaging requirements for liquid desensitised explosives (subclass 3.2)
P7	Reg 13	Packaging requirements for flammable solids (subclasses 4.1.1 and 4.1.3)
P8	Reg 14	Packaging requirements for self-reactive flammable substances (subclass 4.1.2)
P9	Reg 15	Packaging requirements for substances liable to spontaneous combustion (subclass 4.2)
P10	Reg 16	Packaging requirements for substances that emit flammable gases when in contact with water (subclass 4.3)
P11	Reg 17	Packaging requirements for oxidising substances (subclass 5.1.1)
P12	Reg 18	Packaging requirements for organic peroxides (subclass 5.2)
P13	Reg 19	Packaging requirements for toxic substances (class 6)
P14	Reg 20	Packaging requirements for corrosive substances (class 8)

Code	Regulation #	Description
P15	Reg 21	Packaging requirements for ecotoxic substances (class 9)
PG1	Schedule 1	Packaging requirements equivalent to UN Packing Group I
PG2	Schedule 2	Packaging requirements equivalent to UN Packing Group II
PG3	Schedule 3	Packaging requirements equivalent to UN Packing Group III
Disposal	Disposal Regulations	
D1	Reg 5	Disposal requirements for class 1 substances (explosives)
D2,	Reg 6	Disposal requirements for class 2,3,4 substances (flammables)
D3	Reg 7	Disposal requirements for class 5 substances (oxidisers)
D4	Reg 8	Disposal requirements for class 6,8 substances (toxics and corrosives)
D5	Reg 9	Disposal requirements for class 9 substances (ecotoxics)
D6	Reg 10	Disposal requirements for packages
D7	Regs 11, 12	Information requirements for manufacturers, importers and suppliers, and persons in charge
D8	Regs 13, 14	Documentation requirements for manufacturers, importers and suppliers, and persons in charge
Emergency Management	Emergency Management Regulations	
EM1	Regs 6, 7, 9 – 11	Level 1 information requirements for suppliers and persons in charge
EM2	Reg 8(a)	Information requirements for corrosive substances
EM3	Reg 8(b)	Information requirements for explosive substances
EM4	Reg 8(c)	Information requirements for flammable substances
EM5	Reg 8(d)	Information requirements for oxidising substances and organic peroxides
EM6	Reg 8(e)	Information requirements for toxic substances
EM7	Reg 8(f)	Information requirements for ecotoxic substances
EM8	Regs 12-16, 18-20	Level 2 information requirements for suppliers and persons in charge
EM9	Reg 17	Additional information requirements for flammable and oxidising substances and organic peroxides
EM10	Regs 21 – 24	Fire extinguisher requirements
EM11	Regs 25 – 34	Level 3 emergency management requirements: duties of person in charge, emergency response plans

Code	Regulation #	Description
EM12	Regs 35 – 41	Level 3 emergency management requirements: secondary containment
EM13	Reg 42	Level 3 emergency management requirements: signage
Tracking	Tracking Regulations	
TR1	Regs 4(1), 5, 6	General tracking requirements
TR2	Reg 4(2)	Requirement to track explosive (class 1) substances
Approved handlers	Personnel Qualification Regulations	
AH1	Regs 4 – 6	Approved Handler requirements (including test certificate and qualification requirements)

Table 3: Lifecycle Controls Related to Classification Levels

[Note: This table only provides a limited summary of the provisions of the regulations. For further details consult the following sections of this Guide and the Hazardous Substances Regulations.]

Control	Hazardous Property				
	Toxic (incl biological corrosives)	Ecotoxic	Flammable	Oxidising	Explosive
Identification	All classes	All classes	All classes	All classes	All classes
Information required to be immediately available:	Classes 6.1A-E and all corrosives	Classes 9.1A-C, 9.2A-C, 9.3A-B, 9.4A-C	All, flammable nature and state	All, oxidiser or organic peroxide	All, explosive and hazard classification
unequivocal identification	All classes	All classes	All classes	All classes	All classes
Priority identifiers (hazard classification)	All classes	All classes	All classes	All classes	All classes
warning information	Classes 6.1A-C, 6.5A-B, 6.6A-B, 6.7A-B, 6.8A-C, 6.9A-B		All classes		
id manufacturer/importer					
id toxic components					
Workplace signage requirements for quantities and hazard levels	>50 kg Class 6.1A >250 kg Class 6.1B >1000 kg Class 6.1C >10000 kg Class 6.1D >50 kg Class 8.2A >250 kg Class 8.2B >1000 kg Class 8.2C, 8.3A	>100 kg Classes 9.1A, 9.2A, 9.3A, 9.4A >1000 kg Classes 9.1B, 9.2B, 9.3B, 9.4B, 9.1C, 9.2C, 9.4C >10000 kg Classes 9.1D, 9.2D, 9.3C	>250 kg gases 2.1.1A >500 kg gases 2.1.1B >3000 L aerosols 2.1.2A >50 L/kg Class A >250 L/kg Class B	>50 kg Class 5.1.1A >500 kg Class 5.1.1B >1000 kg Class 5.1.1C >250 kg Class 5.1.2A >1 kg Class 5.2A or B >10 kg Class 5.2C-	Any quantity for other than Classes 1.3C, 1.4G or 1.4S >50 kg of Classes 1.3C, 1.4G or 1.4S

Control	Hazardous Property				
	Toxic (incl biological corrosives)	Ecotoxic	Flammable	Oxidising	Explosive
			>1000 L/kg Class C for flammable liquids and solids, other than Classes 4.1.1 and 4.1.2 >250 kg Class 4.1.1A >1000 kg Class 4.1.1B >50 kg Class 4.1.2A or B >250kg Class 4.1.2C or D >1000kg Class 4.1.2E-G >10000 L Class 3.1D	F	
Packaging	UN PG I, II, III	UN PG III requirements for Classes 9.1 to 9.4, in	UN PG I, II, III	UN PG I, II, III	UN PG II requirements

Control	Hazardous Property				
	Toxic (incl biological corrosives)	Ecotoxic	Flammable	Oxidising	Explosive
	<p>requirements</p> <p>Requirements for small packaging</p> <p>Provision for child-resistant packaging for domestic chemicals of Classes 6.1D, 6.1E, 6.3A, 6.3B and 6.4A, and 8.2B, 8.2C and 8.3A</p>	<p>hazard degree A-C</p> <p>Packaging for hazard degree A, B and C < 5kg (L) and for degree D will comply with requirements for small packaging</p>	<p>requirements</p> <p>Packaging for flammable liquids 3.1D may comply with requirements for small packaging</p>	<p>requirements</p>	
Disposal	<p>Treatment to reduce hazard to below threshold level,</p> <p>or</p> <p>treatment and discharge, or discharge such that TEL is not exceeded in the environment</p>	<p>Treatment to reduce hazard to below threshold level,</p> <p>or</p> <p>treatment and discharge, or discharge such that EEL is not exceeded in the environment</p>	<p>Treatment to reduce hazard to below threshold level, including controlled burning</p> <p>Not to be disposed to sewage treatment facility unless below the threshold for</p>	<p>Treatment to reduce hazard to below threshold level</p> <p>Controlled burning such that detonation does not occur</p> <p>Managed discharge to landfill</p> <p>Not to be disposed to sewage treatment facility unless below the threshold for</p>	<p>Treatment to reduce hazard to below threshold level</p> <p>Controlled detonation or deflagration</p> <p>Not to be disposed to the environment or landfill or sewage treatment facility</p>

Control	Hazardous Property				
	Toxic (incl biological corrosives)	Ecotoxic	Flammable	Oxidising	Explosive
			flammability Some classes only may be disposed of by managed discharge to landfill	oxidising capacity	
Emergency Management Level 1 requirements	All except small quantities of low hazard classes	All except small quantities of categories A and B and < 1kg/L of Classes 9.1C, 9.1D, 9.2C, 9.2D, 9.3C, 9.4C	All except small quantities and < 5L of class 3.1D	All except small quantities and < 5L/kg of class 5.2G	All except small fireworks, safety ammunition, some flares and signalling devices, and some articles in classes 1.4G and 1.4S
Emergency Management Level 2 requirements	Emergency management documentation	Emergency management documentation	Emergency management documentation Fire-fighting requirements	Emergency management documentation Fire-fighting requirements	Emergency management documentation Fire-fighting requirements

Control	Hazardous Property				
	Toxic (incl biological corrosives)	Ecotoxic	Flammable	Oxidising	Explosive
Emergency Management Level 3 requirements	>100 kg Class 6.1A, B or C, 8.2A >1000 kg Class 6.1D, 6.5A, 6.5B, 6.7A, 8.2B >10,000 kg of other classes, excluding 6.1E, 6.6B, 6.8B, 6.8C, 6.9B	>100 kg Class 9.1A >1000 kg Classes 9.1B, 9.1C >10,000 kg Class 9.1D	>50 kg Class 4.1.2A & B >100 kg Class 3.1A, 3.2 A-C, 4.1.2C & D, 4.1 .3A-C, 4.2A, 4.3A >200 kg Class 4.1.2E-G >300 kg Class 2.1.1A >1000 kg Class 2.1.1B, 3.1 B, 4.1.1A, 4.2B, 4.3B >3000 L 2.1.2A >10,000kg	>10 kg Class 5.2A&B >25 kg Class 5.2C&D >50 kg Class 5.1.1A >100 kg Class 5.1.2A, 5.2E&F >500 kg Class 5.1.1B >5000 kg Class 5.1.1C	>50 kg Class 1.1 or 1.2 or any combination of these >100 kg Class 1.3 >200 kg Class 1.4, 1.5, or 1.6 or any combination of these

Control	Hazardous Property				
	Toxic (incl biological corrosives)	Ecotoxic	Flammable	Oxidising	Explosive
			Class 3.1C&D, 4.1 .1B, 4.2C, 4.3C		
Tracking	Classes 6.1A, 6.1B, 6.1C	Classes 9.1A, 9.2A, 9.3A, 9.4 A	Class 3.1A, 3.2A, 4.1.2A&B, 4.1.3A, 4.2A, 4.3A	Class 5.1.1A, 5.2A&B	All except small fireworks, safety ammunition, some articles in Class 1.4S, some flares and emergency signalling devices, model rocket motors and small quantities of smokeless powders and gunpowder.
Approved Handlers	Tracked substances plus Class 6.7 A, 8.2A	Tracked substances	Tracked substance s plus Class 2.1.1A, 2.1.2A, 3.1B, 3.2B, 4.1.1A, 4.1.2C-F, 4.1.3B, 4.2B, 4.3B > certain quantities	Tracked substances plus Class 5.1.1B&C, 5.1.2A, 5.2C,D,E,&F	Tracked substances

Table 4 Summary of HSNO Controls

	Title	Key contents
Hazardous Property Controls	Explosive	<p>Limits to prevent accidental initiation</p> <ul style="list-style-type: none"> - impact or pressure shocks; - spark energy - static electricity - lightning strike/side flashing - electromagnetic radiation/stray electric currents - deterioration of explosive articles and loss of ability to function safely <p>Limits to Explosive Facilities to limit the likelihood of unintended initiation (Design and Test certificate requirements)</p> <ul style="list-style-type: none"> - fixed facility (assembly, testing, repair, inspections, manufacturing and packing) test certificate - explosives storage facility test certificate <p>Controlling detonation or deflagration</p> <ul style="list-style-type: none"> - quantities and safety distances - limits on effects <p>defining an area for unintended detonation or deflagration within the facility</p> <p>outside the defined area</p> <p>where explosives are occasionally present</p> <p>intended detonation outside a defined detonation impact area</p> <p>Additional pan-life controls</p> <ul style="list-style-type: none"> - competency - containers (explosive magazines) <p>Managing Areas during intended detonation</p> <p>Managing Areas during intended deflagration</p> <p>Outdoor displays</p> <p>Indoor displays</p> <p>Managing Locations where explosives are present for limited periods of time.</p> <p>Managing incompatible substances.</p>
	Flammable	<p><i>Liquids, gases & aerosols</i></p> <p>Generic requirements for preventing unintended ignition</p> <p>Zones for managing electrical and other ignition sources</p> <p>Flammable gas detection</p>

Title	Key contents
	<p>Test certification</p> <p>Control of planned combustion</p> <p>Protective equipment and clothing</p> <p><i>Flammable solids</i></p> <p>Generic requirements for preventing unintended ignition</p> <p>Dealing with friction</p> <p>Self reactive solids</p> <p>Desensitised explosives</p> <p>Zones - controlling for the effects of fire or explosion</p> <p>Test certification</p> <p>Control of planned combustion</p>
Oxidising & Organic Peroxides	<p>Limiting unintended combustion or explosion by accidental contact with incompatible materials;</p> <ul style="list-style-type: none"> - managing capacity to oxidise - control according to classification degree <p>Limiting accidental combustion or explosion through</p> <ul style="list-style-type: none"> - management of exposure to energy sources (temperature, ignition sources, impact or pressure shock) - accidental exposure due to spills or failure of containers <p>Limit on effects outside a defined fixed location</p> <p>Limit on effects inside a defined fixed location</p> <p>Test Certificate requirements for fixed location</p>
Toxic	<p>Setting an Acceptable Daily Intake</p> <p>Setting tolerable exposure limits</p> <p>Limits on exposure</p> <p>Controls on permitted activities under RMA prior to HSNO</p> <p>Records of Use</p> <p>Controlling exposure in places of work</p> <p>Limiting access to authorised persons</p> <p>Purpose-specific equipment substance containment</p> <p>Protective clothing/equipment requirements</p>
Ecotoxic	<p>Setting Environmental Exposure Limits (EEL)</p> <p>Establishing an acute EEL</p> <p>Non-Target area controls</p> <p>Target area controls</p>

Title		Key contents
		<p>Protection of beneficial insects, terrestrial vertebrates and vertebrate poison controls</p> <p>Records of use</p> <p>Purpose-specific equipment controls</p>
Lifecycle Controls	Packaging	<p>Packaging definition</p> <p>Containment of substance, package selection and reuse</p> <p>Performance measures for UN Packing Group I, II and III.</p> <p>Additional Hazardous Property packaging requirements (including small packages for substances with toxic properties)</p>
	Identification	<p>Comprehensibility, Durability and Clarity</p> <p>Information to be immediately available</p> <p>Quantity limits</p> <p>Importation</p> <p>Workplace information (signage, documentation, availability)</p> <p>Advertisements</p>
	Emergency management	<p>Level 1 - general requirements and preparedness for individual impact - hazardous properties and quantity limits, signage, secondary containment</p> <p>Level 2 - potential impacts extending to several person and/or local areas of the environment -Documentation and fire-fighting equipment</p> <p>Level 3 - Large-scale impact - hazardous substance and quantities, emergency plan, signage, secondary containment</p>
	Disposal	<p>Information requirements</p> <p>Workplace documentation</p> <p>Toxic properties (treatment and/or discharge)</p> <p>Ecotoxic properties (treatment and/or discharge)</p> <p>Explosive properties (treatment, controlled detonation/deflagration, restrictions)</p> <p>Flammable properties (treatment, discharge to environment with restrictions, controlled burning)</p> <p>Oxidising properties (treatment, controlled burning, controlled detonation, discharge to the environment with restrictions)</p> <p>Hazardous substance containers</p>
	Tracking	<p>Person in charge and record keeping (identity of substance, whom obtained it, quantity, location, fate, transfer, access by enforcement officers and time frame for keeping records)</p> <p>Hazardous classes to be tracked.</p>
Other Controls	Competency of handlers of	<p>Approved Handlers</p> <p>- restricted hazardous substance classes and trigger levels requiring</p>

Title	Key contents
hazardous substances, enforcement officers and test certifiers	competency to access them - certification - competency (knowledge and skill requirements). Enforcement Officers - competency (knowledge and skill requirements) Test Certifiers - competency (knowledge and skill requirements)
Contained laboratories exempt the Act	Handling substances of unknown hazards Laboratory construction Signage Security Substance Identification Substance Packaging General Management Emergency preparedness Competency and procedures
Small Fireworks	Public Sale of categories 1.3G, 1.4G and 1.4S
Controls on compressed gases	Container design requirements; containment criteria, strength, durability, compatibility Container approval process; test certification required for design, construction, supply Filling requirements; competency of handlers On-going compliance requirements; in-service testing, testing providers, testing station reviewers Special requirements for small containers

Part B: Physical Property Controls

General Introduction

The Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001 were made under Sections 75 and 76 of the HSNO Act for the purpose of prescribing controls for explosives (class 1), flammable gases (class 2), flammable liquids (class 3), flammable solids (class 4) and oxidising substances (including organic peroxides) (class 5). These regulations, known as the 'physical property controls', are primarily aimed at preventing the hazard from actually occurring eg by keeping ignition sources away from flammable substances. The regulations also provide for the management of hazardous substances and prescribe controls to limit the adverse effects arising from exposure to the hazard.

Glossary

Approved handler: An approved handler is a person who holds a current test certificate certifying that they have met the competency requirements specified by the Personnel Qualification Regulations in relation to handling specific hazardous substances during specified parts of the lifecycle.

Auto-ignition temperature: in relation to any class 2.1.1, 2.1.2, or 3.1 substance is the minimum temperature at which a mixture of flammable vapour and air, or gas and air, is marginally self-igniting when tested in accordance with:

- a. ASTM Standard E 659-78 (1978; reconfirmed 1994) Standard test method for Autoignition Temperature of Liquid Chemicals, or
- b. AS 1896 (1976) Gas vapour ignition: Ignition Temperature, or
- c. IEC 79-4 (1975) Method of test for ignition temperature

Compatible in relation to a class 2, 3, or 4 substance: means that in the absence of an ignition source, the class 2,3 or 4 substance:

- a. is chemically inert in relation to another class 2,3 or 4 substance for the range of temperatures and pressures at which the substances are brought into contact, or
- b. if the substance or material does react with the other class 2,3 or 4 substance, it does so in a way that does not cause or contribute to a fire or explosion, or
- c. when mixed with another class 2,3 or 4 substance, does not lead to a substance of a different hazardous property or type or degree of hazard, or
- d. is not listed as incompatible in Table 1 of Schedule 3

Compatible in relation to a class 5 substance: and its relationship with any other substance or material, means that the other substance or material:

- a. is chemically inert in relation to the class 5 substance for the range of temperatures and pressures at which it is brought into contact with the class 5 substance, or

- b. if it does react chemically with a class 5 substance, it does so in a way that does not cause or contribute to combustion or the expulsion of steam and hot vapours, or generate an explosion, or generate a class 6, 8, or 9 substance

Controlled zone: is an area abutting a hazardous substance location that is regulated so that:

- a. within the zone, the adverse effects of a hazardous substance are reduced or prevented; and
- b. beyond the zone, members of the public are provided with reasonable protection from those adverse effects

Decomposition temperature: in relation to a class 5 substance, means the temperature at which the class 5 substance will spontaneously decompose, possibly with explosive force, releasing heat and usually combustible by-products

Deflagrate: in relation to a substance that is initiated or ignited, means the production in that substance of a chemical reaction that proceeds through, or along the surface of, the substance at subsonic velocity, where that chemical reaction,

- a. results in the steady production of hot gases at high pressures, and
- b. if the substance is sufficiently confined, results in an increase in pressure, rate of reaction, and temperature that may produce a detonation of the substance

Desensitising agent: is a substance or material that when mixed with a class 1, class 4.1.2 or class 5.2 substance, produces a mixture that has reduced hazardous properties compared with the original class 1, class 4.1.2 or class 5.2 substance.

Designated transfer zone: is a place used for the movement of a class 1 substance from one type of transport to another where the movement requires handling of packages or containers, but does NOT include any of the following:

- roll-on roll-off operations in which a vehicle or trailer with its load drives or is driven on to or into another means of transportation for the duration of a journey
- a hazardous substance location
- a designated use zone

Designated use zone: is a place used for the detonation or deflagration of class 1 substances or articles but does NOT include any of the following:

- a hazardous substance location
- a designated transfer zone
- a discharge area

Detonate: in relation to a substance that is initiated, means the production in that substance of a chemical reaction that proceeds through that substance at supersonic velocity, resulting in the production of heat and a supersonic shock wave through the surrounding medium

Discharge area: is a place from which class 1 category G substances are to be fired in an outdoor pyrotechnic display or indoor special effects display.

Exclusion zone: is a place that receives debris from an outdoor pyrotechnic display or indoor special effects display.

Fire resistance rating: in relation to an object or item, means that the object or item is able to maintain its stability, insulation and integrity and is able to offer protection against heat radiation for the time specified by the relevant rating in minutes, where stability, insulation and integrity have the meanings ascribed to them in clause A2 of the First Schedule of the Building Regulations 1992.

‘Hazardous atmosphere zone’ in relation to a class 2.1.1, 2.1.2 and 3.1 substance: is an area where a flammable vapour is present, or may be expected to be present, at a level sufficient to require special precautions to be taken regarding the installation, presence or use of potential ignition sources (as per AS/NZS 2430.3)

‘Hazardous substance location’ in relation to a class 1 substance: is an area where a class 1 substance is manufactured or located for more than 2 hours if the substance is present in quantities above those specified in Table 5 of Schedule 2 of the Controls 1 to 5 Regulations, but does NOT include any of the following:

- a designated use zone
- a designated transfer zone
- any means of transport for the purposes of transfer within a transfer zone
- a vehicle, ship or aircraft while it remains under the direct control of its driver, master or pilot and under the jurisdiction of the Land Transport Safety Rules, the Maritime Rules or the Civil Aviation Rules.

‘Hazardous substance location’ in relation to a class 2, 3, 4 or 5 substance: is an area where a class 2, 3, 4 or 5 substance is located in quantities above those specified in Table 4 of Schedule 3 (for class 2, 3 and 4 substances); in Tables 1 or 2 of Schedule 4 (for class 5.1.1 and 5.1.2 substances); and in Table 1 of Schedule 5 (for class 5.2 substances) for periods of more than

- 18 hours (for substances that do not require tracking) or
- 2 hours (for substances that are subject to the Tracking Regulations)

but does NOT include a vehicle, ship or aircraft while it remains under the direct control of its driver, master or pilot and under the jurisdiction of the Land Transport Safety Rules, the Maritime Rules or the Civil Aviation Rules.

Ignition source: is any agency or agent (including any item, product, part of a facility structure, or piece of equipment) capable of igniting a flammable gas, vapour, or other form of combustible substance and includes a fire, flame, or spark or anything capable of producing a fire, flame or spark.

‘Incompatible’ in relation to a class 5.1.1 or 5.1.2 substance: means another substance or material that is not compatible with the class 5.1.1 or 5.1.2 substance; and includes:

- a. a substance that is not a class 5.1.1 or 5.1.2 substance but is classified in class 5.2 or in any of classes 1, 2, 3 or 4
- b. any organic matter, or substance that contains carbon, in a form that will combust with the class 5.1.1 or 5.1.2 substance

- c. zinc or magnesium in any form, and any other metal in powdered form
- d. any substance or material that will combust with air, or will combust with or catalyse the decomposition of a class 5.1.1 or 5.1.2 substance

'Incompatible' in relation to a class 5.2 substance: means another substance or material that is not compatible with the class 5.2 substance; and includes:

- a. a substance that is not a class 5.2 substance but is classified in class 5.1.1 or 5.1.2 or in any of classes 1, 2, 3 or 4
- b. zinc or magnesium in any form, and any other metal in powdered form
- c. any substance or material that will combust with air, or will combust with or catalyse the decomposition of a class 5.2 substance

'Manufacture' in relation to a class 1 substance or article: includes the following processes:

- making an explosive substance or article
- adapting an explosive substance or article to make any other explosive substance or article
- dividing up an explosive article into component parts
- breaking up or unmaking an explosive article
- remaking or altering or repairing an explosive article
- separating or picking out defective or damaged portions of an explosive article
- assembling, inspecting, or packaging an explosive substance or article

Person in charge: in relation to a place, a hazardous substance location, a transit depot or a place of work, means a person who is:

- a. the owner, lessee, sublessee, occupier, or person in possession of the place, location, or depot or any part of it; or
- b. any other person who, at the relevant time, is in effective control or possession of the relevant part of the place, location, or depot

Place: includes any vehicle, ship, aircraft or other means of transport

Pyrotechnic effect: in relation to a substance that is initiated, means the production in that substance of a self-sustaining exothermic chemical reaction resulting in heat, sound, light, gas, smoke, or motion, or a combination of these

Test certificate: Test certificates provide for a formal means of verifying that required HSNO specifications have been met. Test certificates can be issued to either a person (to certify competence as an approved handler) or to a specific site or location (to certify compliance with certain safety and procedural requirements).

Test certifier: Test certifiers are individuals who are authorised under the HSNO Act by the Authority to issue test certificates.

Transit depot: A transit depot is a permanent place (excluding a means of transport, and excluding places where substances are held for sale or supply) used as a transport depot that is designed to hold

hazardous substances (in containers that remain unopened) for a period of up to 3 days, but for periods that are more than:

- 18 hours (for substances that do not require tracking) or
- 2 hours (for substances that are subject to the Tracking Regulations)

1. Explosive Substances

1.1. Introduction

Overview

Regulations for explosive (class 1) substances are included in the Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001. With regard to explosive substances, the regulations prescribe requirements that aim to:

- reduce the likelihood of unintended initiation or ignition of explosive substances/ articles
- limit the level of adverse effects that could occur in the event of unintended explosions (at locations where explosives are being held, manufactured , transferred or transported) and during the intended use of explosives.

The regulations aim to meet these objectives by managing explosives at all stages of their lifecycle by setting:

- limits on exposures to shock, spark, heat, fire, static electricity, stray electrical currents, electromagnetic radiation and lightning
- controls on the management of locations where explosives are being handled or used
- controls on the transfer (loading and unloading) and transportation of explosives
- controls on the storage and transportation of incompatible groups of explosives
- controls on intended detonation, including pyrotechnic displays
- controls on the explosive containers (magazines) that secure class 1 substances to ensure they meet strength measures for their construction and locking arrangements
- test certification of locations and operations and competency requirements for handlers of explosives.

Scope

The explosives managed under these regulations are those substances and articles classified as Class 1 Explosives according to the UN Manual of Tests and Criteria. Explosives are classified into 6 subclasses (divisions) according to the type of hazard they present and 13 categories (compatibility groups) according to which kinds of explosives are deemed compatible with each other. Unlike most of the other HSNO classes, the categories for explosive substances do not indicate the degree of hazard.

The controls on class 1 substances comprise three main areas:

- general controls on class 1 substances [Regs 13-25]
- controls on hazardous substance locations where explosives are present [Regs 26-31]
- controls on specific activities involving class 1 substances, eg intended detonation and deflagration [Regs 32-34], outdoor pyrotechnic displays [Regs 35-43], indoor pyrotechnic displays [Regs 44-45], transfer of class 1 substances [Regs 46-50] and transportation of class 1 substances [Regs 51-52]

Exclusion

These regulations do not apply to class 1 articles designed for use in combat when they are on a vehicle, ship or aircraft that has been designed to use those articles in combat

1.2. Summary of Controls for Explosive Substances

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one regulatory provision or a group of related provisions in the HSNO regulatory toolbox.

A summary of the hazardous property controls for explosive substances prescribed in the (Classes 1 to 5 Controls) Regulations, as outlined in the Controls Matrix, is provided below.

Explosives Code	Classes 1 to 5 Controls Regulation	Description
X1	Reg 7	General test certification requirements for all class 1 to 5 substances
X2	Reg 8	General public transportation restrictions and requirements for all class 1 to 5 substances
X3	Reg 13	Requirement for explosives to be under the control of an approved handler
X4	Reg 14	General limits on location of explosives
X5	Reg 15	Limits on impact or pressure shock
X6	Regs 16, 17	Limits on spark energy, heat and fire,
X7	Reg 18	Limits on static electricity in relation to equipment
X8	Reg 19	Protection from stray electrical currents
X9	Reg 20	Protection from electromagnetic radiation
X10	Regs 21 – 25	Segregation of incompatible substances and securing explosive substances
X11	Regs 26 – 29, 31	Controls on hazardous substance locations where explosives are kept
X12	Reg 30	Test certification requirement for hazardous substance locations
X13	Regs 32 – 34	Controls on intended detonation and deflagration of explosive substances
X14	Regs 35 – 39,	Controls on outdoor pyrotechnic displays using class 1 category G explosives, including approved handler requirements

	41 – 43	
X15	Reg 40	Requirement to obtain test certificate for outdoor pyrotechnic displays using class 1 category G explosives
X16	Regs 44, 45	Controls on indoor pyrotechnic displays using class 1 category G explosives, including approved handler requirements
X17	Regs 46 – 50	Requirements for the transfer of explosive substances
X18	Regs 51 – 52	Requirements for the transportation of explosive substances by public road or rail

General test certification requirement [X1, Reg 7]

Where a test certificate is required for a hazardous substance location holding class 1 substances, that test certificate must be issued by an approved test certifier and must typically be renewed yearly. However, the Authority can, on request by the persons required to obtain the test certificate, extend the time period up to 3 years. This renewal requirement does not apply to the requirement to obtain test certificates for outdoor pyrotechnic displays, which must be done on an event-by-event basis.

Public transportation restrictions [X2, Reg 8]

All class 1 substances are prohibited from carriage on any public transport vehicle with the following exceptions:

- up to 5 kg, per package, of a class 1.4G, UN 0403, signal flares
- up to 5 kg, per package, of a class 1.4S, UN 0404, signal flares
- up to 2 kg, per package, of class 1.4S substances with serial numbers UN 0012, UN 0014 or UN 0055 (small arms ammunition and empty cartridge cases)

Retail packs of (small) fireworks, in the possession of consumers, are also excluded from this provision as fireworks are not covered by the controls in the Classes 1 to 5 Controls regulations after the point of retail sale (see section 14 of this Guide).

Approved handler requirements [X3, Reg 13]

All class 1 substances in any quantity (with the exceptions listed below) must be under the personal control of an approved handler, or be being handled by a person under the direct supervision of an approved handler, or secured.

The following class 1 substances are not required to be under the control of an approved handler:

- small arms safety ammunition, including pre-primed cartridges and primers, of hazard classification 1.4S (ie. UN numbers 0012, 0014, 0044, 0055)
- airbag initiators and seatbelt pretensioners of hazard classification 1.4G or 1.4S (ie UN numbers 0503, 0323)

The following class 1 substances are not required to be under the control of an approved handler after point of sale to the public:

- fireworks of hazard classification 1.3G, 1.4G and 1.4S that are controlled under the Hazardous Substance (Fireworks Regulations) 2001
- emergency flares and signalling devices of hazard classification 1.3G, 1.4G and 1.4S
- model rocket motors of hazard classification 1.4G and 1.4S
- propellant powders of hazard classification 1.3C (UN 0161) and 1.1C (UN 0160) in amounts less than 15 kg
- gunpowder of hazard classification 1.1D (UN 0027) in amounts less than 5 kg

In other cases, for class 1 substances to be able to be handled by a person who is not an approved handler, an approved handler must be present at the location where the substance is being handled and must be available at all times to provide assistance, if necessary, to the person handling the substance. The approved handler must also have provided guidance to the other person in respect of the handling. This means that a group of workers, who are not necessarily themselves approved handlers of explosives, may handle explosives as long as they do this under the direct supervision of somebody who is an approved handler.

The approved handler must be competent in the knowledge and skills necessary for safe management of explosives including hazard classification, adverse effects, equipment, protective clothing and safety procedures, precautions to prevent harm to people and the environment, procedures for an emergency, offences, penalties and liabilities; and relevant regulations and codes of practice. This can be gained by 2 or more years active handling experience (under the Explosives Act) or 6 months handling experience plus practical instruction under an approved handler (or equivalent) (see section 12, Personnel Qualifications).

General limits on class 1 substances [X4, Reg 14]

With a few exceptions noted in the regulations, all class 1 substances must be either:

- at a hazardous substance location
- at a designated use zone, or in the case of class 1 category G pyrotechnic substances, in a discharge area
- at a designated transfer zone
- on or in a vehicle, ship or aircraft under the direct control of its driver, master or pilot.

With a few exceptions noted in the regulations, a class 1 substance must not be held at a transit depot nor must it be held at a designated transfer zone for more than 8 hours.

General controls on class 1 substances to avoid unintended initiation or ignition [X5–X9, Regs 15–20]

Explosives are classified and managed according to their sensitivity to stimuli that can initiate or ignite them. The key stimuli to be managed are impact, pressure shock, friction, spark, heat, fire, static electricity, stray electrical currents and electromagnetic radiation. Each performance requirement specified prescribes a limit for each of the stimuli to prevent the initiation or ignition of the explosive. The data for the specified limits

came from testing of explosive substances for sensitivity to stimuli, and from design limits for explosives that are accepted for transportation and use.

Limits are set on the levels of the following stimuli to which explosives can be subjected:

- impact and pressure shock apply to shocks that can occur during handling, stacking, pumping, and transfer [Reg15]
- spark energy - the limits ensure exclusion of potential ignition sources and protection of electrical systems [Reg 16]
- heat and fire - the limits apply to avoiding sources that could generate a fire and to preventing an external fire threatening explosives [Reg 17]
- static electricity - the limits apply to persons and equipment handling substances during manufacture, and articles during testing and assembling, and prevent static charges developing [Reg 18]
- stray electrical currents - the limits apply to detonators and detonation systems to prevent electrical currents being induced [Reg 19]
- electromagnetic radiation, radio frequency transmissions - the limits apply to detonators and detonation systems (electro-explosive devices or electrical leads) to prevent electrical currents being induced [Reg 20].

Requirements are also specified for ensuring buildings containing explosives are protected from lightning strike (see below).

These limits and requirements are then checked through design and test certificate requirements for:

- facilities used for assembling, testing and manufacturing explosive substances, and
- facilities used for “fixed” locations or for storing of explosive substances;

The regulations presume an absence of sources of stimuli; otherwise, it has to be shown that stimuli are present at below the limit set. In designated areas associated with loading/unloading and use, absence of such stimuli is checked under the procedures for managing such areas, with an exemption for intended detonation systems.

It is expected that approved codes of practice will provide practical means to meet the limits prescribed in the regulations. Ensuring that limits are implemented will be achieved by the requirement for a test certificate for manufacturing plants and stores of explosives.

Segregation of incompatible explosives and securing explosives [X10, Reg 21-25]

Segregation of incompatible substances and materials [Reg 21]

Some types of explosive substances and articles are incompatible with each other or with other hazardous substances. Storing or transporting such substances together significantly increases either the likelihood of an accident, or the magnitude and type of effects of such an accident.

The category (compatibility group) of an explosive substances provides the basis for decisions on separation of incompatible explosive types. Separating incompatible types of explosives:

- minimises the hazards by ensuring that substances do not mix in the event of a leak or spill

- minimises the risk from an accidental initiation of sensitive explosive substances by ensuring relatively larger quantities of less sensitive substances would not be able to be initiated.

Adequate separation depends on the degree of incompatibility and the cost of separation. Some groups of explosives must be stored and transported separately, while others may be stored (and transported) in the same facility (or vehicle) with restrictions on proximity [Reg 21 and Table 1 of Schedule 2 of the Classes 1 to 5 Controls Regulations].

Securing explosives [Regs 22]

With a few exceptions, when a class 1 substance is not under the personal control of an approved handler, it must be secured in a container (magazine) at a hazardous substance location or designated use zone.

Containers (explosive magazines) [Reg 23]

The Classes 1 to 5 Control Regulations prescribe the following requirements for explosive magazines:

- the outer case must have a compressive strength of at least 500 kN/m²
- the outer case must have a shear strength of at least 750 kN/m²
- locking arrangements for entry into the magazine that have a tensile strength of at least 1250 kN/m²

The previous requirements for explosive magazines (Explosives Regulations 1959 and AS 2188 Relocatable Magazines (1988), now reissued as AS 2187.1 Explosives Storage (1998)), prescribed both construction materials for the magazines and methods to secure explosives against theft. The performance requirements above are equivalent to the current prescription for steel given in AS 2187.1 Explosives Storage (1998). A prescriptive document such as this could be approved as a code of practice providing a means of compliance with the regulatory performance standards.

Any new magazine constructed after the commencement of these regulations must meet the above performance standards and must also meet the design and test certification requirements specified (regulation 24). Existing magazines which have a licence to store under the Explosives Act do not have to meet the above performance requirements for a period of 10 years from the date of commencement of these regulations but must have its ongoing compliance with the previous requirements certified annually.

Controls on hazardous substance locations where class 1 substances are present [X11 and X12, Regs 26–31]

Requirement to establish a hazardous substance location [Reg 26]

There is a requirement to establish a hazardous substance location where any class 1 substance is present for more than 2 hours (other than a designated use zone or a designated transfer zone) in quantities greater than those specified in Table 5 of Schedule 2 (Classes 1 to 5 Controls Regulations).

Within such zones, there is a requirement for the person in charge to:

- notify the responsible enforcement authority of the locality and capacity of the hazardous substance location

- ensure that the substances will be under the control of an approved handler and that any container/building used to hold the substance is secured
- ensure that any test certification requirements are met
- ensure that a site plan is available for inspection
- if required, notify the Civil Aviation Authority of the locality of the hazardous substance location

Requirements to reduce the likelihood of unintended initiation at a hazardous substance location [Reg 27]

The regulations provide for a number of controls for hazardous substance locations in order to reduce the likelihood of unintended initiation of class 1 substances, including:

- ensuring that all handling systems and equipment do not exceed specified limits for impact or pressure shock, spark energy, heat, fire or static electricity
- ensuring that no readily combustible material is present within 5 m of the outside of the hazardous substance location and no class 2, 3, 4, 5, 6, 8, or 9 substances are present inside the hazardous substance location (unless they are used to manufacture a class 1 substance)
- procedures that must be followed in the event of an approaching thunderstorm, ie evacuation of personnel away from target areas, cessation of any loading, unloading or manufacturing of a class 1 substance.

Protection from lightning strike [Regs 28 and 29]

If class 1 substances are present at a hazardous substance location in more than the quantities specified in Reg 28(2), there is a requirement to ensure that the buildings containing explosives are protected from lightning strike.

Test certification requirement for hazardous substance locations [Reg 30]

The person in charge of a hazardous substance location where explosives are kept must ensure that the location has a current test certificate. However, this requirement does not apply to hazardous substance locations that hold only those class 1 substances specified in Table 6 of Schedule 2 (Classes 1 to 5 Controls Regulations) if they are present at quantities less than the levels specified.

The test certificate must be issued by an approved test certifier and must demonstrate compliance with a number of specified controls, including:

- segregation of incompatible substances
- approved handler requirements
- security requirements
- notification to relevant enforcement officer of hazardous substance location and provide information on the quantities and types of class 1 substances that the facility is designed to accommodate
- requirements to reduce the likelihood of unintended ignition

Requirements to control the adverse effects of unintended initiation at a hazardous substance location [Reg 31]

The person in charge of the hazardous substance location must:

- ensure that unauthorised people are excluded from the location and any associated controlled zone
- limit the quantity of class 1 substances present at the hazardous substance location so that in the event of an unintended explosion occurring, people and the surrounding environment are not subject to more than defined levels of adverse effect. This includes (at different levels of effect):
 - the public and the environment outside of the controlled area
 - persons required to be within the controlled area but not directly engaged in explosives operations
 - the interior or exterior of any building containing an explosives manufacturing plant

To protect against the adverse effects from unintended detonations in areas where explosives are present for only a restricted time at a given location, eg ports, airports etc., limits are set to protect the public which depend on whether the explosives are in containerised loads or not (see X17 below).

Controls on intended detonation and deflagration of class 1 substances [X13, Regs 32-34]

For situations involving the intentional detonation or deflagration of a class 1 substance (blasting, seismic investigations, avalanche control, film and video productions, disposal etc), additional procedures are required which aim to ensure the protection of people, the environment and property. All intended explosions must be carried out in a designated use zone and under the control of an approved handler. The requirements include:

- notification of the responsible enforcement authority
- managing on-site storage of the class 1 substances
- excluding unauthorised people
- requirements for audible warning sounds prior to firing
- requirements for firing the charge
- actions to be taken in the event of an approaching thunderstorm, ie cessation of any handling or preparation of any class 1 substance for detonation, and evacuation of personnel away from the explosives

There are limits on the levels of exposure to adverse effects for persons within the controlled area who are directly involved in the explosives operations, and for the public and environment, including buildings, outside the controlled area.

The person in charge is responsible for defining the potential or intended impact zones and managing arrangements (distances and quantities of explosives) so that the limits on effects would be met both within the controlled area and at the boundary of the area.

Small-scale usage of explosives is exempted from some of these requirements, eg small scale blasting on farms and the use of emergency flares and rockets. Where the aim of these requirements is provided by another mechanism, such as excluding people as part of avalanche management procedures, those other mechanisms are deemed sufficient.

Translating limits on effect to safety distances requires expert interpretation. Accordingly, the Authority is expected to approve codes of practice for safety distances that meet the effect limits in different circumstances. Such codes of practice would need to be updated according to new explosives test data.

However, the regulations provide for 'mixing rules' which specify how quantities should be determined for use in the 'quantity-distance' formula, where there are explosives from different classifications.

Controls on outdoor pyrotechnic displays [X14 and X15, Regs 35–43]

The regulations prescribe controls for managing outdoor pyrotechnic (fireworks) displays involving class 1 category G substances. The requirements are based on current best practice in the industry and specify that the person in charge of the display must:

- ensure that the approved handler in control of the substances is competent with regards to the proposed display [Reg 35 (a)]
- establish a discharge area around the firing point [Reg 36 (a)]. The discharge area must be sufficiently separate from sensitive locations to avoid unintended effects, with defined boundaries areas specified [Reg 37]. Within the discharge area, the approved handler in control of the substances must [Reg 41]:
- ensure that the only class 1 substances in the area are those intended for the display
- ensure safe procedures are in place for the securing, handling and firing of the substances
- ensure that any malfunctioning substances are monitored and safely disposed of
- exclude unauthorised people
- provide a layout that limits the likelihood of unintended ignition from adjacent fireworks being ignited
- establish an exclusion zone to safely receive the fallout from high level displays or malfunctioning pyrotechnic [Reg 36 (b)]. Requirements for the boundaries of exclusion zone are specified in Reg 38
- notify the relevant enforcement officer of the location, date and time of the display and the number of firings [Reg 39 (1)]
- obtain prior written agreement for the holding of the display from the New Zealand Fire Service (or New Zealand Rural Fire Authority as appropriate) and if relevant, from the agency responsible for air safety in the area [Reg 39 (2)].
- provide a record of the display that includes a site plan, procedures for establishing discharge areas and exclusion zones, information on the type and number of pyrotechnics to be used and details on the methods of firing and positioning of firing points. The record must be available for inspection by an enforcement officer not less than three days before the display to enable compliance to be checked [Reg 39 (4-5)]
- obtain a test certificate for the display plan [Reg 40].

Controls on indoor pyrotechnic displays [X16-Regs 44 and 45]

The regulations prescribe controls for managing indoor pyrotechnic displays involving class 1 category G substances (eg to cover special effects in stage productions). The requirements are based on current best practice in the industry and specify that before the commencement of the display, the person in charge of the display must:

- ensure that there is an approved handler personally in control of the substances [Reg 44 (1) (a)]
- notify the relevant enforcement officer of the location, date and time of the display and the number of firings at least three working days before the display occurs [Reg 44 (1) (b)]

- obtain prior written agreement for the holding of the display from the New Zealand Fire Service (or New Zealand Rural Fire Authority as appropriate) and provide any (additional) fire-fighting capability specified by a Chief Fire Officer [Reg 44 (2)].

The approved handler in charge of the substances at the indoor display must:

- ensure safe procedures are in place for the securing, handling and firing of the substances [Reg 45 (1)]
- use only those class 1 category G substances that are designed for indoor use [Reg 45 (2) (a)]
- follow certain safety procedures if the indoor display is fired by an electrical current [Reg 45 (2) (b)]
- test examples of all the class 1 category G substances intended for use in the display [Reg 45 (2) (c)]
- establish exclusion zones around the firing points [Reg 45 (2) (d)]
- provide a display plan that must be available for inspection by an enforcement officer not less than three days before the display to enable compliance to be checked which [Reg 45 (3)]:
 - specifies the type and number of pyrotechnics to be used
 - includes a diagram of the indoor area showing firing points, the exclusion zone, the position of the audience, the location of the container holding the pyrotechnic substances and the location of the area for preparing any pyrotechnic devices.
 - specifies the names and responsibilities of the authorised display operators
- ensure that any malfunctioning substances are monitored and safely disposed of
- provide a layout that limits the likelihood of unintended ignition from adjacent fireworks being ignited
- ensure the safety of the audience and surrounding environment [Reg 45 (4)]
- ensure that all pyrotechnic articles and class 1 category G substances are removed at the end of the display [Reg 45 (5)]

Transfer of class 1 substances [X17, Regs 46–50]

The regulations specify requirements relating to controlling areas at ports, airports, rail yards, etc, when explosive substances are being loaded and unloaded from one type of transport to another (designated transfer zones). These procedures are associated with situations where significant quantities of explosive substances and articles are being handled, and consequently are at greater risk of accidental initiation than during storage. A controlled area is defined for achieving the limits on effects of any accidental detonations during the handling.

Transportation of class 1 substances [X18, Regs 51 and 52]

Transportation by road or rail of class 1 substances [Reg 51]

The regulations also specify requirements when class 1 substances are transported by road or rail, including

- notifying the relevant enforcement officer of the intended route and times of transportation
- ensuring that the substance is either under the control of an approved handler or secured to certain specifications
- ensuring that all requirements are met relating to avoiding unintended initiation or ignition eg not exceeding the limits of impact or pressure shock, spark energy or heat that the class 1 substance is exposed to

- exclusion of unessential personnel from the vehicle/train
- ensuring that the maximum quantities allowable for transportation are not exceeded
- ensuring that the separation distances between vehicles in a convoy or rail wagons on the same train are such that in the event of any unintended detonation or deflagration, the pressure shock transmitted to any preceding or following vehicle or rail wagon does not exceed specified limits

It is emphasised that under no circumstances can a class 1.1A substance be transported on a public road or by rail.

Requirements to be met during interruptions when transporting class 1 substances [Reg 52]

If a road vehicle transporting explosives is required to stop because of a breakdown or emergency before reaching a controlled storage site or a site controlled for use, the duration of the stop must be minimised. During the stop, the substance must be managed according to the requirements for Level 3 emergency management planning as required under Part 4 of the Emergency Management Regulations.

Managing explosive substances from the pan-life cycle controls

The hazardous property requirements are supported by pan life cycle controls, which are a key to the overall management of explosives. These requirements in relation to explosives are summarised in the following sections.

Tracking [Schedule 1 of the Tracking Regulations]

With the same exceptions noted above under requirements for approved handlers (X3), there is a requirement for a person in charge of any place where class 1 substances are held to maintain a record that enables the location, quantity and, as necessary, fate of the substance to be tracked at all times.

Emergency management [all of the Emergency Management Regulations]

There are three levels of emergency management requirements.

The first level requires that any quantity of explosives must have sufficient information with the substance that if the substance is no longer under the controls imposed (eg if a package breaks and substance is spilt) then a person is warned of the risk of explosion.

The second level applies to explosive substances in a workplace or during transport, where other people or the immediate environment can be affected. This level requires that more detailed information is accessible to a worker that covers the action to be taken to deal with any fire involving or threatening the explosive substances, and how to bring the substances back under required controls. The second level also requires fire extinguishing equipment when specified quantities of explosives are exceeded.

The third level is triggered by greater quantities of explosives (specified in Schedule 4 of the Emergency Management Regulations) that would cause an impact beyond the immediate environment in an emergency. The quantities are based on those that trigger the requirement for managing loading and unloading sites. This level requires an emergency plan to be in place, that describe possible incidents from a failure of control, and the actions required to warn and evacuate people, to treat injuries, and to manage the incident

so that it is contained, reduced and eliminated. The plan also addresses how to contact responsible persons, emergency services, and the provision of equipment and materials necessary for the plan. These requirements would ensure, for example, that during transport of this amount of explosives, an assistant was available to implement the procedures required for any breakdown of a vehicle transporting explosives.

Identification [Regs 10, 18, 21, Part 2, Part 3 of the Identification Regulations]

The identification requirements cover provisions for facilities storing, assembling, testing, and manufacturing explosive substances to display operating and emergency procedures in the working area, and to display the prohibitions in force at any point of entry to a working area. These prohibitions are those needed to implement the requirements to avoid unintended initiation or ignition of explosives.

Packaging [Reg 10 of the Packaging Regulations]

The packaging requirements are generally for explosives to be in UN certified PG II packaging unless they have been tested and classified in more restrictive PG I packaging. However, for up to 2 kg of safety ammunition or fireworks available to the public, the provisions for 'small packaging' are sufficient. A specific requirement for fire resistance is applied in the case of packaging fireworks for sale to the public.

Disposal [Reg 5 of the Disposal Regulations]

The disposal requirements provide two options for explosives. An explosive can be treated to reduce it to below the explosive threshold level, or it can be destroyed in a manner that ensures the limits on effects for an intended detonation are achieved. For example, defective fireworks can be disposed of by soaking in water to remove soluble oxidiser components. Alternatively, explosives that are not propellants can be burned in an open pit as long as the burning material does not extend above the rim of the pit.

1.3. Detailed performance requirements

This section will follow at a later date

1.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

1.5. Comparison with previous controls

Controls under previous legislation:

Explosives were previously under the control of the Explosives Act 1957. The regulations from this Act were either prescriptive or allowed for requirements to be imposed at the discretion of an explosives inspector. Government previously maintained a significant number of technical experts to provide direction on the

requirements where discretion was allowed which meant that regulators had to both set controls and monitor compliance.

Comparison with HSNO controls

The objective of the HSNO regulations with regard to explosive substances is to set requirements to control explosive properties and effects at a level that provides for the safety of people and the protection of property at an acceptable cost of compliance. The limits in the HSNO regulations are based on current international data eg the limits on effects from the possibility of an unintended explosion are based on NATO standards in use in the commercial and military sectors.

The HSNO regulations specify controls as measurable objectives, and as such, provide for greater accountability and transparency. For example, controls to prevent accidental functioning of explosives can be set as limits on the level of spark energy, heat and shock.

The HSNO Act also provides for codes of practice to be established that enable users of explosives to have systems appropriate to their circumstances approved, providing they meet the specified level of safety. It is expected that most industry users will use codes of practice approved by the EPA on the basis of these regulations.

The Act also provides for test certifiers whose role is to certify that a particular technical means does comply with the prescribed requirements. This reduces the need for Government to maintain a large technically expert staff and also enable some current licence provisions to be recast as test certificates. The requirement for approved handlers largely mirrors the previous requirements for people using explosives to obtain certificates of competence from the regulatory bodies.

2. Flammable Substances

2.1. Introduction

Overview

Regulations for flammable gases (class 2), flammable liquids (class 3) and flammable solids (class 4) are included in the Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001. With regard to flammable substances, the regulations prescribe requirements that aim to:

- reduce the likelihood of unintended ignition of flammable substances
- limit the level of adverse effects in the event of any intentional or unintentional ignition so that people, property and ecosystems are not subjected to more than a defined level of adverse effect.

The regulations aim to meet these objectives by managing flammable substances at all stages of their lifecycle by setting

- limits on ignition sources (eg spark, temperature)
- limits on the proportion of flammable vapour to air (flammable gases and liquids)
- controls on the management of locations (transit depots, hazardous atmosphere zones, hazardous substance locations) where flammable substances are being held or used
- controls on containers used to hold certain classes of flammable substances
- controls on transportation of flammable substances
- test certificates and competency requirements

Scope

The regulations cover the following types of flammable substances:

- Class 2 Flammable Gases:
 - Class 2.1.1 Flammable gases, eg LPG
 - Class 2.1.2 Flammable aerosols
- Class 3 Flammable Liquids:
 - Class 3.1 Flammable liquids, eg petrol
 - Class 3.2 Liquid desensitised explosives eg nitroglycerine solution in alcohol
- Class 4 Flammable Solids:
 - Class 4.1.1 Readily combustible solids, eg aluminium powder (this class also includes solids that are liable to cause fire through friction, such as matches)
 - Class 4.1.2 Self-reactive solids, eg azodicarbonamide
 - Class 4.1.3 Solid desensitised explosives, eg TNT wetted with more than 30% water
 - Class 4.2 Spontaneously combustible solids ie substances that react with the oxygen in air to produce heat, pyrophoric and self- heating substances, eg phosphorus
 - Class 4.3 'Dangerous when wet' solids ie substances that emit flammable gases when in contact with water, eg sodium metal.

The controls on flammable substances comprise four main areas:

- general controls on flammable substances [Regs 53-76]
- controls on hazardous substance locations [Regs 77-82]
- controls on transit depots [Reg 83]
- controls on intended combustion of flammable substances [Regs 84-85]

Exclusion

These regulations do not apply to any substance that is required for the motive power or control of a motor vehicle, aircraft or ship while it is contained in the fuel system, electrical system, or control system of the vehicle, aircraft or ship.

Similarly, these regulations do not apply to any fuel gas supplied or used in a gas distribution system, gas installation or gas appliance when they are subject to the Gas Act 1992 and regulations made under that Act.

2.2. Summary of Controls for Flammable Substances

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one or more regulations in the HSNO regulatory toolbox.

A summary of the hazardous property controls for flammable substances prescribed in the (Classes 1 to 5 Controls) Regulations as outlined in the Controls Matrix is provided below.

Flammable Code	Classes 1 to 5 Controls Reg #	Description
F1	Reg 7	General test certification requirements for all class 1 to 5 substances
F2	Reg 8	General public transportation restrictions and requirements for all class 1 to 5 substances
F3	Reg 55	General limits on flammable substances
F4	Reg 56	Certain flammable substances to be under the control of an approved handler
F5	Regs 58, 59	Requirements regarding hazardous atmosphere zones for class 2.1.1, 2.1.2 and 3.1 substances
F6	Regs 60 – 70	Requirements to prevent unintended ignition of class 2.1.1, 2.1.2 and 3.1 substances
F7	Regs 71, 72	Limits on ignition sources and temperature for class 3.2 and 4 substances
F8	Reg 73	Requirements to prevent unintended ignition of class 4.1.1 substances

F9	Reg 74	Requirements to prevent unintended ignition of class 4.1.2 substances
F10	Reg 75	Requirements to prevent unintended ignition of class 3.2 and 4.1.3 substances
F11	Reg 76	Segregation of incompatible substances
F12	Regs 77, 78	General requirement for hazardous substance locations for flammable substances
F13	Regs 79, 80	Requirements to control adverse effects of unintended ignition of class 3.2 and 4 substances at hazardous substance locations
F14	Reg 81	Test certification requirements for facilities where class 2.1.1, 2.1.2 or 3.1 substances are present
F15	Reg 82	Test certification requirements for facilities where class 3.2 or 4 substances are present
F16	Reg 83	Controls on transit depots where flammable substances are present
F17	Regs 84, 85	Requirements to control adverse effects of intended ignition of flammable substances, including requirements for protective equipment and clothing

General test certification requirement [F1, Reg 7]

Where a test certificate is required for a hazardous substance location substance holding flammable substances, that test certificate must be issued by an approved test certifier and must typically be renewed yearly. However, the Authority can, on request by the persons required to obtain the test certificate, extend the time period to 3 years.

Public transportation restrictions [F2, Reg 8]

The following classes of flammable substances are prohibited from carriage on any passenger service vehicle in any quantity:

class 3.1A, 4.1.2A, 4.1.3A, 4.1.3B, 4.1.3C, 4.2A or 4.3A

Other flammable substances are allowed to be carried on passenger service vehicles if the quantity of substance in any individual package is less than that specified in Schedule 1 (Classes 1 to 5 Controls Regulations).

General limits on class 2, 3 and 4 substances [F3, Reg 55]

Where a class 2, 3 or 4 substance is present at a place for longer than the specified times listed below, and in a quantity that exceeds the levels specified in Table 4 of Schedule 3 (Classes 1 to 5 Controls Regulations), that substance must be held at a hazardous substance location (or transit depot as appropriate).

- 18 hours if the substance is not subject to tracking requirements

- 2 hours if the substance is subject to tracking requirements (ie class 3.1A, 3.2A, 4.1.2A, 4.1.2B, 4.1.3A, 4.2A, 4.3A)

Approved handler requirements [F4, Reg 56]

When certain class 2, 3 or 4 substances are handled in quantities above the amounts specified in Table 2 of Schedule 3 (Classes 1 to 5 Controls Regulations), they must be under the control of an approved handler or secured to a specified standard.

Segregation of incompatible substances [F11, Reg 76]

One means of reducing the likelihood of unintended ignition of flammable substances is to ensure that the substance does not come into contact with any incompatible substance or material, eg by keeping class 4.2 substances away from air and keeping class 4.3 substances away from water. A list of substances and materials considered incompatible with class 2, 3 and 4 substances is provided in Table 1 of Schedule 3 (Classes 1 to 5 Controls Regulations).

Controls on transit depots [F16, Reg 83]

Transit depots are places designed to hold hazardous substances (in containers that remain unopened) for a period of up to 3 days, but for periods that are more than:

- 18 hours (for substances that do not require tracking) or
- hours (for substances that are subject to the Tracking Regulations)

Whenever any class 2, 3 or 4 substance is held at a transit depot in quantities exceeding the levels specified in Table 4 of Schedule 3 (Classes 1 to 5 Controls Regulations), there is a requirement for the person in charge to:

- notify the responsible enforcement authority of the locality and capacity of the hazardous substance location
- where relevant, ensure that the substances will be under the control of an approved handler
- ensure that any road vehicle loaded with containers of class 2, 3 or 4 substances is within specified distances of other vehicles or places containing hazardous substances
- ensure that containers of class 2, 3 or 4 substances held in the depot (but not loaded onto a vehicle) are within specified distances from vehicles or other containers
- ensure that all class 2, 3 or 4 substances remain in their containers and the containers remain closed
- ensure the safety of any electrical equipment
- comply with any signage requirements
- comply with relevant parts of other Acts and Regulations, eg Electricity Act 1992, HSE (Mining Underground Regulations) 1999 or Civil Aviation Rules

Controls on hazardous substance locations where any class 2, 3 or 4 substance is present [F12, Regs 77 and 78]

Requirement to establish a hazardous substance location [Reg 77]

There is a requirement to establish a hazardous substance location where any class 2, 3 or 4 substance is present:

- in quantities greater than those specified in Table 4 of Schedule 3 (Classes 1 to 5 Controls Regulations) and
- for a period exceeding either 18 hours (for substances that do not require tracking) or 2 hours (for substances that are subject to the Tracking Regulations)

Within such zones, there is a requirement for the person in charge to:

- notify the responsible enforcement authority of the locality and capacity of the hazardous substance location
- where relevant, ensure that the substances will be under the control of an approved handler and that any container/building used to hold the substances is secured
- ensure that any test certification requirements are met
- ensure that a site plan is available for inspection
- where required, establish and manage a hazardous atmosphere zone

Requirements to reduce the likelihood of unintended ignition at hazardous substance locations [Reg 78]

The regulations provide for a number of controls for hazardous substance locations in order to reduce the likelihood of unintended ignition of class 2, 3 or 4 substances, including:

- requirements for fire resistant walls and separation distances from ignition sources
- requirements for segregation of incompatible substances
- safety requirements for electrical equipment (construction, design, earthing)

General requirements to control the adverse effects of intended combustion of any class 2, 3 or 4 substance [F17, Regs 84 and 85]

These controls are intended to ensure that where any class 2, 3 or 4 substance is intentionally burnt, the effects of combustion are managed:

- to ensure that adverse effects are contained within the intended area, and
- to prevent people being exposed to harmful levels of heat radiation.

Three forms of controls are specified:

- controls relating to the maximum level of heat radiation that a person may be exposed to
- controls on defined combustion zones
- controls relating to protective equipment and protective clothing [Reg 85]

Controls specific to flammable gases (class 2.1.1), flammable aerosols (class 2.1.2) and class 3.1 flammable liquids [F5–F6, Regs 58–70; F14, Reg 81]

Hazardous atmosphere zones [F5, Regs 58 and 59]

There is a requirement to establish a hazardous atmosphere zone wherever class 2.1.1A, 2.1.1B, 2.1.2A, 3.1A, 3.1B or 3.1C substances are present in quantities greater than those specified in Table 3 of Schedule 3 (Classes 1 to 5 Controls Regulations). Within such zones, additional controls are imposed including:

- a requirement that any potential ignition sources within such zones (eg electrical system, electrical equipment) be protected or insulated to an extent that is consistent with the degree of hazard [Reg 59]
- test certification requirements [Reg 81].

Requirements to reduce the likelihood of unintended ignition [F6, Regs 60–70]

This part of the regulations was developed through a consideration of the fire triangle (fuel, oxygen, ignition source) and existing controls. In essence, controls for flammable gases and liquids provide for:

1. placing limits on the proportion of flammable vapour to air to ensure that the proportion of flammable vapour to air will always be sufficiently outside the flammable range, so that ignition cannot take place, and
2. ensuring that there is insufficient energy available for ignition. This energy could be in the form of either ignition energy (eg a spark), or temperature. Accordingly, the controls provide two approaches to ensure that there is insufficient energy for ignition:
 - a. keeping the temperature of the vapour/air mixture, or the temperature of any surface in contact with the substance/air mixture, below the auto-ignition temperature of the substance, and
 - b. keeping sources of ignition below the minimum ignition energy, either by
 - removal of the ignition source from any location where flammable substances are handled, or
 - by protecting the “general” mass of flammable material from the ignition source, for example by enclosing any ignition sources in an enclosure that will not allow the propagation of the flame to the outside; or using flameproof motors, specially designed to prevent ignition energy escaping.

The regulations aim to cover all foreseeable circumstances in which unintended ignition could take place. For each of these cases, the overarching requirement is to meet the above criteria.

The regulations do not include any specific requirements aimed at controlling the adverse effects in the event of unintended ignition of class 2.1.1, 2.1.2 or 3.1 substances. It is expected that this will be addressed in the regulations on the bulk storage of flammable substances which are yet to be produced.

Test certification requirements [F14, Reg 81]

There is a test certification requirement when class 2.1.1, 2.1.2 or 3.1 substances are present in quantities above the amounts specified in Tables 3 and 4 of Schedule 3, (Classes 1 to 5 Controls Regulations) at any hazardous substance location, hazardous atmosphere zone or transit depot).

That test certificate must be issued by an approved test certifier and must demonstrate compliance with a number of specified controls, including:

- notification to relevant enforcement officer of hazardous substance location
- approved handler requirements
- security requirements
- hazardous atmosphere zone requirements, including controls on electrical systems and electrical equipment
- segregation of incompatible substances
- signage requirements
- emergency management requirements
- fire-fighting equipment
- secondary containment

Controls specific to class 3.2 flammable liquids and flammable solids (class 4) [F7–F10, Regs 71–75; F13, Regs 79 and 80; F15, Reg 82]

Limits on ignition sources [F7, Reg 71]

No class 3.2 or 4 substance should be exposed to any ignition source unless the spark energy transferred to the substance is less than 0.25 mJ [Reg 71]

The key controls aimed at achieving this are:

- requiring electrical equipment to be “protected” to prevent it becoming an ignition source
- requiring that items of fixed equipment be electrically bonded and earthed to control the build-up of static electricity, or sparks
- avoiding subjecting Class 4.1.1 solids to friction [Reg 73]
- special handling arrangements to restrict the amount of impact, pressure shock, friction, spark ignition.

Specific limits on temperature [F7, Reg 72]

Wherever certain class 3.2 or 4 substances are present, the temperature must be kept below that necessary for ignition to occur (unless ignition is intended). This is achieved by ensuring that the temperature must not exceed the control temperature specified in Table 6 of Schedule 3 (Classes 1 to 5 Controls Regulations), [Reg 72].

Requirements to reduce the likelihood of unintended ignition [F8–F10, Regs 73–75]

Different controls aimed at reducing the likelihood of unintended ignition of class 3.2 or 4 substances have been prescribed for each specific class, for example:

- controls on class 4.1.1 substances are aimed at reducing the amount of friction (which may cause ignition of the substance) that the substance is subject to [Reg 73]
- controls on class 4.1.2 substances focus on requirements for containers (strength, security, capacity and construction that will not cause or contribute to a fire or explosion) and ensuring that the substance is not subjected to specific levels of impact, pressure shock or friction [Reg 74]

- controls on class 3.2 and 4.1.3 substances (desensitised explosives) are aimed at ensuring that enough desensitising agent has been added to the substance, and remains with it, to avoid unintended ignition of the substance [Reg 75]

Requirements to control adverse effects of unintended ignition at hazardous substance locations [F13, Regs 79–80]

In order to control any potential adverse effects resulting from the unintended ignition of class 3.2 and 4 substances at a hazardous substance location, there is a requirement for the person in charge to establish a 'controlled zone' that is of sufficient size to provide for the protection of people and the environment.

Requirements for the controlled zone include:

- exclusion of all non-authorised personnel
- ensuring that all requirements for limiting the likelihood of unintended combustion are met (as described in regulations 73–76)
- in the event of an unintended fire, no area beyond the boundary of the controlled zone is exposed to more than a specified amount of heat radiation, and in the case of class 4.1.2 substances, more than a prescribed level of blast overpressure, eg by ensuring that the boundary of the controlled zone has a fire resistant wall and is a specified distance from the substance.

Test certification requirements [F15, Reg 82]

There is a test certification requirement when class 3.2 or 4 substances are present in quantities above the amounts specified in Table 4 of Schedule 3, (Classes 1 to 5 Controls Regulations) at any hazardous substance location or transit depot).

That test certificate must be issued by an approved test certifier and must demonstrate compliance with a number of specified controls, including:

- notification to relevant enforcement officer of hazardous substance location
- approved handler requirements
- security requirements
- temperature control plan and system requirements
- controlled zone requirements, including fire resistance rating and construction materials
- segregation of incompatible substances
- signage requirements
- emergency management requirements
- fire-fighting equipment

2.3. Detailed performance requirements

This section will follow at a later date

2.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

2.5. Comparison with previous controls

Controls under previous legislation

Prior to HSNO, flammable substances were under the control of the Dangerous Goods Act 1974. While the regulations under this Act provided mostly adequate controls for the safe management of flammables, they suffered from four distinct problems:

- they were becoming out of date
- they were prescriptive and did not allow for innovation
- the requirements were often not clearly expressed but left to the discretion of Dangerous Goods Inspectors, who spent a lot of time providing advice to people. For example, the Dangerous Goods Regulations did not set out the requirements for comparatively straight-forward things such as windows in depots but required all such windows to be approved by an inspector
- the Dangerous Goods Regulations required an increasingly expensive and unsustainable 'hands-on' control regime to administer

Relationship to Gas Act

The HSNO Act applies to gases covered by the Gas Act 1992 and associated regulations. The HSNO regulations have adopted (by cross reference) the controls in the Gas Act and associated regulations, which are the control standards for flammable gases when those gases are used in accordance with the Gas Act. The HSNO flammable property controls will apply to compressed gas in storage containers. This approach will avoid unnecessary duplication of controls.

Comparison with HSNO controls

In comparison, the HSNO requirements are expressed in quantified, performance-based terms and are clear enough that people can readily see what is required without having to depend upon a regulator for advice on what to do.

The level of stringency of control of the new HSNO regulations is comparable to that in the old Dangerous Goods Regulations as well as relevant New Zealand, Australian and International Standards. Thus, if a person complied with previous regulations and standards, they would not have any difficulty complying with the HSNO flammable substance regulations, ie for most business users, it's simply 'business as usual'.

3. Oxidising substances and organic peroxides

3.1. Introduction

Overview

Regulations for oxidising substances and organic peroxides (class 5 substances) are included in the Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001. With regard to class 5 substances, the primary aims of the regulations are to:

- reduce the likelihood of any unintended release of chemical energy as an explosion or fire
- limit the adverse effects that occur from both accidental combustion or intentional mixing of an oxidising substance with incompatible material.

To achieve this, the regulations prescribe requirements

- for class 5 substance to be kept separate from any incompatible substances or materials that it would react with
- to limit the sources of energy present which may promote combustion, including energy arising from impact or friction for organic peroxides eg some oxidising substances require special precautions such as temperature control at ambient temperatures
- to limit the level of adverse effects that people and property may be subject to (in the event of intended or unintended combustion) eg requirements to establish a controlled zone, requirements for separation distances

Scope

Class 5 substances can release sufficient chemical energy to cause or promote combustion. The property is reactive, and the combustion can be vigorous and result in explosion when a critical temperature is reached. The fires are more difficult to control than 'ordinary fires' because the oxidiser provides its own source of chemical energy, and the reaction products may also act as fuel. By comparison, flammable substance reactions require atmospheric oxygen to burn.

Class 5 substances can be divided into two categories:

- Oxidising Substances (Class 5.1.1 and 5.1.2) are those that cause or contribute to combustion; generally by making chemically bonded oxygen, chlorine, or fluorine available. Oxidising substances comprise:
 - oxidising liquids/solids (class 5.1.1)
 - oxidising gases (class 5.1.2)
- Organic Peroxides (Class 5.2) are substances similar in molecular structure to hydrogen peroxide (ie, [H-O-O-H] or containing the peroxy bond) where one or more of the hydrogens are replaced by an organic (carbon based) chemical group. The peroxy bond [-O-O-] is very reactive

3.2. Summary of Controls for Oxidising Substances (Class 5.1.1 and 5.1.2 Substances)

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one or more regulations in the HSNO regulatory toolbox.

A summary of the hazardous property controls for oxidising substances prescribed in the (Classes 1 to 5 Controls) Regulations as outlined in the Controls Matrix is provided below.

Oxidising substance code	Classes 1 to 5 Controls Reg #	Description
O1	Reg 7	General test certification requirements for all class 1 to 5 substances
O2	Reg 8	General public transportation restrictions and requirements for all class 1 to 5 substances
O3	Reg 88	General limits on class 5.11 and 5.12 substances
O4	Reg 89	Certain class 5.1.1 and 5.1.2 substances to be under the control of an approved handler
O5	Reg 91	Requirements to prevent unintended combustion or explosion of class 5.1.1 and 5.1.2 substances
O6	Reg 92	Requirements for protective clothing and equipment
O7	Reg 93	Requirements to control adverse effects of spills or failure of containers
O8	Regs 94 – 97	Controls on hazardous substance locations where class 5.1.1 or 5.1.2 substances are present, including additional requirements for facilities where these substances are manufactured or used
O9	Regs 98 – 100	Test certification requirements for hazardous substance locations where class 5.1.1 or 5.1.2 substances are present, including additional requirements for facilities where these substances are manufactured or used
O10	Reg 101	Controls on transit depots where class 5.1.1 or 5.1.2 substances are present
O11	Reg 102, 103	Requirements to control adverse effects of intended combustion or explosion of class 5.1.1 or 5.1.2 substances, including requirements for protective equipment and clothing

General test certification requirement [O1, Reg 7]

Where a test certificate is required for a hazardous substance location substance holding oxidising substances, that test certificate must be issued by an approved test certifier and must typically be renewed yearly. However, the Authority can, on request by the persons required to obtain the test certificate, extend the time period to 3 years.

Public transportation restrictions [O2, Reg 8]

Class 5.1.1A substances are prohibited from carriage on any passenger service vehicle in any quantity.

Other oxidising substances are allowed to be carried on passenger service vehicles if the quantity of substance in any individual package is less than that specified in Schedule 1 (Classes 1 to 5 Controls Regulations), ie

- up to 0.5 kg of a class 5.1.1B substance
- up to 1 kg of a class 5.1.1C substance
- up to 1L (aggregate water capacity) of a class 5.1.2A substance

General limits on class 5.1.1 and 5.1.2 substances [O3, Reg 88]

Where a class 5.1.1 or 5.1.2 substance is present at a place for longer than the specified times listed below, and in a quantity that exceeds the levels specified in Table 1 or Table 2 of Schedule 4 (Classes 1 to 5 Controls Regulations), that substance must be held at a hazardous substance location (or transit depot as appropriate).

- 18 hours if the substance is not subject to tracking requirements (ie 5.1.1B, 5.1.1C and 5.1.2A)
- 2 hours if the substance is subject to tracking requirements (ie 5.1.1A)

Unless combustion of a class 5.1.1 or 5.1.2 substance is intended, or such substances are being manufactured or used at a hazardous substance location, the person in charge must ensure that at all times the substance remains in a package or container of a type that:

- prevents the substance (including gas, vapour, particulate matter) coming into contact with any incompatible substance or ignition source
- prevents the temperature exceeding specified levels
- complies with specified security requirements

Approved handler requirements [O4, Reg 89]

When class 5.1.1 or 5.1.2 substances are handled in quantities above the amounts specified in Table 3 of Schedule 4 (Classes 1 to 5 Controls Regulations), they must be under the control of an approved handler or secured to a specified standard.

General controls on class 5.1.1 and 5.1.2 substances [O5–O7, Regs 91–93]

Controls to reduce the likelihood of unintended combustion [O5, Reg 91]

The following controls apply to any quantity of class 5.1.1 and 5.1.2 substances:

- they must not come into contact with any incompatible substance or material, ie those that will react and cause combustion.
- they must not come into contact with any ignition source. The principal concern is to avoid fire reaching the more reactive oxidising substances
- they must be secured to specified standards
- the temperature of a class 5.1.1 and 5.1.2 substance must not exceed specified limits

For small quantities, the above controls in conjunction with packaging and information requirements included on the package are considered to be sufficient.

Requirements for protective clothing and equipment [O6, Reg 92]

In order to protect people from adverse effects when handling class 5.1.1 and 5.1.2 substances, the regulations prescribe controls relating to design, construction and use of protective clothing and equipment.

Requirement to control adverse effects of spills or failure of containers [O7, Reg 93]

In the event of a spill or leak of a class 5.1.1 substance, the following requirements have been prescribed with the aim of managing any potential adverse effects:

- the leak/spill must be immediately absorbed or diluted using compatible absorbents or diluents, or recovered by other means
- the absorbed/diluted substance must be appropriately disposed of unless it has been demonstrated that it does not contain any incompatible substance. All material including clothing and equipment involved in the cleanup must also be appropriately disposed of if contaminated with the substance.

Controls on hazardous substance locations where class 5.1.1 or 5.1.2 substances are present [O8–O9, Regs 94–100]

Requirement to establish a hazardous substance location [Reg 94]

There is a requirement to establish a hazardous substance location where any class 5.1.1 or 5.1.2 substance is present:

- in quantities greater than those specified in Table 1 of Schedule 4 (Classes 1 to 5 Controls Regulations) if the substance are contained in closed packages or Table 2 of Schedule 4 (Classes 1 to 5 Controls Regulations) if the substance is being manufactured or used, and
- for a period exceeding either 18 hours (for substances that do not require tracking) or 2 hours (for substances that are subject to the Tracking Regulations)

Separate hazardous substance locations must be established for places holding class 5.1.1 or 5.1.2 substances in closed packages and places where such substances are being manufactured or used.

Within such locations, there is a requirement for the person in charge to:

- notify the responsible enforcement authority of the locality and capacity of the hazardous substance location, and whether any class 5.1.1 or 5.1.2 substances are being manufactured or used at the location
- ensure that the substances will be under the control of an approved handler and that any container/building used to hold the substances is secured
- ensure that any test certification requirements are met
- ensure that a site plan is available for inspection

Requirements to reduce the likelihood of unintended ignition at a hazardous substance location [Reg 95]

The regulations provide for a number of controls for hazardous substance locations in order to reduce the likelihood of unintended ignition of 5.1.1 and 5.1.2 substances, including:

- the temperature of the area immediately around the substances must not exceed specified limits
- the substances are separated from incompatible substances and ignition sources by means such as a fire-resistant wall or specified separation distances
- procedures are in place to ensure that every person entering the location is free from any incompatible material and that people within the location are protected from direct contact with any class 5.1.1 or 5.1.2 substance, eg by protective clothing or equipment
- all containers of class 5.1.1 and 5.1.2 substances must be kept closed at all times (except for permanently open vents and situations involving manufacturing or use)
- moisture or any vapour, gas or particulate matter of a class 5.1.1 and 5.1.2 substance must not come into contact with any electrical equipment within the facility or otherwise make contact with an ignition source should the circuit or equipment become faulty
- compliance with any relevant controls under the Electricity Act 1992

Extra requirements for hazardous substance locations where class 5.1.1 and 5.1.2 substances are being manufactured or used [Reg 96]

The regulations prescribe a number of additional controls on hazardous substance locations where class 5.1.1 and 5.1.2 substances are being manufactured or used, including:

- all containers of class 5.1.1 and 5.1.2 substances must be kept closed other than when the substance is being added or removed
- no person must be exposed to any class 5.1.1 or 5.1.2 substance unless protected by clothing or equipment that meets specified requirements
- procedures must be in place to ensure that any person leaving the facility is free from any class 5.1.2 or 5.1.2 substance
- other hazardous substance locations must be separated from the facility by either a fire-resistant wall or specified separation distance

Requirement to control adverse effects of unintended combustion or explosion at a hazardous substance location [Reg 97]

In order to control any potential adverse effects resulting from the unintended combustion or explosion of class 5.1.1 or 5.1.2 substances within a hazardous substance location, there is a requirement for the person in charge to establish a 'controlled zone' that is of sufficient size to provide for the protection of people and the environment. Requirements for the controlled zone include:

- exclusion of all non-authorised personnel
- no person within the controlled zone is exposed to more than a specified amount of heat radiation unless they are shielded by protective clothing or equipment
- manage the controlled zone to ensure that, the requirements for limiting the likelihood of unintended combustion are met eg by ensuring that the substance is separated from any ignition source, ensuring that the boundary of the controlled zone has a fire resistant wall, ensuring specified separation distances are met, ensuring that no place outside the controlled zone is subject to more than a specified level of heat radiation
- controls to ensure that people in proximate buildings would not be exposed to more than a specified level of heat radiation eg by ensuring that the boundary of the controlled zone has a fire resistant wall or that specified separation distances are met

Test certification requirements [O9, Regs 98–100]

There is a test certificate requirement for hazardous substance locations where more than the following quantities of oxidising substances are held:

- 50 kg or 50 L of class 5.1.1A
- 500 kg or 500 L of class 5.1.1B
- 5000 kg or 5000 L of class 5.1.1C
- 250 kg or 200m³ of class 5.1.2A

That test certificate must be issued by an approved test certifier and must demonstrate compliance with a number of specified controls, including:

- notification to relevant enforcement officer of hazardous substance location
- approved handler requirements
- security requirements
- design and management of the location must comply with requirements to isolate substances from incompatible materials and ignition sources
- signage requirements
- emergency management requirements

Test certificates provide a check for compliance with all the requirements in relation to the types of substances held or used at that location. The trigger quantity is tailored to the degree of hazard. This provision will replace the present annual DG licensing scheme for locations handling quantities of 1 tonne or more (of any oxidising substance).

Controls on transit depots [O10, Reg 101]

Transit depots are places designed to hold hazardous substances (in containers that remain unopened) for a period of up to 3 days, but for periods that are more than:

- 18 hours (for substances that do not require tracking) or
- 2 hours (for substances that are subject to the Tracking Regulations)

Where the quantity of any class 5.1.1 or 5.1.2 substance at a transit depot exceeds the level specified in Table 1 of Schedule 4 (Classes 1 to 5 Controls Regulations), there is a requirement for the person in charge to:

- notify the responsible enforcement authority of the locality and capacity of the hazardous substance location
- ensure that the substances remain in their closed containers
- ensure that the substances will be under the control of an approved handler
- ensure that the depot is secured to specified standards
- ensure that any road vehicle loaded with containers of class 5.1.1 or 5.1.2 substances is within specified distances of other vehicles or places containing hazardous substances
- ensure that containers of class 5.1.1 or 5.1.2 substances held in the depot (but not loaded onto a vehicle) are within specified distances from vehicles or other containers
- ensure the safety of any electrical equipment
- comply with any signage requirements
- comply with any relevant controls under the Electricity Act 1992

Requirement to control adverse effects of intended combustion [O11, Regs 102 and 103]

The following controls apply to situations where class 5.1.1 and 5.1.2 substances are intentionally burnt, deliberately brought into contact with incompatible substances and/or ignition sources, exposed to a temperature exceeding specified limits or when such situations might accidentally occur:

- controls relating to the maximum level of heat radiation that a person (not protected by clothing or equipment) may be exposed to
- controls relating to protective equipment and protective clothing [Reg 103]

3.3. Summary of Controls for Organic Peroxides (Class 5.2 Substances)

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one or more regulations in the HSNO regulatory toolbox.

A summary of the hazardous property controls for organic peroxides prescribed in the (Classes 1 to 5 Controls) Regulations as outlined in the Controls Matrix is provided below.

Organic peroxide code	Classes 1 to 5 Controls Reg #	Description
OP1	Reg 7	General test certification requirements for all class 1 to 5 substances
OP2	Reg 8	General public transportation restrictions and requirements for all class 1 to 5 substances
OP3	Reg 106	General limits on class 5.2 substances
OP4	Reg 107	Certain class 5.2 substances to be under the control of an approved handler
OP5	Regs 109, 110	Requirements to prevent unintended combustion or explosion of class 5.2 substances, including limits on temperature
OP6	Reg 111	Limits on impact or pressure shock
OP7	Reg 112	Requirements for equipment and clothing
OP8	Reg 113	Requirements to control adverse effects of spills or failure of containers
OP9	Reg 114	Requirements to prevent unintended combustion or explosion of 5.2A substances
OP10	Reg 115	Requirements to prevent unintended combustion or explosion of class 5.2B, 5.2C, 5.2D, 5.2E or 5.2F substances
OP11	Regs 116 – 119	Controls on hazardous substance locations where class 5.2 substances are present, including additional requirements for facilities where these substances are manufactured
OP12	Regs 120 – 123	Test certification requirements for hazardous substance locations where class 5.2 substances are present, including additional requirements for facilities where these substances are manufactured and requirements for securing class 5.2 substances
OP13	Reg 124	Controls on transit depots where class 5.2 substances are present
OP14	Regs 125, 126	Requirements to control adverse effects of intended combustion or explosion of class 5.2 substances, including requirements for protective equipment and clothing

General test certification requirement [OP1, Reg 7]

Where a test certificate is required for a hazardous substance location substance holding organic peroxides, that test certificate must be issued by an approved test certifier and must typically be renewed yearly. However, the Authority can, on request by the persons required to obtain the test certificate, extend the time period to 3 years.

Public transportation restrictions [OP2, Reg 8]

Class 5.2A substances are prohibited from carriage on any passenger service vehicle in any quantity.

Other organic peroxides are allowed to be carried on passenger service vehicles if the quantity of substance in any individual package is less than that specified in Schedule 1 (Classes 1 to 5 Controls Regulations), ie

- up to 25 mL (or 0.2 kg if a solid) of a class 5.2B substance
- up to 125 mL (or 0.5 kg if a solid) of a class 5.2C, 5.2D, 5.2E or 5.2F substance
- up to 1 L (or 1 kg if a solid) of a class 5.2G substance

General limits on class 5.2 substances [OP3, Reg 106]

Where a class 5.2 substance is present at a place for longer than the specified times listed below, and in a quantity that exceeds the levels specified in Table 1 of Schedule 5 (Classes 1 to 5 Controls Regulations), that substance must be held at a hazardous substance location (or transit depot as appropriate).

- 18 hours if the substance is not subject to tracking requirements (ie 5.2C, 5.2D, 5.2E, 5.2F or 5.2G)
- 2 hours if the substance is subject to tracking requirements (ie 5.2A and 5.2B)

Unless combustion of a class 5.2 substance is intended, or a class 5.2 substance is being manufactured or used at a hazardous substance location, the person in charge of the substance must ensure that at all times the substance remains in a package or container of a type that:

- prevents the substance (including gas, vapour, particulate matter) coming into contact with any incompatible substance or ignition source
- is designed and constructed to comply with specified requirements for security, impact or pressure shock, temperature and where relevant, any requirements specific to particular classes of 5.2 substances

Approved handler requirements [OP4, Reg 107]

When class 5.2 substances are handled in quantities above the amounts specified in Table 2 of Schedule 5 (Classes 1 to 5 Controls Regulations), they must be under the control of an approved handler or secured to a specified standard.

General controls on class 5.2 substances [OP5–OP8, Regs 109–113]

The requirements for class 5.2 substances (organic peroxides) are similar to those for class 5.1.1 and 5.1.2 (oxidising) substances, with some specific requirements added to address the more reactive nature of this chemical group.

Requirement to reduce the likelihood of unintended combustion or explosion, including limits on temperature [OP 5–OP6, Regs 109–111]

The following general controls apply to any quantity of a class 5.2 substance:

- they must be kept separate from any incompatible substance or material ie those that will react and cause combustion
- they must not come into contact with any ignition source. The principal concern is to avoid fire reaching the substance
- they must not be subject to impact or pressure shock that exceeds specified limits



- they must be secured to specified standards
- the temperature of a class 5.2 substance must not exceed specified limits [Reg 110]

Requirements for equipment and clothing [OP7, Reg 112]

In order to protect people from adverse effects when handling class 5.2 substances, the regulations prescribe controls relating to design, construction and use of protective clothing and equipment.

Requirements to control adverse effects of spillage or failure of containers [OP8, Reg 113]

In the event of a spill or leak of a class 5.2 substance, the following requirements have been prescribed with the aim of managing any potential adverse effects:

- the leak/spill must be immediately absorbed or diluted using compatible absorbents or diluents, or recovered by other means
- the absorbed/diluted substance must be appropriately disposed of unless it has been demonstrated that it does not contain any incompatible substance. All material including clothing and equipment involved in the cleanup must also be appropriately disposed of if contaminated with the substance.

Additional controls specific to particular classes of 5.2 substances [OP9–OP10, Regs 114–115]

In addition to the general controls listed above, additional controls are required for all class 5.2 substances except class 5.2G.

Requirements to reduce the likelihood of unintended combustion of class 5.2A substances [OP9, Reg 114]

The following additional controls are required for class 5.2A substances because of their similarity to explosives and sensitivity to impact or pressure shock:

- they must not be transported on any public road or railway
- they must not be kept in a container that exceeds 0.5 kg or 0.5 L capacity unless specific requirements are met

Requirements to reduce the likelihood of unintended combustion of class 5.2B, 5.2C, 5.2D, 5.2E or 5.2F substances [OP10, Reg 115]

The following additional controls are required for class 5.2B, 5.2C, 5.2D, 5.2E or 5.2F substances:

- they must be kept in a container whose capacity and design does not cause or contribute to combustion or explosion and that is in accordance with the requirements of Packing Instruction P520 and Paragraph 4.1.7 of Chapter 4.1 of the UN Model Regulations
- if the substances are held in a container that will not be used for transportation on a public road or railway, the container may hold a quantity of the substance that is in excess of the quantities shown in Table 4 of Schedule 5 (Classes 1 to 5 Control Regulations) if specific requirements are met

For small quantities the above controls in conjunction with packaging and information requirements included on the package are considered to be sufficient

Controls on hazardous substance locations where class 5.2 substances are present [OP11–OP12, Regs 116–123]

Requirement to establish a hazardous substance location [Reg 116]

There is a requirement to establish a hazardous substance location where any class 5.2 substance is present:

- in quantities greater than those specified in Table 1 of Schedule 5 (Classes 1 to 5 Controls Regulations) and
- for a period exceeding either 18 hours (for substances that do not require tracking) or 2 hours (for substances that are subject to the Tracking Regulations)

Separate hazardous substance locations must be established for places holding class 5.2 substances in closed packages and places where such substances are being manufactured or used.

Within such locations, there is a requirement for the person in charge to:

- notify the responsible enforcement authority of the locality and capacity of the hazardous substance location and whether any class 5.2 substance is being manufactured or used at the location
- ensure that the substances will be under the control of an approved handler and that any container/building used to hold the substances is secured
- ensure that any test certification requirements are met
- ensure that a site plan is available for inspection

Requirements to reduce the likelihood of unintended ignition at a hazardous substance location [Reg 117]

The regulations provide for a number of controls for hazardous substance locations in order to reduce the likelihood of unintended ignition of class 5.2 substances, including:

- the temperature and any source or impact or pressure shock in the area immediately around the substances must not exceed specified limits
- the substances are separated from incompatible substances and ignition sources by means such as a fire-resistant wall or specified separation distances
- procedures are in place to ensure that every person entering the location is free from any incompatible material and that people within the location are protected from direct contact with any class 5.2 substance, eg by protective clothing or equipment
- moisture or any vapour, gas or particulate matter of a class 5.2 substance must not come into contact with any electrical equipment within the facility or otherwise make contact with an ignition source should the circuit or equipment become faulty
- all containers of class 5.2 substances must be kept closed at all times (except for permanently open vents and situations involving manufacturing or use)
- compliance with any relevant controls under the Electricity Act 1992

Extra requirements for hazardous substance locations where class 5.2 substances are being manufactured or used [Reg 118]

The regulations prescribe a number of additional controls on hazardous substance locations where class 5.2 substances are being manufactured or used, including:

- all containers of class 5.2 substances must be kept closed other than when the substance is being added or removed
- no person must be exposed to any class 5.2 substance unless protected by clothing or equipment that meets specified requirements
- procedures must be in place to ensure that any person leaving the facility is free from any class 5.2 substance
- other hazardous substance locations must be separated from the facility by either a fire-resistant wall or specified separation distances

Requirement to control adverse effects of unintended combustion or explosion at a hazardous substance location [Reg 119]

In order to control any potential adverse effects resulting from the unintended combustion or explosion of class 5.2 substances within a hazardous substance location, there is a requirement for the person in charge to establish a 'controlled zone' that is of sufficient size to provide for the protection of people and the environment. Requirements for the controlled zone include:

- exclusion of all non-authorised personnel
- no person within the controlled zone is exposed to more than a specified amount of heat radiation unless they are shielded by protective clothing or equipment
- manage the controlled zone to ensure that, the requirements for limiting the likelihood of unintended combustion are met eg by ensuring that the substance is separated from any ignition source, ensuring that the boundary of the controlled zone has a fire resistant wall, ensuring specified separation distances are met, ensuring that no place outside the controlled zone is subject to more than a specified level of heat radiation or blast overpressure
- controls to ensure that people in proximate buildings would not be exposed to more than a specified level of heat radiation eg by ensuring that the boundary of the controlled zone has a fire resistant wall or that specified separation distances are met

Test certification requirements [OP12, Regs 120–123]

There is a test certificate requirement for hazardous substance locations where more than the following quantities of organic peroxides are held:

- 10 kg of class 5.2A or 5.2B
- 25 kg of class 5.2C or 5.2D
- 100 kg of class 5.2E or 5.2F

That test certificate must be issued by an approved test certifier and must demonstrate compliance with a number of specified controls, including:

- notification to relevant enforcement officer of hazardous substance location
- approved handler requirements
- security requirements
- design and management of the location must comply with requirements to isolate substances from incompatible materials and ignition sources
- signage requirements
- emergency management requirements

Test certificates provide a check for compliance with all the requirements in relation to the types of substances held or used at that location. The trigger quantity is tailored to the degree of hazard. This provision will replace the present annual DG licensing scheme for locations handling quantities in excess of 10 kg (of organic peroxides), regardless of degree of hazard.

Controls on transit depots [OP13, Reg 124]

Transit depots are places designed to hold hazardous substances (in containers that remain unopened) for a period of up to 3 days, but for periods that are more than:

- 18 hours (for substances that do not require tracking) or
- 2 hours (for substances that are subject to the Tracking Regulations)

Where the quantity of any class 5.2 substance at a transit depot exceeds the level specified in Table 1 of Schedule 5 (Classes 1 to 5 Controls Regulations), there is a requirement for the person in charge to:

- notify the responsible enforcement authority of the locality and capacity of the hazardous substance location
- ensure that the substances remain in their closed containers
- ensure that the substances will be under the control of an approved handler
- ensure that the depot is secured to specified standards
- ensure that any road vehicle loaded with containers of class 5.2 substances is within specified distances of other vehicles or places containing hazardous substances
- ensure that containers of class 5.2 substances held in the depot (but not loaded onto a vehicle) are within specified distances from vehicles or other containers
- ensure the safety of any electrical equipment
- comply with any signage requirements
- comply with any relevant controls under the Electricity Act 1992

Requirement to control adverse effects of intended combustion [OP14, Regs 125 and 126]

The following controls apply to situations where class 5.2 substances are intentionally burnt, deliberately brought into contact with incompatible substances and/or ignition sources, is exposed to a temperature or impact or pressure shock that exceeds specified limits or when such situations might accidentally occur:

- controls relating to the maximum level of heat radiation that a person (not protected by clothing or equipment) may be exposed to
- controls relating to protective equipment and protective clothing [Reg 126]

Integration with lifecycle controls

The specifications for the oxidising property need to be seen within the context of the other elements of the HSNO controls framework. Controls to manage adverse effects are consistent with the relevant corresponding requirements for explosives and flammable substances as the adverse effects (from fire or explosion) are the same. The regulations also include requirements for dealing with the pan life cycle aspects of hazardous substances, such as identification, packaging, disposal, emergency preparedness, tracking, and competency.

With regards to disposal or spills, the regulations specify the precautions to be taken to avoid or reduce the risk of fire occurring. This may include dilution with a compatible substance or a neutralising agent. In each case, enough detail is provided to prevent the outbreak of fire that would otherwise occur. Similarly, it should be noted that fire protection equipment is to be provided through the emergency planning requirements. The need for protection and systems to manage the potential explosive hazard will also be addressed in the emergency planning process.

3.4. Detailed performance requirements

This section will follow at a later date

3.5. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

3.6. Comparison with previous controls

Controls under previous legislation

Prior to HSNO, flammable substances were under the control of the Dangerous Goods Act 1974 and its related regulations, mainly the Dangerous Goods (Class 4 – Flammable Solids or Substances and Class 5 – Oxidising Substances) Regulations 1985. While these regulations provided mostly adequate controls for the safe management of oxidising substances and organic peroxides, they suffered from four distinct problems:

- they were becoming out of date
- they were prescriptive and did not allow for innovation
- the requirements were often not clearly expressed but left to the discretion of Dangerous Goods Inspectors, who spent a lot of time providing advice to people.
- the Dangerous Goods Regulations required an increasingly expensive and unsustainable ‘hands-on’ control regime to administer

Comparison with HSNO controls

The HSNO controls follow international conventions and best practice, and are consistent with the controls provided under the regulations they replace ie the Dangerous Goods Regulations. Consequently, anyone complying with the previous legislation should not have any difficulty complying with the HSNO regulations and there should be minimal additional costs incurred.

However, the performance based specifications of the HSNO regulations provide for more detail and allow for targeted controls to be prescribed for varying levels of hazard. The additional detail essentially describes the standards and practices that Dangerous Goods Inspectors have approved using their discretionary powers. For example, each of the pan life cycle requirements provides for controls targeted to a specific quantity, hazard and the type of oxidising property.

Targeted controls mean that the degree of control better reflects each type and degree of hazard, usually with a minimum trigger quantity. For example, the trigger quantity that requires a site test certificate has been increased for class 5.1.1 substances that are in the least hazardous category. Conversely, the trigger quantity has been reduced for oxidising substances that are in the most hazardous category. Similarly for organic peroxides, the trigger quantity for site test certificates for the most highly hazardous categories remains unchanged from the DG licence level (10 kg) while increasing for the less hazardous categories. In addition, the annual Dangerous Goods Licence has been replaced by a test certificate, which is valid for between one to three years depending on safety records of the site involved.

Overall, the change to the HSNO regime is not expected to greatly impact on compliance costs as the more stringent requirements only affect a small number of substances. Also, the HSNO requirements for competency and tracking are not expected to result in much change to industry best practice which is well represented in industry already

Part C: Biological Property Controls

General Introduction

The Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001 were made under Section 75(1)(d), (e) and (f) of the HSNO Act for the purpose of prescribing controls for toxic (class 6), corrosive (class 8) and ecotoxic (class 9) substances. These regulations, known as the “biological property controls”, are aimed at limiting the exposure and the adverse effects of exposure, of hazardous substances to people and the environment.

Glossary

Acceptable daily exposure (ADE):	The amount of a hazardous substance (mg/kg body weight/day) that, given a lifetime of daily exposure, would be unlikely to result in adverse health effects.
Approved handler:	An approved handler is a person who holds a current test certificate certifying that they have met the competency requirements specified by the Personnel Qualification Regulations in relation to handling specific hazardous substances during specified parts of the lifecycle.
Bioaccumulative:	In relation to a substance, means the substance has a BCF greater than or equal to 500 or, if BCF data is not available, a log Kow greater than or equal to 4; and, for the purposes of this definition, measured log Kow values take precedent over estimated values
Biocidal action:	In relation to a substance, means the substance causes mortality, inhibited growth, or inhibited reproduction in an organism
Environmental exposure limit (EEL):	An EEL is the (maximum) concentration of an ecotoxic substance (or ecotoxic component of a substance) in an environmental medium that will present a low risk of adverse environmental effects to organisms in non-target areas.
Environmental medium:	<ul style="list-style-type: none"> • In relation to a class 6 substance, means air, water, soil or a surface that a hazardous substance may be deposited onto • In relation to a class 9 substance, means water, soil or sediment where these are in the natural environment, or a surface that a hazardous substance may be deposited onto
Exposure route:	Means a route by which a person or other living organism can absorb a substance and includes ingestion, inhalation, dermal contact or contact with the eye or mucous membranes
Lowest observable adverse effect level (LOAEL):	Is the lowest dose or concentration of a substance that causes a significant adverse biological or toxic effect
No observable adverse effect level (NOAEL):	Is the highest dose or concentration of a substance at which no significant adverse biological or toxic effect is observed.
Person in charge:	In relation to a place of work means a person who is: <ul style="list-style-type: none"> a. the owner, lessee, sublessee, occupier, or person in possession of

	<p>the place, location, or depot or any part of it; or</p> <p>b. any other person who, at the relevant time, is in effective control or possession of the relevant part of the place, location, or depot</p>
Potential daily exposure (PDE):	Is the amount of a hazardous substance (mg/kg body weight/day) that a person is likely to be exposed to through a particular exposure route
Reference dose (RfD):	The amount of a hazardous substance (mg/kg body weight/day) that, given a lifetime of daily exposure, would be unlikely to result in a specific toxic effect in a person in a particular subpopulation.
Tolerable exposure limit (TEL):	Represents the maximum concentration of a substance (or toxic component of a substance) in an environmental medium that will present a low risk of a toxic effect occurring in people exposed to that substance
Workplace exposure standard (WES):	Is an airborne concentration of a substance (expressed as mg substance/m ³ of air or ppm in air) which must not be exceeded in a workplace

1. Toxic substances

1.1. Introduction

Overview

The Act defines a 'toxic' substance as one that is 'capable of causing ill-health in, or injury to, human beings'. Regulations for toxic (class 6) substances are included in the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001. The primary purpose of these regulations with regard to toxic substances is to:

- limit the likelihood that members of the public will be involuntarily exposed to toxic substances
- limit the extent to which people are exposed to such substances, including occupational exposure, in order to minimise any impacts that these substances may have on health and safety.

Routes of exposure include ingestion of food or water, inhalation or dermal contact or contact with the eyes or mucous membranes.

The regulations aim to achieve these goals by setting general requirements for the use and management of toxic substances (outlined below) and through setting acceptable daily exposure (ADE)/reference dose (RfD) values, tolerable exposure limits (TELs), and workplace exposure standards (WESs). The general requirements include:

- the keeping of records when certain types of substances are applied/discharged in the environment
- standards for equipment used to handle hazardous substances
- use of protective clothing and equipment
- specification of quantities of hazardous substances that are required to be under the control of an approved handler or secured
- limits on the carriage of hazardous substances on public transport

1.2. Summary of Controls for Toxic Substances

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one regulatory provision or a group of related provisions in the HSNO regulatory toolbox.

A summary of the hazardous property controls for toxic substances prescribed in the (Classes 6, 8 and 9 Controls) Regulations as outlined in the Controls Matrix is provided below.

Toxic property control code	Classes 6, 8 and 9 Controls Regulations	Description
T1	Regs 11 – 27	Limiting exposure to toxic substances; setting values for acceptable daily exposure (ADE)/reference dose (RfD), potential daily exposure (PDE), tolerable exposure limit (TEL); prohibition on use of substances in excess of TEL
T2	Regs 29, 30	Controlling exposure in places of work and other 'use' situations; setting of workplace exposure standards (WES)
T3	Regs 5(1), 6	Requirements for keeping records of use
T4	Reg 7	Requirements for equipment used to handle substances
T5	Reg 8	Requirements for protective clothing and equipment
T6	Reg 9	Quantities of toxic substances that require an approved handler
T7	Reg 10	Restrictions on carriage of toxic substances on passenger service vehicles
T8	Reg 28	Controls for vertebrate poisons

General requirements:

Records of Use [T3– Regs 5(1), 6]

A person using a substance that is highly toxic in an area where members of the public may be present or where the substance may enter air or water, must keep written records of each such use for a minimum of 3 years following the use. 'Highly toxic' substances are those that are acutely toxic with classifications of 6.1A, 6.1B or 6.1C; mutagens of classification 6.6A; carcinogens of classification 6.7A; or substances that exhibit high reproductive or developmental toxicity (6.8A), or are highly toxic to target organs (6.9A).

The record of use must be made available to an enforcement officer on request. They are an aid to enforcement specifically during the investigation of any alleged breach of a TEL for a highly hazardous substance. They may also be used as evidence for a defence if legal action was taken.

This provision is particularly relevant to the spray application of substances and the laying of poison baits.

Equipment used to handle hazardous substances [T4– Reg 7]

Any equipment used to handle toxic substances (eg spray equipment) must retain and/or dispense that substance in the manner intended, ie without leakage, and must be accompanied by sufficient information so that this can be achieved.

Protective Clothing and Equipment [T5–Reg 8]

The requirements for protective clothing and equipment are designed to limit exposure by physically isolating the person from the substance. They are intended to be consistent with the hierarchy of prevention and control measures required for the workplace by the Health and Safety in Employment Act (1992).

Protective clothing/equipment must be employed when substances that are highly toxic are being handled (including respiratory and contact sensitisers and known carcinogens). The clothing/equipment must be designed, constructed and operated to ensure that the person:

- does not come into contact with the substance
- is not directly exposed to a concentration of the substances that is greater than the WES for that substance

The person in charge must ensure that for the protective clothing/equipment used to handle the substance, there is access to (within 10 minutes) sufficient information specifying the circumstances in which the clothing or equipment may be used and the requirements for maintaining the clothing/equipment.

Quantities of hazardous substances required to be under the control of an approved handler or secured [T6–Reg 9]

Where toxic substances of hazard classification 6.1A, 6.1B, 6.1C are held or used in any quantity or 6.7A substances are held or used in quantities equal to or greater than 10 kg or

10 L, the substances must generally be under the personal control of an approved handler, or locked up.

However, such substances may be handled by a person who is not an approved handler if:

- an approved handler is present at the facility where the substance is being handled, and
- the approved handler has provided guidance to the person in respect of handling, and
- the approved handler is available at all times to provide assistance if necessary

Carriage on public transport [T7–Reg 10]

In order to limit the potential for public exposure to hazardous substances, the following requirements are prescribed for the carriage of toxic substances on public transport:

- carriage of any quantity of class 6.1A substances is prohibited
- carriage of any other class 6 substance is restricted to the quantities per package provided in Schedule 2 of the Classes 6, 8 and 9 Control Regulations. These quantity restrictions are largely drawn from the Land Transport Rule: Dangerous Goods 1999, Schedule 2 'Dangerous Goods in Limited Quantities and Consumer Commodities', which in turn is drawn from United Nations Recommendations on the Transport of Dangerous Goods (UNRTDG) exceptions for dangerous goods in limited quantities.

Controls on Vertebrate Poisons [T8–Reg 28]

These controls limit the likelihood of substances laid or applied for vertebrate pest control (eg, 1080, cyanide) from coming into contact with members of the general public and non-target species (eg dogs), in places of public access.

A person in charge of an acutely toxic (class 6.1) substance that is laid or applied outdoors as part of bait for the purpose of controlling vertebrate pests must:

- erect warning signs at every normal entry point to the place at least 3 days prior to the bait being applied or laid, and
- ensure exposure to non-target vertebrate species is limited (see also ecotoxic control E4, Regs 50 and 51)

The requirement for the substances to be under the control of an approved handler or secured (T6, Reg 9) can be waived once the bait has been applied or laid.

Protecting children

In addition to the toxic property controls, the following life cycle controls combine to minimise the likelihood that children will be exposed to substances with toxic properties:

- the Identification Regulations use labelling to warn of the need to keep substances that are in the home away from children
- the Packaging Regulations require that certain class 6 substances are packaged to restrict entry by young children.

Limiting exposures through setting of ADE/RfD values, PDE values and TEL values [T1– Regs 11-27]

In order to limit the extent to which people are exposed to toxic substances, the regulations provide for the setting of tolerable exposure limits (TELs) which represent the maximum allowable concentration of a substance legally allowable in a particular environmental medium.

TEL values are established by the Authority and are enforceable controls under the HSNO Act. TELs are derived from potential daily exposure (PDE) values, which in turn are derived from acceptable daily exposure (ADE) / reference dose (RfD) values. PDE and ADE/RfD values are not enforceable controls under the Act.

Acceptable Daily Exposure (ADE) / Reference Dose (RfD) Values [Regs 11-21]

An ADE is an amount of a hazardous substance (mg/kg body weight/day) that, given a lifetime of daily exposure, would be unlikely to result in adverse health effects (analogous to an Acceptable Daily Intake (ADI), which is used internationally for setting food residue limits such as MRLs - maximum residue levels). An RfD is a similar measure but can be used to protect against a specific toxic effect of concern. Either or both of these measures can be established for the purposes of controlling involuntary exposure to a substance with toxic properties.

An ADE or RfD is derived by dividing the no observable adverse effect level (NOAEL) or lowest observable adverse effect level (LOAEL) of a substance by an uncertainty factor of between 1 to 10,000. The uncertainty factor takes into account a number of variables and is actually the product of three uncertainty factors which consider the following:

1. the variations in sensitivity of various human sub-populations when exposed to the substance [value from 1-10]

2. the uncertainties in the extrapolation of data from organisms to humans [value from 1-10]
3. uncertainties resulting from data considerations such as variations in data, reliability and uncertainty of data, extrapolating from acute to chronic data, deriving a NOAEL from a LOAEL, differences in the nature and severity of the toxic effect [value from 1-100]

Overall, uncertainty factors of 100 are most commonly used internationally. The range provided, however, reflects the need for caution where there is scientific or technical uncertainty, as required by section 7 of the HSNO Act.

NOAEL (no observable adverse effect level) is the highest dose or concentration of a substance at which no significant adverse biological or toxic effect is observed.

LOAEL (lowest observable adverse effect level) is the lowest dose or concentration of a substance that causes a significant adverse biological or toxic effect

When deriving an ADE value, the NOAEL or LOAEL should be taken from the most sensitive species for which data is available. When deriving an RfD value, the NOAEL or LOAEL should be taken from a study that shows the specific toxic effect of concern. It should be noted that the data may include both directly measured data and calculated or estimated values that show equivalency.

An ADE and/or RfD value must be set for a toxic substance if:

- it is likely to be present in an environmental medium (air, water, soil or a surface that the substance may be deposited onto) or food or other matter that might be ingested, eg children's crayons, and
- it is a substance to which people are likely to be exposed to during their lifetime, and
- exposure is likely to result in an appreciable toxic effect

An ADE and/or RfD value may be set for a substance or, where the substance is a mixture, for any toxic component of the mixture. Any value established must not exceed 2 mg/kg bodyweight/day, a conservative estimate that reflects the range of acceptable daily intakes that are currently set. The Authority has the choice of either adopting internationally agreed ADEs or RfDs, adopting values used by other NZ Government agencies, or formulating its own, based on an assessment of the toxicological data available for the substance.

Potential Daily Exposure (PDE) Values [Regs 22-23]

If an ADE or RfD value is set for a substance, a PDE value for each exposure route must also be set for the substance. The PDE is a measure of the relative likelihood of a person actually being exposed to the substance through a particular exposure route given daily living patterns. The PDE is a fraction of the ADE or RfD and is also expressed in mg/kg bodyweight/day.

The main routes of exposure will be considered in the calculation - oral ingestion (from food, water, air, soil), inhalation (from the air), skin contact (from surface deposition, water, soil) and contact via the eyes or other mucous membranes. The sum of all PDE values from each possible exposure route must be less than or equal to the ADE or RfD set for the substance.

Tolerable Exposure Limits (TELs) [Regs 24-27]

The TEL represents the maximum concentration of a substance (or toxic component of a substance) in an environmental medium that will present a low risk of a toxic effect occurring in people exposed to that substance. It establishes the maximum concentration of a substance legally allowable in a particular environmental medium (eg air, water, soil). TEL values will be established by the Authority from the PDE and ADE/RfD values in consultation with relevant government agencies.

A TEL must be set for a substance in each environmental medium that relates to an exposure route for which a PDE has been set. The TEL is set by calculating the concentration of the substance (in a given environmental medium) that would result in an exposed person receiving a dose of the substance not greater than the PDE set for the relevant exposure route. In addition, the following factors must also be taken into account when setting a TEL:

- the extent to which the exposure is acute or chronic
- the likely frequency and duration of exposure
- the average body weight of potentially exposed persons
- data on the way the substance behaves in the body, or on how the body processes it eg the extent of absorption, binding affinity, excretion
- any available medical, accident or epidemiological data for that substance which may affect the level at which this limit needs to be set, for the populations potentially exposed.

These factors will be taken from values set by international bodies or conventions recognised by New Zealand or from values set under any other New Zealand legislation. If the substance is a mixture, a TEL may be set for the substance or one or more components based on the assessment of the available toxicological data.

TELs would be set for each environmental medium into which a substance with toxic substances could enter, except for foodstuffs. Limiting toxic exposures from foods via MRLs is the statutory jurisdiction of the Ministry of Health under the Food Act.

TELs will be expressed as a concentration in or on each of those media. They will be used as performance measures for enforcement in situations such as spray drift (in industrial, agricultural or domestic settings), setting permissible levels of substances in non-foodstuffs, and also for disposal.

Once a TEL has been set for a particular substance, no person (or place where a person may be) shall be exposed to a level of the substance that exceeds a TEL for that substance. This control applies to any place where the user of the hazardous substance cannot control the access of the general public (eg public roads or public areas, hospitals, domestic/commercial private property beyond the use area). TELs do not apply to a place of work if members of the public do not have access to the place of work.

Limiting exposures through setting of WES [T2–Regs 29-30]

Workplace exposure standards (WES) are designed to protect persons in the workplace from the adverse effects of toxic substances. WESs only apply to places of work that the public does not have access to. Workplaces require different exposure standards from those intended to protect the general public because a shortened potential exposure time is involved (eg working hours as opposed to a whole lifetime) and there is less need to take account of more susceptible people (eg children and the elderly).

A WES is an airborne concentration of a substance (expressed as mg substance/m³ of air or ppm in air) which must not be exceeded in a workplace. The maximum WES levels that can be set for any substance are 10,000 mg/ m³ or 1,500 ppm.

Three types of WES can be established:

- WES-TWA (8-hour time-weighted average),
- WES-STEL (a 15 minute, short term exposure limit)
- a WES-ceiling (concentration not to be exceeded during any part of a working day).

If the substance is a mixture, a WES may be set for the substance or one or more components based on the assessment of the available toxicological and hygiene data.

In setting a WES for a substance, the Authority must specifically include Department of Labour advice, including adopting WESs proposed by OSH; or derive a value taking account of:

- all the potential exposure routes in the place of work
- the duration of exposure in the place of work
- the extent to which the substance accumulates in the body or is eliminated from the body
- the hazard classification of the substance
- any PDE values established for the substance, and the extent to which any toxic effects would be compounded by exposure outside of the workplace

1.3. Detailed performance requirements

This section will follow at a later date

1.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

1.5. Comparison with previous controls

Controls under previous legislation

Prior to HSNO, toxic substances were under the control of the Toxic Substances Act 1979, the Pesticides Act 1979, the Health Act 1956, and the Animal Remedies Act 1967. That regime provided a range of fairly

prescriptive controls focussed primarily on lifecycle aspects of substances, and proved inadequate in areas such as chemical spray drift. Under the Health Act, prosecution for this form of trespass required proof that adverse health effects had occurred as a result of chemical exposure. Due to the fact that it is almost impossible to prove such correlations, few successful prosecutions were made.

Workplace safety is controlled under the Health and Safety in Employment (HS&E) Act 1992. However, as there are no regulations under that Act dealing specifically with chemical exposures, there is little detailed guidance for workplace managers on what constitutes a legally acceptable level of safety for their workers.

Comparison with HSNO controls

In many situations, the HSNO requirements involve the same level of control as the previous legislation eg the workplace requirements under HSNO reflect the HS&E philosophy of eliminating, isolating and minimising workplace hazards and does not impose additional requirements. The workplace exposure limits prescribed by HSNO incorporate WESs already set by the Department of Labour as guidance to managing exposure to harmful chemicals under the HS&E Act. Therefore adherence to these and other safety practices established under the HS&E Act should ensure compliance with HSNO obligations, with respect to toxic hazards.

However, for situations where previous legislation did not provide adequate control eg chemical spray drift, the HSNO regulations will be stricter. The HSNO regulations provide for the establishment of exposure limits (TELs), which will provide objective, measurable standards by setting permissible levels of toxic substances in environmental media. This control is designed to limit the likelihood and extent to which the public is involuntary exposed to toxic substances. The model chosen is similar to the World Health Organisation (WHO) system of assigning guidance values for chemicals in the environment.

2. Corrosive Substances

2.1. Introduction

Overview

The HSNO legislation defines 3 sub-classes of corrosive substances:

- subclass 8.1 – substances corrosive to metals
- subclass 8.2 – substances corrosive to skin
- subclass 8.3 – substances corrosive to eyes

Regulations for biologically corrosive substances (subclasses 8.2 and 8.3) are included in the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001. The primary purpose of these regulations with regard to biologically corrosive substances is to limit the likelihood and extent of exposure to the public of such substances in order to minimise any impacts that these substances may have on health and safety. There are no property controls specifically for substances corrosive to metals (unless these are also biologically corrosive). The management of substances corrosive to metals only is restricted to controls in the lifecycle regulations.

The regulations aim to achieve this goal by prescribing the following requirements for the use and management of corrosive substances:

- the keeping of records when certain types of substances are applied/discharged in the environment
- standards for equipment used to handle hazardous substances
- use of protective clothing and equipment
- specification of quantities of hazardous substances that are required to be under the control of an approved handler or secured
- limits on carriage of hazardous substances on public transport

2.2. Summary of Controls for Corrosive Substances

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one regulatory provision or a group of related provisions in the HSNO regulatory toolbox.

A summary of the hazardous property controls for corrosive substances prescribed in the (Classes 6, 8 and 9 Controls) Regulations as outlined in the Controls Matrix is provided below.

(Biological) Corrosive property control code	Classes 6, 8 and 9 Controls Regulations	Description
T3	Regs 5(1), 6	Requirements for keeping records of use
T4	Reg 7	Requirements for equipment used to handle substances
T5	Reg 8	Requirements for protective clothing and equipment
T6	Reg 9	Quantities of toxic substances that require an approved handler
T7	Reg 10	Restrictions on carriage of toxic substances on passenger service vehicles

General requirements:

Records of Use [T3–Regs 5(1), 6]

A person using a substance that is highly corrosive (ie has a hazard classification of 8.2A or 8.2B) in an area where members of the public may be present or where the substance may enter air or water, must keep written records of each such use for a minimum of 3 years following the use. He or she must make this record available to an enforcement officer on request.

A written record of use would be an aid to enforcement. It may also be used as evidence, for a defence, if legal action was taken.

Equipment used to handle hazardous substances [T4–Reg 7]

Any equipment used to handle substances that are corrosive to the skin or eye must retain and/or dispense that substance in the manner intended, ie without leakage, and must be accompanied by sufficient information so that this can be achieved.

Protective Clothing and Equipment [T5–Reg 8]

The requirements for protective clothing and equipment are designed to limit exposure by physically isolating the person from the substance. They are intended to be consistent with the hierarchy of prevention and control measures required for the workplace by the Health and Safety in Employment Act (1992).

Protective clothing/equipment must be employed when substances that are corrosive to the skin or eye are being handled. The clothing/equipment must be designed, constructed and operated to ensure that the person does not come into contact with the substance.

The person in charge must ensure that, for the protective clothing/equipment used to handle the substance, there is access to (within 10 minutes) sufficient information specifying the circumstances in which the clothing or equipment may be used and the requirements for maintaining the clothing/equipment.

Quantities of hazardous substances required to be under the control of an approved handler or secured [T6–Reg 9]

Where a class 8.2A substance (highly corrosive to skin) is held or used in any quantity, the substance must generally be under the personal control of an approved handler, or locked up. However, such substances may be handled by a person who is not an approved handler if:

- an approved handler is present at the facility where the substance is being handled, and
- the approved handler has provided guidance to the person in respect of handling, and
- the approved handler is available at all times to provide assistance if necessary

Carriage on public transport [T7–Reg 10]

In order to limit the potential for public exposure to hazardous substances, the following requirements are prescribed for the carriage of biologically corrosive substances on public transport:

- carriage of any quantity of class 8.2A substances is prohibited
- carriage of class 8.2B, 8.2C, and 8.3A substances is restricted to the quantities per package provided in Schedule 2 of the Classes 6, 8 and 9 Control Regulations. These quantity restrictions are largely drawn from the Land Transport Rule: Dangerous Goods 1999, Schedule 2, 'Dangerous Goods in Limited Quantities and Consumer Commodities', which in turn is drawn from the United Nations Recommendations on the Transport of Dangerous Goods (UNRTDG) exceptions for dangerous goods in limited quantities.

2.3. Detailed performance requirements

This section will follow at a later date.

2.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date.

2.5. Comparison with previous controls

Controls under previous legislation

Prior to HSNO, corrosive substances were under the control of the Toxic Substances Act 1979. That regime provided a range of fairly prescriptive controls focussed primarily on lifecycle aspects of substances.

Workplace safety is controlled under the Health and Safety in Employment (HS&E) Act 1992. However, as there are no regulations under that Act dealing specifically with corrosive chemical hazards, there is little detailed guidance for workplace managers on what constitutes a legally acceptable level of safety for their workers.

Comparison with HSNO controls

In many situations, the HSNO requirements involve the same level of control as the previous legislation, eg the workplace requirements under HSNO reflect the HS&E philosophy of eliminating, isolating and minimising workplace hazards and does not impose additional requirements. Therefore adherence to safety practices established under the HS&E Act should ensure compliance with HSNO obligations, with respect to corrosive hazards.

3. Ecotoxic Substances

3.1. Introduction

Overview

The Act defines an 'ecotoxic' substance as one that is 'capable of causing ill health, injury, or death to any living organism' (other than humans as they are covered under the definition of toxic). Regulations for ecotoxic (class 9) substances are included in the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001.

There are 4 sub-classes of ecotoxic substances:

- subclass 9.1 – substances that are ecotoxic in the aquatic environment
- subclass 9.2 – substances that are ecotoxic in the soil environment
- subclass 9.3 – substances that are ecotoxic to terrestrial vertebrates
- subclass 9.4 – substances that are ecotoxic to terrestrial invertebrates

The primary purpose of these regulations with regard to ecotoxic substances is to:

- specify limits on environmental concentrations of substances in order to protect organisms from the adverse effects of the substances
- provide for prescriptive management strategies to be applied in order to protect organisms that are at high risk from particular substance use patterns
- specify minimum operating standards for equipment used in the handling of ecotoxic substances

The regulations aim to achieve these goals through the setting of environmental exposure limits (EELs) and by prescribing the following requirements for the use and management of ecotoxic substances:

- the keeping of records when certain types of substances are applied/discharged in the environment
- standards for equipment used to handle hazardous substances
- specification of quantities of hazardous substances that are required to be under the control of an approved handler or secured
- limits on carriage of hazardous substances on public transport

3.2. Summary of Controls for Ecotoxic Substances

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one regulatory provision or a group of related provisions in the HSNO regulatory toolbox.

A summary of the hazardous property controls for ecotoxic substances prescribed in the (Classes 6, 8 and 9 Controls) Regulations as outlined in the Controls Matrix is provided below.

Ecotoxic property control code	Classes 6, 8 and 9 Controls Regulations	Description
E1	Regs 32 – 45	Limiting exposure to ecotoxic substances, the environmental exposure limit (EEL) approach
E2	Regs 46 – 48	Restrictions on use of substances in application areas
E3	Reg 49	Controls relating to protection of terrestrial invertebrates eg beneficial insects
E4	Regs 50, 51	Controls relating to protection of terrestrial vertebrates
E5	Regs 5(2), 6	Requirements for keeping records of use
E6	Reg 7	Requirements for equipment used to handle substances
E7	Reg 9	Quantities of ecotoxic substances that require an approved handler
E8	Reg 10	Restrictions on carriage of ecotoxic substances on passenger service vehicles

General requirements

Records of Use [E5–Regs 5(2), 6]

A person using a substance that is highly ecotoxic (ie has a hazard classification of 9.1A, 9.2A, 9.3A or 9.4A) must keep a written record of that use if 3 kg or more of the substance is applied or discharged within 24 hours in an area where the substance may enter air or water (and leave the place where it is under control). The record must be kept for a minimum of 3 years following the use. He or she must make this record available to an enforcement officer on request.

This provision is particularly relevant to the spray application of substances (particularly agrichemical substances) and the laying of poison baits.

A written record of use would be an aid to enforcement, specifically during the investigation of any alleged breach of an EEL for a highly hazardous substance. It may also be used as evidence, for a defence, if legal action was taken.

Equipment used to handle hazardous substances [E6–Reg 7]

Any equipment used to handle ecotoxic substances (eg pesticide spray equipment) must retain and/or dispense that substance in the manner intended, ie. without leakage, and must be accompanied by sufficient information so that this can be achieved.

Quantities of hazardous substances required to be under the control of an approved handler or secured [E7–Reg 9]

Where highly ecotoxic substances of hazard classification 9.1A, 9.2A, 9.3A or 9.4A are held or used in any quantity, the substances must generally be under the personal control of an approved handler, or locked up. However, such substances may be handled by a person who is not an approved handler if:

- an approved handler is present at the facility where the substance is being handled, and
- the approved handler has provided guidance to the person in respect of handling, and
- the approved handler is available at all times to provide assistance if necessary

Carriage on public transport [E8–Reg 10]

In order to limit the potential for environmental exposure to ecotoxic substances, the carriage of any class 9 substance on public transport vehicles is restricted to the quantities per package provided in Schedule 2 of the Classes 6, 8 and 9 Control Regulations. These quantity restrictions are largely drawn from the Land Transport Rule: Dangerous Goods 1999, Schedule 2, 'Dangerous Goods in Limited Quantities and Consumer Commodities', which in turn is drawn from the United Nations Recommendations on the Transport of Dangerous Goods (UNRTDG) exceptions for dangerous goods in limited quantities.

Setting Environmental Exposure Limits (EELs) [E1–Regs 32-45]

An EEL is the (maximum) concentration of an ecotoxic substance (or ecotoxic component of a substance) in an environmental medium that will present a low risk of adverse environmental effects to organisms in non-target areas. It establishes the maximum concentration of a substance legally allowable in a particular (non-target) environmental medium (eg soil or sediment or water) including deposition of a substance onto surfaces eg as in spray drift deposition.

An EEL value can be established by one of three means:

- applying the default EEL's specified
- adopting an established EEL
- calculating an EEL from an assessment of available ecotoxicological data

EELs may be set for an ecotoxic substance for one or more environmental media which relate to an exposure route through which organisms may be exposed to the substance. Only one EEL may apply to any particular environmental medium at any given time or in any given circumstance. However, different EELs may be set for marine and fresh surface waters, and similarly, for the corresponding sediments.

Applying default EELs [Reg 32]

The regulations provide for the Authority to apply the following default EELs:

- 0.1 micrograms of substance per litre of water (0.1 µg/L)
- 1 microgram of substance per kilogram of dry weight of soil or sediment (1 µg/kg)

These default EELs represent very low levels of environmental contamination and will be used in situations where:

- there is expected to be little likelihood that the substance will be released into the environment (either intentionally or through incidental use)
- there are no appropriate exposure limits already established that can be adopted
- there is insufficient or no ecotoxicological data available in order to calculate an EEL.

Adopting an established EEL [Reg 35(a)]

The Authority has the ability to adopt exposure limits that have been established for ecotoxic substances by international scientific or regulatory bodies recognised by New Zealand or by a convention that New Zealand has signed or ratified.

Calculating EELs [Regs 35(b), 36, 37, 39-42]

An EEL is calculated by taking an established ecotoxicity value for a substance, and dividing it by an uncertainty factor of between 1 to 10,000. The ecotoxicity value should be selected from the ecotoxicological data available for the substance and should be relevant to both a species that is likely to be exposed to the substance, and to the environmental medium that the EEL is to be set for.

The uncertainty factor takes into account a number of variables including extrapolation from available data and is the product of four uncertainty factors, each in magnitude from 1-10, which consider the following:

1. the variations in sensitivity between the species for which data are available and other species likely to be exposed in that environmental medium
2. the uncertainties involved if the available data are for short exposure periods and predictions need to be made regarding the effects of longer exposure periods
3. the uncertainties involved if data from controlled experiments conducted in the laboratory need to be extrapolated to effects that may occur in the environment
4. the concern over potential future effects if substances, or ecotoxic degradation products, which are bioaccumulative are released into the environment.

The data referred to above may include both directly measured data and calculated or estimated values.

Modifying EELs for rapidly degradable substances [Reg 34]

Where an EEL has been set for a rapidly degradable substance, the Authority has the ability to increase the EEL in specific circumstances. However, the adjusted EEL value is only relevant to the circumstances specified and must not be more than 10 times the original EEL

Maximum EELs [Reg 38]

The regulations provide for maximum EEL values that can be set. An EEL for a substance must not exceed:

- 100 milligrams of substance per litre of water (100 mg/L)
- 100 milligrams of substance per kilogram of dry weight of soil or sediment

- (100 mg/kg)
- 1000 milligrams of substance per square metre of surface on which the substance is deposited (1000 mg/m²)

Additional EEL for secondary poisoning [Reg 43]

Where there is the possibility of an organism being poisoned by a substance through feeding on other organisms containing residues of the substance an additional EEL may be set to protect against this. This EEL is derived from an ecotoxicity value for a species of organism that is likely to be affected by secondary poisoning by the substance, using the uncertainty factors discussed above, and adjusted to take into account the circumstances and extent of exposure.

Application of EELs in the aqueous environment [Reg 44]

In situations involving discharge (of effluent) into a receiving body of water, an EEL set for a substance in surface water may not be exceeded within the receiving water after 'reasonable mixing'. However, the EEL does not apply within the zone of 'reasonable mixing', such as may be specified within an RMA resource consent. Since the HSNO controls are intended to be minimum national standards, to not enable 'reasonable mixing' would be more stringent than many current resource consents. This provision recognises that the use of reasonable mixing would involve specific land use considerations. However, the resource consent process under the RMA would assure that these matters were considered for a specific location.

Prohibition on exceeding EEL [Reg 45]

Once an EEL has been set for an ecotoxic substance for a particular environmental medium, that substance must not be used in a manner that will result in the concentration of the substance in the environmental medium exceeding that EEL.

General restrictions on use within an application area [E2–Regs 46-48]

For ecotoxic substances that are intentionally released into the environment for the purpose of impacting on specific organisms (ie pesticides), the EEL controls apply at the boundary of the target area (application area). The target or application area is an area for which the person intentionally using the substance either has control over or is otherwise authorised to apply the substance to. The EEL controls do not apply within these target areas, providing the substance is not applied at a rate that exceeds the allowed application rate for the substance, thereby enabling pesticide products to be used at effective levels. However, the EEL controls will protect the broader environment from off-site movement of the substance outside the boundaries of the target area.

While the EEL approach provides protection of non-target areas from substances intentionally released into the environment, it does not directly control effects within the target (application) area. In recognition that there are target area effects that are not acceptable, the regulations include controls to restrict specific effects of substances within the target area. These controls include the capacity for the Authority to establish maximum application rates, in terms of quantity of the substance per unit area, for the use of the substance.

The application rate set must be not greater than the application rate specified in the application for approval of the substance or a rate calculated in a similar manner to the calculation of EELs but where the product of the uncertainty factors must not exceed 100. Ecotoxic substances, designed for biocidal action, must not be applied in a target area at a rate greater than the application rate set for the substance. Other 'target area' controls are covered below.

Protection of terrestrial invertebrates [E3–Reg 49]

For substances that are ecotoxic to terrestrial invertebrates (class 9.4 substances), a control framework based on specific management strategies in addition to the restriction on application rates is considered appropriate. Therefore, the Authority may restrict the use of a substance so that it is not to be used in situations where it poses a high risk to beneficial invertebrates eg honeybees.

The specific management strategies include restrictions for using the substance:

- in an area where bees are foraging and the substance is in a form in which bees are likely to be exposed to it; or
- on specific plants likely to be visited by bees if the plant is in open flower or part bloom, or is likely to flower within a specified period of time following application of the substance (not longer than 10 days).

Protection of terrestrial vertebrates [E4–Regs 50-51]

General requirements for use of ecotoxic substances [Reg 50]

In order to restrict adverse affects in non-target species when substances that are ecotoxic to terrestrial vertebrates (class 9.3 substances) are intentionally released into the environment in granular form or coated on seeds, the Authority has the ability to set an EEL specifically for use in application areas (expressed as milligrams of the substance per square metre of surface area) which must not be exceeded six or more hours after application of the substance.

Use of ecotoxic substances as baits [Reg 51]

To protect non-target organisms during pest control operations, an approach based on EEL values alone is not appropriate because sufficient concentrations of the chemicals that control the pest species need to be allowed. In order to manage unintended exposures in application areas arising from the use of bait in vertebrate pest control operations, there is a requirement that where class 9.3 substances are intentionally used outdoors as baits, the Authority has the ability to specify that the bait should:

- be a specific colour; and/or
- have a specific method of release and/or
- contain, or not contain, specific attractants or repellents.

3.3. Detailed performance requirements

This section will follow at a later date

3.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

3.5. Comparison with previous controls

Controls under previous legislation

Under previous legislation, ecotoxic substances were predominately under the control of the Pesticides Act 1979 and the RMA 1991. The Pesticides Act and Regulations included a number of prescriptive requirements that restricted the use of pesticides and also contained a general requirement to avoid causing off-site damage to plants. The control of environmental effects was also addressed by the requirement for pesticides to be registered for specific uses with a condition that the registration be re-assessed if the use patterns of the pesticides altered. The effects of ecotoxic substances under the RMA are controlled through the resource consent or plan process.

Hazardous substances not controlled under the Pesticides Act were regulated under the Toxic Substances Act 1979, Dangerous Goods Act 1974 and Explosives Act 1957. However, these three Acts established only minimal controls relating specifically to the protection of the environment and therefore provided an inadequate framework for ecotoxic substances.

Comparison with HSNO controls

The HSNO regulations provide for setting environmental exposure limits (EELs) on ecotoxic substances. This is in contrast to previous legislation which focussed on restricting pesticide uses and controlling methods of application but which provided minimal overall environmental controls.

Under previous legislation (Pesticides Act), the requirement to prove that adverse effects to plants had occurred as a result of pesticide use was typically an ineffective basis for prosecution due to difficulties with linking adverse effects to a specific pesticide release. In contrast, the HSNO provision for setting EELs will provide a more certain and enforceable control regime.

Although many of the HSNO regulations are focussed on setting performance-based standards for compliance, some regulations relating to specific situations have retained the relatively prescriptive management controls of predecessor legislation, eg, for the protection of terrestrial invertebrates.

Part D Lifecycle Controls

General Introduction

In addition to the regulations described above that focussed on the management of specific hazardous properties of substances, a range of regulations were prescribed (under section 76 of the Act) providing for the lifecycle management of actual substances. These 'lifecycle control regulations' apply to all types of hazardous substances, covering the following areas:

- packaging
- identification
- emergency management
- disposal
- tracking
- competency of persons handling highly hazardous substances (approved handlers)

Glossary

Child resistant	In relation to packaging, means that: <ol style="list-style-type: none"> a. 80% of children aged between 42 and 51 months would be unable to gain access to the contents of the packaging, or would be unlikely to obtain a toxic dose from packaging that is or contains a dispensing device within a period of 5 minutes, and b. 90% of adults aged between 50 and 70 years would be able to open and re-close any child-resistant closure in the packaging
Combination packaging:	Means both the inner and outer packaging
Inner packaging:	Means packaging for which an outer packaging is required for transport or to assist handling
Outer packaging:	Means the outer part of combination packaging, together with any absorbent materials, cushioning, and other components necessary to contain and protect the inner packaging
Package:	Means the packaging and the contents
Packaging:	Means a container that is a receptacle and any other components or materials necessary for the receptacle to perform its containment function, and includes inner packaging once its outer packaging has been removed

1. Packaging

1.1. Introduction

Overview

The Hazardous Substances (Packaging) Regulations 2001 were made under Section 76(1)(a) of the HSNO Act for the purpose of prescribing requirements for packaging of hazardous substances. The purpose and principles of the Act require that the health and safety of people and the environment be protected from the adverse effects of hazardous substances. Adequate packaging is a key requirement to upholding these principles by avoiding accidental exposures, to both people and the environment, of hazardous substances, which may cause either biological hazards (eg toxicity and ecotoxicity) or physical hazards (eg fire and explosion).

Scope

The Packaging regulations are divided into three parts:

- Part 1–Preliminary. This part defines the scope of packaging and the boundary with specifications for other containers.
- Part 2–General packaging requirements. This part specifies the generic performance requirements for packaging, including ability to contain the substance and be compatible with the substance.
- Part 3– Packaging requirements specific to each hazard classification. This part specifies particular packaging requirements for different hazard classifications.

The regulations apply to an item of packaging that

- has a capacity of 450 litres or less; and
- has a net mass of contents of 400 kg or less; but EXCLUDING:
 - a container for holding gases or aerosol components under pressure (other than atmospheric pressure)
 - a container designed for mechanical handling that has been tested and certified as an intermediate bulk container (IBC)
 - a container permanently fixed in one location, including a container permanently fixed to a vehicle.

[Further regulations are to be prepared which will contain provisions for bulk containers (greater than 450 litres), including permanently fixed tanks and tank wagons, and for compressed gas cylinders and aerosol containers.]

Following the UNRTDG, HSNO packaging can include:

- inner packaging which by itself is insufficient to meet the performance requirements, so that an outer package is necessary (for transport)
- inner receptacles are containers which require an outer packaging to perform their containment function
- receptacles are containment vessels for receiving and holding substances, including any means of closing

- outer packaging which is the outer protection of composite and combination packaging, together with any absorbent materials, cushioning and other components necessary to contain and protect the inner packaging or inner container
- combination packaging which combines inner and outer packaging
- composite packagings are packagings consisting of an inner receptacle and an outer packaging, which once assembled remain as integrated units for filling, storing, transport, and emptying
- packages are the packaging and the contents.
- packagings are receptacles and any other components or materials necessary for the receptacle to perform its containment function
- unit load is a transport device in which a number of packages are placed or stacked, and secured by strapping, shrink wrapping or other suitable means, to a load board such as a pallet, or placed in a protective outer container such as a pallet box, or secured together in a sling.

1.2. Summary of Controls

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one regulatory provision or a group of related provisions in the HSNO regulatory toolbox.

A summary of the controls for packaging prescribed in the Packaging Regulations, as outlined in the Controls Matrix, is provided below.

Packaging code	Packaging Regulation	Description
P1	Regs 5, 6, 7 (1), 8	General packaging requirements
P2	Regs 7 (2), (3)	Specific criteria for class 4.1.2 and 5.2 substances
P3	Reg 9	Criteria that allow substances to be packaged to a standard not meeting Packing Group I, II or III criteria
P4	Reg 10	Packaging requirements for explosive substances (class 1)
P5	Reg 11	Packaging requirements for flammable liquids (subclass 3.1)
P6	Reg 12	Packaging requirements for liquid desensitised explosives (subclass 3.2)
P7	Reg 13	Packaging requirements for flammable solids (subclasses 4.1.1 and 4.1.3)
P8	Reg 14	Packaging requirements for self-reactive flammable substances (subclass 4.1.2)

P9	Reg 15	Packaging requirements for substances liable to spontaneous combustion (subclass 4.2)
P10	Reg 16	Packaging requirements for substances that emit flammable gases when in contact with water (subclass 4.3)
P11	Reg 17	Packaging requirements for oxidising substances (subclass 5.1.1)
P12	Reg 18	Packaging requirements for organic peroxides (subclass 5.2)
P13	Reg 19	Packaging requirements for toxic substances (class 6)
P14	Reg 20	Packaging requirements for corrosive substances (class 8)
P15	Reg 21	Packaging requirements for ecotoxic substances (class 9)
PGI	Schedule 1	Packaging requirements equivalent to UN Packing Group I
PGII	Schedule 2	Packaging requirements equivalent to UN Packing Group II
PGIII	Schedule 3	Packaging requirements equivalent to UN Packing Group III

General Packaging Requirements [P1–Regs 5, 6, 7(1), 8]

The general criteria for the performance of packaging cover basic “fitness for purpose” criteria including:

- the ability to contain the contents, across the lifecycle of the substance, and for the range of environmental conditions in which packages are used [Reg 5]
- the packaging must be compatible with its contents to ensure its initial ability to contain is not compromised [Reg 5(1)(e)]
- selecting packaging that is suitable for the physical state and physical properties of the hazardous substance [Reg 7(1)]
- restrictions on packing hazardous substances in packaging that has been previously packed with another substance, unless the substances are compatible or any traces of the original substance are first removed from the packaging.

Levels of packaging performance requirements [PG I, PG II, PG III, ‘Limited Quantities’–Schedules 1 to 5]

To match the level of hazard of a substance, four levels of packaging containment performance are specified. Three of these are equivalent to UNRTDG ‘Packing group’ levels PG I – III. The fourth level has lesser performance requirements for small packages and lower hazard substances, and the criteria for this have been derived from the UNRTDG criteria for Dangerous Goods packed in Limited Quantities (DGLQ) and is consistent with the requirements of the Land Transport Rule: Dangerous Goods 1999. Substances are allocated to a particular level of containment performance based on their hazard classification.

The performance requirements for each of the four levels are defined by an overall set of objectives and measurable standards. These are described in the schedules to the Packaging Regulations as follows:

Level 1: Schedule 1 of the Packaging Regulations, equivalent to UN PGI

Level 2: Schedule 2 of the Packaging Regulations, equivalent to UN PGII

Level 3: Schedule 3 of the Packaging Regulations, equivalent to UN PGIII

Level 4: Schedule 4 of the Packaging Regulations, derived from UN DGLQ

The performance requirements for the first three packaging containment levels (equivalent to UN PGs I-III) are measured by the ability to withstand the stacking test, drop test, internal hydraulic pressure test, and the leak-proofness test. The overall containment objective allows vapour loss from packaging holding volatile hazardous substances provided the loss is not detectable by smell, sight or sound. The measurable performance requires packers of each volatile liquid hazardous substance to package it according to the internal hydraulic test pressure that is marked on the packaging.

No packaging shall be marked as complying with the UNRTDG criteria for PG I-III, unless it complies with the tests set out in Schedules 1-3 of the regulations, respectively, and the packaging design has also been test certified as complying with those tests.

The performance requirement for the 4th level of containment provides that:

- there is a measurable drop performance for strength, and a measurable leak-proofness test for liquids packaging
- packers can assure themselves of this performance based on any equivalent type of product testing, and
- where a packer considers a lesser standard with regard to the drop performance is sufficient, that packaging can be used provided a warning statement is provided on the package; eg 'handle with care'.

This provision can only be used for certain hazard classifications below certain quantities [Reg 9(5)]

A visual check for compliance with containment and compatibility criteria is generally sufficient. Where there are grounds to suspect that packaging does not comply, checks on the packaging markings, or checking by an informal equivalent of the drop test, for example, can be undertaken.

To meet the requirements, it is the responsibility of the packer of a hazardous substance to select a compatible packaging type of the specified performance. It is an offence if the packer selects inadequate packaging. It is also expected that users should provide handling and storage arrangements appropriate to the package.

Packaging requirements specific to each hazardous classification [P3–P15, Regs 9–21]

Explosive substances (Class 1) [P4, Reg 10]

Self-reactive flammable substances (Class 4.1.2) [P8, Reg 14]

Organic peroxides (Class 5.2) [P12, Reg 18]

These substances are generally packed in PG II packaging to avoid intensifying any unintended detonation or exothermic decomposition. However, UNRTDG now permits packaging explosives in PG I type packages provided they have been tested and classified in that packaging.

Packaging for this group of substances must also avoid closure designs that allow small amounts of the substance to be trapped during closure, and must also prevent the compression of the substance at subzero (–oC) temperatures.

Packaging for retail fireworks, when sold to the public, does not have to meet the above criteria provided it meets a performance standard for fire resistance equivalent to exposure to a cigarette lighter flame for 25 seconds.

In the case of organic peroxides (class 5.2) and self-reactive flammable substances (class 4.1.2), limits on the quantity of these substances in a package and on the temperatures at which the package is to be held, are covered by property performance requirements in the Classes 1 to 5 Controls regulations.

Small quantities of organic peroxides of hazard classifications 5.2B-F, not requiring temperature control (as above), and substances of hazard classification 5.2G, may be packaged in packaging meeting the criteria for 'limited quantities' packaging in Schedule 4.

The requirement for packaging organic peroxides is also augmented by a requirement to exclude any incompatible material, being material that may cause the oxidising substance to explode or combust.

Flammable liquids (Class 3.1) [P5, Reg 11]

As these are volatile substances, they are covered by the packaging objective for limiting vapour losses, with the limit for vented packages linked to the property performance. Identification requirements require situations that allow vapour build up to be specified.

Flammable liquids are classified into 4 categories covering each of the containment performance levels ie, generally:

- 3.1A substances should be packaged according to Schedule 1 (PG I)
- 3.1B substances should be packaged according to Schedule 2 (PG II) when in quantities over 1 L, and may be packaged according to Schedule 4 when in quantities below 1 L
- 3.1C substances should be packaged according to Schedule 3 (PG III) when in quantities over 5 L, and may be packaged according to Schedule 4 when in quantities below 5 L
- 3.1D substances may be packaged according to Schedule 4

However, in line with the UNRTDG, viscous flammable liquids in class 3.1A or 3.1B are exempt from the packaging requirements that would otherwise apply, and can be packaged according to Schedule 3.

Similarly, viscous substances of hazard classification 3.1C are exempt from the packaging requirements that would otherwise apply, and can be packaged according to Schedule 4.

Liquid desensitised explosives (Class 3.2) [P6, Reg 12]

The packaging requirements specified for class 3.2 substances are:

- 3.2A substances should be packaged according to Schedule 1 (PG I)
- 3.2B substances should be packaged according to Schedule 2 (PG II)
- 3.2C substances should be packaged according to Schedule 3 (PG II)

Flammable solids (Class 4.1.1) and Solid Desensitised Explosives (Class 4.1.3) [P7, Reg 13]

Substances liable to spontaneous combustion (Class 4.2) [P9, Reg 15]

Substances that, when in contact with water, emit flammable gases (Class 4.3 P10, Reg 16]

In subclasses 4.1.3, 4.2 and 4.3, substances of hazard category A, B and C should be packaged according to Schedules 1, 2 and 3 (PG I, II and III) respectively. Substances of hazard classification 4.1.1A and 4.1.1B should be packaged according to Schedules 2 (PG II) and 3 (PG III) respectively.

The standard packaging requirement specified for substances liable to spontaneous combustion (Class 4.2) does not prevent the package from containing some air necessary to allow for thermal expansion of the substance (ullage), but ensures that the substance is separated from the air by an appropriate means.

The requirement for substances which in contact with water emit flammable gases (Class 4.3) is augmented by the requirement to contain any agent necessary for keeping the substance separate from water or water vapour.

Substances of hazard classifications 4.1.1A and B, 4.2B and C, and 4.3B and C, in small quantities, may be packaged according to the criteria for limited quantities in Schedule 4.

Oxidising Substances (Class 5.1.1) [P11, Reg 17]

Oxidising substances of hazard category A, B and C should be packaged according to Schedules 1, 2 and 3 (PG I, II and III) respectively. However, small quantities of category B and C substances may be packaged according to the criteria for limited quantities in Schedule 4.

The requirement for packaging for oxidising substances is augmented by a requirement to exclude any incompatible material, being material that may cause the oxidising substance to explode or combust.

Packaging requirements for oxidising gases (class 5.1.2A) will be provided by the separate regulations for compressed gas containers to be produced under s.140(1)(c) of the HSNO Act.

Toxic Substances (Class 6) [P13, Reg 19]

The 4 containment levels for packaging are applied to the hazard classes for toxicity, as follows:

- 6.1A substances should be packaged according to Schedule 1 (PG I)
- 6.1B, 6.6A, 6.7A, 6.8A and 6.9A substances should be packaged according to Schedule 2 (PG II), with quantities of 0.5 kg/0.1 litres or less able to be packaged according to Schedule 4
- 6.1C, 6.5A, 6.5B, 6.6B, 6.7B, 6.8B, 6.8C and 6.9B substances should be packaged according to Schedule 3 (PG II), with quantities of 3 kg/1 litres or less able to be packaged according to Schedule 4
- 6.1D, 6.3A, 6.3B and 6.4A substances should be packaged according to Schedule 4.

There is also a requirement for certain toxic substances that are liable to be in the home (acute toxic classifications 6.1D and 6.1E, and skin and eye irritants 6.3A, 6.3B and 6.4A, in packages of less than 2.5L or 2.5 kg) to be child resistant (Reg 19(2)). Substances within this definition that are restricted to workplaces where children do not have access are excluded from this requirement.

The child resistance requirement focuses on the objective of keeping substances inaccessible to young children and allows a wide range of child resistant solutions. The property performance requirements for toxic substances provide the overall objective and the identification requirements attend to the necessary warnings. While this regulation provides the tools for child resistance in terms of closures and dispenser design, the Authority will use s.77 of the HSNO Act to vary the requirement for these controls based on its assessment of the risks to young children from particular substances, taking into account their formulation, packaging, and labelling.

The child resistance requirement in packaging provides that the substance be in packaging which is significantly difficult for children under 5 years to obtain a toxic dose, while allowing ready access to adults over 50 years. Significantly difficult to children is achieved where 80% of children between 42 and 51 months tested are unable to gain access to a resistant closure, or would be unlikely to obtain a toxic dose from a resistant dispensing device within a period of 5 minutes. Ready access for adults is achieved where 90% of adults between 50 and 70 years tested are able to open and re-close any child resistant closure.

Corrosive Substances (Class 8) [P14, Reg 20]

The packaging requirements for corrosive substances are that:

- highly skin corrosive 8.2A substances be packaged according to Schedule 1 (PG I)
- skin corrosive 8.2B substances be packaged according to Schedule 2 (PG II) when in quantities of more than 1 kg or 0.5 L, and may be packaged according to Schedule 4 when in quantities of less than 1 kg or 0.5 L
- that metallic corrosive 8.1A, skin corrosive 8.2C, and eye corrosive 8.3A substances be packaged according to Schedule 3 (PG III) when in quantities of more than 2 kg or 1 L, and may be packaged according to Schedule 4 when in quantities of less than 2 kg or 1 L
- corrosive substances liable to be in homes (8.2B, 8.2C or 8.3A in packaging less than 2.5 kg/litres) are to be in child resistant packaging

Ecotoxic Substances (Class 9) [P15, Reg 21]

The packaging requirements for ecotoxic substances are that:

- 9.1D and 9.2D substances be packaged according to Schedule 4
- all other class 9 substance be packaged according to Schedule 3 (PG III) when in quantities of more than 5 kg or 5L and may be packaged according to Schedule 4 when in quantities of less than 5 kg or 5L

1.3. Detailed performance requirements

This section will follow at a later date

1.4. Means of meeting performance requirements

Packaging is an area in which technology development is continuously being applied. The HSNO Packaging Regulations are constrained to the testing or performance based component of the UNRTDG. This will ensure significant benefits by not constraining packaging requirements to particular prescriptions of design or construction. The prescriptive parts of the UNRTDG are expected to be put forward by industry for approval as codes of practice for packaging.

Codes of practice to meet provisions for child resistance are expected to include child-resistant closures conforming to recognised standards and to also include restricted product flow orifices and non-removable dispenser caps such as those on aerosol dispensers.

Approved Codes, Standards, other – this section will follow at a later date

1.5. Comparison with previous controls

Controls under previous legislation

In general, packaging requirements under the Dangerous Goods and Toxic Substances Regulations followed international requirements for transport.

Comparison with HSNO controls

The HSNO Regulations for packaging also largely follow the requirements as given by the United Nations Recommendations for the Transport of Dangerous Goods (UNRTDG) Model Regulations and are consistent with the Land Transport Rule 45001: Dangerous Goods 1999.

However, the HSNO Regulations differ from the UNRTDG in two respects. One is that the HSNO Regulations apply to all parts of the lifecycle and includes a provision to limit the accessibility of toxic substances packaged for home use to young children (under five year olds). This is in keeping with the code of practice adopted under the Toxic Substances Regulations by the Ministry of Health.

Secondly, the UNRTDG requirement for the lowest containment level (“small packages”) is purely descriptive whereas the HSNO Regulations has set a measurable performance requirement (Schedule 4) to assist packers check their performance with requirements. This requirement will be able to be met by the standard product testing that responsible manufacturers undertake to ensure that a new product is suitable for marketing.

2. Identification

2.1. Introduction

Overview

The Hazardous Substances (Identification) Regulations 2001 were made under Section 76(1)(b) of the HSNO Act for the purpose of prescribing identification requirements for hazardous substances. The Identification regulations are one of a number of 'lifecycle' regulations in the HSNO regulatory toolbox (see Figure 1 in Part A of this Guide) and prescribe such requirements as provision of information relating to the identification of the hazardous substance, the nature and degree of hazard, and precautions and other aids necessary for safe management of the substance.

Scope

The regulations for identification are focused on ensuring that sufficient information is available with hazardous substances to enable their safe use and management.

The Identification Regulations are divided into three parts and the types of information that are required to be provided by these parts are as follows:

- Part 1—Identification of hazardous substances. This part covers the information that is required to be 'immediately available' with a hazardous substance that identifies it, so that a person handling or using the substance understands the hazards of the substance and any precautions that are necessary. This type of information includes both priority and secondary identifiers and is most commonly provided by way of a label attached to substance packaging. However, it can be achieved through other means such as an instruction sheet inserted in the packaging or an audio message.
- Part 2—Documentation for hazardous substances in places of work. This part covers information that is required to be available in the workplace to enable effective management of the hazardous substance. This would normally be achieved by way of a material safety data sheet (MSDS) but other forms of documentation such as product safety cards could be used if they contain all the information required by the regulations.
- Part 3—Signage and advertising. Signage at a location storing hazardous substances provides information that is necessary to ensure that people (including the emergency services) entering the location understand the hazards of the stored substances and any precautions that are necessary.

The regulations also include requirements on the presentation of the information ie that it is accessible, comprehensible, clear and durable.

The identification controls apply across the hazard classification scheme, but some hazard classification categories have additional or particular requirements.

2.2. Summary of Controls

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one regulatory provision or a group of related provisions in the HSNO regulatory toolbox.

A summary of the controls for identification prescribed in the Identification Regulations, as outlined in the Controls Matrix, is provided below.

Identification code	Identification Regulations	Description
I1	Regs 6, 7, 32-35, 36 (1)-(7)	General identification requirements, duties of persons in charge, accessibility, comprehensibility, clarity and durability
I2	Reg 8	Priority identifiers for corrosive substances
I3	Reg 9	Priority identifiers for ecotoxic substances
I4	Reg 10	Priority identifiers for explosive substances
I5	Reg 11	Priority identifiers for flammable substances
I6	Reg 12	Priority identifiers for organic peroxides
I7	Reg 13	Priority identifiers for oxidising substances
I8	Reg 14	Priority identifiers for toxic substances
I9	Reg 18	Secondary identifiers for all hazardous substances
I10	Reg 19	Secondary identifiers for corrosive substances
I11	Reg 20	Secondary identifiers for ecotoxic substances
I12	Reg 21	Secondary identifiers for explosive substances
I13	Reg 22	Secondary identifiers for flammable substances
I14	Reg 23	Secondary identifiers for organic peroxides
I15	Reg 24	Secondary identifiers for oxidising substances
I16	Reg 25	Secondary identifiers for toxic substances
I17	Reg 26	Use of generic names
I18	Reg 27	Requirements for using concentration ranges
I19	Regs 29 – 31	Additional information requirements, including situations where substances are in multiple packaging
I20	Reg 36(8)	Durability of information for class 6.1 substances

I21	Regs 37 – 39, 47 – 50	General documentation requirements
I22	Reg 40	Specific documentation requirements for corrosive substances
I23	Reg 41	Specific documentation requirements for ecotoxic substances
I24	Reg 42	Specific documentation requirements for explosive substances
I25	Reg 43	Specific documentation requirements for flammable substances
I26	Reg 44	Specific documentation requirements for organic peroxides
I27	Reg 45	Specific documentation requirements for oxidising substances
I28	Reg 46	Specific documentation requirements for toxic substances
I29	Regs 51, 52	Signage requirements
I30	Reg 53	Advertising corrosive and toxic substances

General identification requirements [I1–Regs 6,7,32-35, 36(1)-(7)]

Duties of persons in regard to identification of hazardous substances [Regs 6, 7]

In general terms, the identification duties of suppliers require that a person must not supply a hazardous substance to any other person unless it is identified with the priority identifier and secondary identifier information required by Part 1 of the Identification regulations (see below). They must also ensure that the substance is not identified as belonging to a hazard class it does not belong to.

Persons in charge of a hazardous substance (eg in a workplace) must ensure that it continues to comply with these requirements.

Presentation requirements: accessibility, comprehensibility, clarity and durability [Regs 32-35, 36(1)-(7)]

Regardless of the type of information that is being supplied with a hazardous substance, it is important that the information achieve its purpose ie that it be understood by those people using the hazardous substance. Accordingly, the following controls have been prescribed for the presentation of information to ensure that certain performance standards are met for accessibility, comprehensibility, clarity and durability:

- The information must be accessible (Reg 32-33). Priority identifier information must be provided so that it is available to a person handling the substance within 2 seconds. Secondary identifier information must be provided so that it is available to a person handling the substance within 10 seconds. These requirements must be complied with until the substance concerned has been treated or disposed of according to the Hazardous Substance (Disposal) Regulations 2001.
- The information must be comprehensible (Reg 34) ie the intended audience must be able to understand the information required in this regulation and thereby take appropriate precautions when managing the substance. For some substances the intended audience may be a specialised sector of the workforce, for other substances the intended audience will be the general public.

- The information must be able to be easily read by a person with normal eyesight in the normal circumstances where the substance may be found (Reg 35). For hazard and precautionary information on packaging, this means that the information is prominent in comparison with non-hazard information and can be understood at the distances associated with normal handling.
- The information must be provided in a durable format (Reg 36 (1)-(7)) ie the information is provided in a manner that ensures it is available with the substance. For example, labels for hazardous substances used outdoors need to be resistant to fading by sunlight, immersion in water and other aspects of weathering. While manufacturers and importers need to supply information in a durable format, hazardous substance managers also need to ensure the information remains with the substance and in good condition.

Information to be immediately available – Priority and Secondary Identifiers (Labels) [12–119; Regs 8–14, 18–31]

There are two types of information relating to the identification of a hazardous substance that must be immediately available. These are:

- **Priority Identifiers:** This information must be available to any person handling the substance within two seconds, and primarily consists of an indication of the type of hazard that exists (see below). This would normally be provided by way of signal headings or commonly understood pictograms such as the UN Dangerous Goods diamonds.
- **Secondary Identifiers:** This information must be available to any person handling the substance within ten seconds and consists of information such as describing the degree of hazard and other risks associated with the substance, and information on how to prevent and manage those risks (see below). This would normally be provided by way of less prominent print on labels, often in secondary panels or on 'back' labels.

This identification information, in combination with other information-related requirements eg emergency management (first aid) and disposal information, is designed to allow a person without special training to deal with the substance safely. This type of 'basic' information is likely to appear on a permanent label on a package. The information requirements for both priority and secondary identifiers need to be complied with until the substance concerned has been treated or disposed of according to the Hazardous Substance (Disposal) Regulations 2001.

The Identification requirements for labelling were developed with consideration to the existing requirements within New Zealand and current international best practice. The required information is:

- a prominent warning of the hazard of the substance (eg flammable, toxic or explosive){eg use of signal headings, pictograms} [priority identifier]
- for toxic substances and corrosive substances that are not restricted to the workplace and can be found in peoples homes, a prominent statement of the need to keep the substance away from children [priority identifier]
- some differentiation of the degree of hazard (eg highly flammable versus flammable) {eg use of UN Packing Group numbers}[secondary identifier]

- the unequivocal identification of the actual substance (eg technical or common name) [secondary identifier]
- a description of the nature and degree of the hazards which the substance possesses. This information is complimentary to the prominent hazard warning, providing additional information on the specific nature of the hazardous property and the degree of the hazard. For example, while the prominent hazard warning describes a substance as toxic, for effective management it is also important to know whether the chemical can cause cancer, or if it is a strong or relatively weak skin irritant (eg use of EU risk phrases)[secondary identifier]
- advice on the adverse effects of the hazardous substance and the precautions that should be taken to prevent injury to a person or damage to the environment in the course of handling or using the substance. Examples are the precautionary statements “use only in well-ventilated areas” where there is a risk to people inhaling a toxic substance, and “keep away from heat” for flammable substances {eg use of EU safety phrases}[secondary identifier]
- information to enable to the New Zealand manufacturer or importer of the substance to be contacted [secondary identifier]
- if the substance increases in hazard over time, or develops additional or different hazardous properties, a description of how the hazard changes and an expiry date for the substance [secondary identifier]
- where a substance has highly toxic or corrosive ingredients, the identification of these ingredients and their concentration in the substance. Corrosive ingredients and relatively less toxic ingredients may be identified by generic names (reg 26) [secondary identifier].

The above information needs to be available with the substance in such a manner that the intended users of the substance are alerted to the hazard(s) and can then immediately locate the information necessary to safely manage the substance. In situations where the substance is packaged in a transport load or is stored in a large container, the above requirements need not apply, provided that either:

- there is prominent information describing the hazardous nature of the substance and also the precautions that need to be taken to safely manage the substance (eg for flammable substances a large flammable class label and a statement such as ‘No Smoking’) or
- there is information available that complies with the relevant transport requirements within New Zealand.

Similarly, when a hazardous substance is imported into New Zealand in a closed package or in a freight container and when it is being carried to the destination stated in its import documentation (and it is still in its original container), if the package/container complies with the labelling requirements of the Land Transport Rule: Dangerous Goods 1999 (or NZS 5433: 1999 Transport of Dangerous Goods on Land) this will be considered to be in compliance with the HSNO requirements discussed above.

Workplace documentation requirements [I21–I28; Regs 37-50]

Workplaces that have hazardous substances in quantities above those specified in Schedule 2 of the Identification regulations need to have workplace documentation for each substance.

Workplace documentation is more detailed and technical than information required to be immediately available with hazardous substances. This is because workplace information is used as an information source to manage the wide range of activities that are undertaken with workplace hazardous substances eg describing the precautions necessary for the safe handling of hazardous substances. In current practice, the primary means of providing this workplace documentation is the MSDS.

Workplace documentation needs to be readily available within the workplace to any person responsible for managing or using hazardous substances. The primary responsibility for preparing and supplying the workplace documentation rests with the hazardous substance manufacturer or importer (or supplier). However, ensuring that the documentation is readily available within the workplace is the responsibility of the workplace management.

The required documentation must (amongst other things):

- provide information on the unequivocal identification of the substance, including its chemical name, common name(s), trade name(s), UN number and CAS registry number (as applicable)
- describe the physical characteristics of the substance including physical state and colour, and characteristics specific to hazardous properties that need consideration to ensure appropriate use and handling. For flammable substances this includes flammability limits, while for toxic substances it includes a summary of toxicity data
- provide information to enable to the New Zealand manufacturer or importer of the substance to be contacted
- state the date on which the document was prepared and include emergency management and disposal information
- state the general degree and type of hazard(s) which the substance possesses
- details on the precautions that should be taken to prevent injury to a person or damage to the environment during the substance's lifecycle
- if the substance increases in hazard over time, or develops additional or different hazardous properties, a description of how the hazard increases/changes and an expiry date for the substance
- where a substance has highly toxic or corrosive ingredients, the identification of the ingredients and their proportion within the substance. This identification must also include any CAS number allocated to the ingredient. However, generic names may be used to identify corrosive ingredients
- the exposure limits for toxic substances (TEL and/or WES), or ecotoxic substances (EEL)

Workplace signage requirements [I29–Regs 51-52]

Locations where hazardous substances are stored in quantities above those specified in Schedule 3 of the Identification regulations need to have signage information to alert people that precautions may be necessary at the location. Signs are required:

- at every entrance to the building and/or location (vehicular and pedestrian) where hazardous substances are present
- at each entrance to rooms or compartments where hazardous substances are present
- immediately adjacent to the area where hazardous substances are located in an outdoor area

The information provided in the signage needs to be understandable over a distance of 10 metres and be sufficient to:

- advise that the location contains hazardous substances
- describe the general type of hazard of the substance (eg flammable, toxic or explosive) and provide some differentiation of the degree of hazard (eg highly flammable versus flammable)
- and where the signage is immediately adjacent to the hazardous substance storage areas, describe the precautions needed to safely manage the substance (eg a 'No Smoking' warning near flammable substances).

Advertisements for corrosive and toxic substances [I30–Reg 53]

Advertisements for substances that are either toxic or corrosive to human tissue need to provide information identifying the specific type of hazard, the degree of toxicity, and indicate that access by children must be restricted.

2.3. Detailed performance requirements

This section will follow at a later date

2.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

2.5. Comparison with previous controls

Controls under previous legislation

Previous New Zealand legislation provided numerous requirements for the identification (eg labelling, signage) of hazardous substances eg Toxic Substances Regulations 1983, Pesticides Act 1979 and various Dangerous Goods Regulations. There were also internationally accepted identification specifications such as those in the UNRTDG model regulations, and standards developed by the International Standards Organisation (ISO). Specific identification provisions and standards also exist in regulatory schemes of our major trading partners, namely Australia, EU and the US. While all of the above requirements were consistent in their intent (ie to communicate hazards and enable the necessary precautions to be taken), they were highly prescriptive and could therefore differ widely in specific details.

Comparison with HSNO controls

The objectives for setting controls for identification requirements are to regulate in a way that:

- ensures sufficient and necessary information is available to enable users to safely handle hazardous substances, and
- minimises the cost of compliance

To achieve these objectives, the development of the HSNO regulations was based on converting the previous prescriptive legislative requirements into performance-based equivalents. This performance based approach enabled the requirements to be specified in a way that could accommodate various prescriptive requirements from international schemes, including the EU, Australia and internationally accepted identification approaches eg UNRTDG. The latter are particularly important for ensuring consistency with the move to international harmonisation of labelling under the GHS.

Generally, the information requirements prescribed by the HSNO regulations are similar to those prescribed by previous legislation although it was recognised that previous requirements for information in the workplace were insufficient. Therefore, the HSNO requirements are based on best practice currently occurring in New Zealand, legislative requirements in the EU, Australia, the US and the specifications of the ISO.

The replacement of prescriptive requirements with a performance-based approach provides a major benefit of the identification regulations. This will result in reduced costs due to consistency with current international harmonisation activities (eg Trans-Tasman harmonisation), which will have such effects as eliminating the need for identification requirements specific to the New Zealand market eg New Zealand specific labels.

A further benefit is that the regulations have updated previous legislation to international best practice. In particular, the requirements for MSDS type information will ensure the provision of adequate information for the safe management of hazardous substances and so is expected to reduce accidents associated with improper handling in the workplace.

3. Emergency Management

3.1. Introduction

Overview

The Hazardous Substances (Emergency Management) Regulations 2001 were made under Section 76(1)(d) of the HSNO Act for the purpose of prescribing requirements to manage any emergency involving a hazardous substance. These regulations are part of the lifecycle performance component of the regulatory toolbox.

Scope

Emergencies generally occur when a control on the substance has failed so that the substance is not contained as expected and/or some harm has already occurred. Every year in New Zealand, there are about 200 incidents involving hazardous substances that are attended by the Fire Service, with many other incidents occurring that do not require Fire Service attendance. Almost all of these incidents result in harm to the environment, human health or property, often with considerable costs. The Emergency Management Regulations focus on measures to be put in place so that when incidents and emergencies occur, their effects are minimised both in severity and extent. Such measures include the provision of information (eg, first aid instructions or spill response procedures), equipment (eg, for fire-fighting) or, for high hazard situations, specific emergency management plans.

In general, the requirements for emergency management are that:

- sufficient information is available to enable a person handling the substance to identify any likely emergency situations and define the steps to be taken when faced with an emergency
- an emergency plan is developed setting out the steps required to isolate or contain, and, as far as possible, to remedy the harmful effects of exposure.

The Emergency Management Regulations provide for three levels of emergency management. The requirements for the higher levels include those required for the lower levels.

Level 1: Level 1 emergency management relates to general information requirements and is thus applicable to all circumstances. Level 1 essentially focuses on particular requirements to manage risks to individuals. It would be normally addressed by the provision of information on labels.

Level 2: Level 2 emergency management is essentially focussed on the workplace and provides for further documentation requirements (eg MSDSs) and fire-fighting requirements. Situations requiring Level 2 emergency management are those that affecting several people, such as in a workplace, and/or a localised area of the environment (including both property and ecosystems).

Level 3: Level 3 emergency management is required for managing an emergency where the effects are able to extend to large numbers of people and/or significant parts of the environment. This level provides for the provision of emergency response plans, secondary containment and site signage.

3.2. Summary of Controls

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one regulatory provision or a group of related provisions in the HSNO regulatory toolbox.

A summary of the controls for emergency management prescribed in the Emergency Management Regulations, as outlined in the Controls Matrix, is provided below.

Emergency Management code	Emergency Management Regulation	Description
EM1	Regs 6, 7, 9-11	Level 1 information requirements for suppliers and persons in charge
EM2	Reg 8 (a)	Information requirements for corrosive substances
EM3	Reg 8 (b)	Information requirements for explosive substances
EM4	Reg 8 (c)	Information requirements for flammable substances
EM5	Reg 8 (d)	Information requirements for oxidising substances and organic peroxides
EM6	Reg 8 (e)	Information requirements for toxic substances
EM7	Reg 8 (f)	Information requirements for ecotoxic substances
EM8	Regs 12-16, 18-20	Level 2 information requirements for suppliers and persons in charge
EM9	Reg 17	Additional information requirements for flammable and oxidising substances and organic peroxides
EM10	Regs 21-24	Fire extinguisher requirements
EM11	Regs 25-34	Level 3 emergency management requirements: duties of person in charge, emergency response plans
EM12	Regs 35-41	Level 3 emergency management requirements: secondary containment
EM13	Reg 42	Level 3 emergency management requirements: signage

Requirements for Level 1 emergency management [EM 1–EM7, Regs 6–11]

General duties and information requirements [EM1, Regs 6, 7, 9–11]

Level 1 emergency management information must be provided where hazardous substances are sold or supplied in quantities equal to or greater than the quantities specified in Schedule 1 (Emergency Management Regulations).

(Note: Schedule 1 currently contained in the Emergency Management Regulations 2001 has omitted the entries for classes 6 and 9 and some of class 5 by error. This will be corrected by amendment. In the interim, the missing entries are given in a table at the end of this section).

At this level, it is assumed that:

- there is access to any basic material required to manage the emergency (eg water for fighting certain types of fire, or for washing off substances which are corrosive), or
- the requirement for information will contribute to preparedness by prompting the person in charge of the substance to consider other equipment or material (eg types of fire extinguisher).

Any information supplied must be readily available and meet the performance standards for clarity, comprehensibility and durability set out in the Identification Regulations. Readily available information means that when handling the primary container, or before removing the substance from any container, a person must be able to locate the required information within 10 seconds. This information would normally, therefore, be provided by way of a label.

When a hazardous substance is being transported, it is sufficient compliance with these requirements if it is labelled or marked in accordance with the identification requirements under the relevant rules of the Land Transport Act, Civil Aviation Act or the Maritime Transport Act.

Specific information requirements for Level 1 [EM2–EM7, Reg 8]

For substances that are above specified quantity thresholds, the following information must be immediately available with the substance:

1. for corrosive substances: [EM2, Reg 8(a)]
 - a description of the usual symptoms of exposure
 - a description of the first aid to be given
 - a 24-hour emergency service telephone number
2. for explosive substances: [EM3, Reg 8(b)]
 - a 24-hour emergency service telephone number
3. for flammable substances: [EM4, Reg 8(c)]
 - a description of the material and equipment needed to put out any fire involving it
 - if the substance is subject to temperature control, a warning of the temperature at which it is likely to ignite.
4. for oxidising substances and organic peroxides: [EM5, Reg 8(d)]
 - a description of the material and equipment needed to put out any fire
 - a 24-hour emergency service telephone number
 - if the substance is subject to temperature control, a warning of the temperature at which it is likely to decompose and possibly explode
5. for toxic substances of classes 6.1, 6.3, 6.4 or 6.5: [EM6, Reg 8(e)]
 - a description of the usual symptoms of exposure

- a description of the first aid to be given
 - a 24-hour emergency service telephone number
6. for ecotoxic substances: [EM7, Reg 8(f)]
- a description of the parts of the environment likely to be immediately affected
 - a description of its typical effects on the environment
 - a statement of any immediate actions that may be taken to prevent the substance from entering or affecting those parts of the environment

Requirements for Level 2 emergency management [EM8–EM10, Regs 12–24]

General duties and documentation requirements [EM8, Regs 12–16, 18–20]

Level 2 emergency management information must be provided where hazardous substances are sold or supplied, or held in a workplace, in quantities equal to or greater than the quantities specified in Schedule 2 (Emergency Management Regulations). Level 2 emergency management requirements are focused principally on workplace situations. They centre mainly on the supply of additional information/documentation (eg MSDSs). There are also requirements for class 1 to 5 substances that relate to fire extinguishers. Any information supplied must be available within 5 minutes and meet the performance standards for clarity and comprehensibility set out in the Identification Regulations.

Level 2 emergency management information is intended to allow trained workers to deal effectively with an emergency, and includes, for each hazard, a description of:

- the preparations that should be made for an emergency involving the substance
- any special training or equipment required to deal with the emergency (eg antidotes, absorbent or neutralising materials, specialised protective equipment etc.)
- the actions to be taken to reduce or eliminate the dangers arising from an emergency (eg provision of first aid to people exposed to the substance, spill response)
- the actions to be taken to re-establish the controls that were imposed on the substance when it was approved.

Specific documentation requirements for flammable and oxidising substances and organic peroxides [EM9, Reg 17]

The following information is specifically required for flammable substances, oxidising substances and organic peroxides:

- the steps to be taken to control any fire involving the substance, including the types of extinguishant to be used

When a hazardous substance is being transported, it is sufficient compliance with these documentation requirements if it is accompanied by documents that comply with the documentation requirements under the relevant rules of the Land Transport Act, Civil Aviation Act or the Maritime Transport Act.

Requirements for fire-extinguishers [EM10, Regs 21–24]

The intention of these general requirements is to provide sufficient fire-fighting capacity to stop a fire spreading if it starts, or reaching the hazardous substances, rather than providing sufficient capacity to extinguish any possible fire involving a large quantity of hazardous substances. It is expected that as quantities of substances become sufficiently large to require an emergency plan, the systematic evaluation required by the plan would indicate the need for greater fire-fighting capacity.

Every place (including vehicles) where explosive, flammable or oxidising substances are held in quantities that require Level 2 emergency management must have the specified number of fire extinguishers (either one or two) as detailed in Schedule 3 (Emergency Management Regulations). Each fire extinguisher must be located within 30 m of the substance, or, in a transportation situation, in or on the vehicle. The performance measure for an extinguisher is that it must be capable of extinguishing a fully ignited pool of flammable liquid (50 mm deep and at least 6 m² in area), before the extinguisher is exhausted, and must be able to be used by one person.

Requirements for Level 3 emergency management [EM 11–13, Regs 25–42]

General duties and information requirements [Reg 25–26]

Level 3 emergency management must be provided for where hazardous substances are held at any fixed location or on a motor vehicle in quantities equal to or greater than those specified in Schedule 4 (Emergency Management Regulations). Level 3 emergency management includes requirements for the preparation of an emergency response plan, secondary containment and signage.

Emergency response plans [Regs 27–34]

The emergency response plan must describe, in relation to all the hazardous substances held at the place, all of the likely emergencies that may arise from any breach or failure of controls. Plans will vary greatly depending on the nature of the activities at the site and the types and quantities of substances involved. For example:

- a small or low hazard activity or circumstance may require only a relatively simple plan
- a larger or more hazardous activity or circumstance may require a more detailed and extensive plan.

Incidents of the scale possible at this level will often extend beyond the boundaries of the location where the substance(s) are found and:

- warnings may be required for the surrounding community, and
- local emergency service providers or providers of other services (eg electricity and gas supply or authorities with responsibility for water and wastewater systems) may need to be involved in both the development and testing of the plan.

The plan required for hazardous substances will often be part of a broader emergency plan required under other legislation or prepared for some other reason.

Successful management of incidents will often require individuals with specific training and may require special equipment. Where these are required, they need to be available and their availability needs to be determined during planning and as part of testing the plan.

Contents of the plan [Reg 29–30]

For each identified emergency scenario, the emergency management plan must:

1. Describe the actions to be taken to:
 - warn people at the location, and in surrounding areas that may be adversely affected, that an emergency has occurred
 - advise these people on the actions they should take to protect themselves
 - help or treat any person injured as a result of the emergency
 - manage the emergency so that any adverse effects are in the first instance, restricted to the area initially affected, then reduced in severity as soon as practicable and if possible eliminated
 - re-establish controls on any remaining substance.
2. Identify every person with responsibilities for undertaking the actions described in 1 above, and provide information including:
 - how to contact the person
 - any skills which the person is required to have
 - the actions that person is expected to take.
3. Specify:
 - how to obtain information about the hazardous properties of, and means of controlling, the substance(s) which may be involved
 - actions to be taken to contact any emergency service provider
 - the purpose and location of each item of equipment or material to be used to manage the incident
 - how to decide which actions to take
 - the sequence in which actions should be taken.
4. Show how specific hazards, if relevant, have been taken into account eg
 - for fire, specify the design and installation of fire extinguishers and any additional fire-fighting equipment, material and systems provided
 - for liquid or liquefied oxidizing substances or organic peroxides, specify procedures to isolate the substance from incompatible substances

Availability of equipment, materials and people [Reg 31]

Where items of equipment, materials or responsible (trained) people are described in the plan these must either:

- be present at the location, or
- be available to reach the location within the times specified in the plan, or
- (in the case of trained personnel) be available to provide specified advice or information within a time specified in the plan.

Availability of plan [Reg 32]

The information in the plan is to be available to every person designated as responsible to execute the plan or a specific part of it, and to every emergency service provider identified in it. The information is to meet the performance standards for clarity and comprehensibility of documentation as contained in the Identification regulations.

In the context of these requirements a person may be either:

- a specific individual, or
- a specified role in the organisation, or
- a specified organisation providing the particular function.

Testing plans [Reg 33]

Each emergency plan must be tested either:

- every 12 months, or
- within three months of any change to the personnel, procedures or actions specified in the plan
- and the test must demonstrate that each procedure in the plan is workable and effective. The results of the test must be documented, retained for at least 2 years and made available for inspection along with the plan, when requested by an enforcement officer.

Secondary containment [EM12, Reg 35–41]

Where liquid (or liquefiable) hazardous substances are held at any fixed location in quantities above those specified in Schedule 4 of the Emergency Management Regulations, there is a requirement for a secondary containment system. Secondary containment is a defined area within which:

- the substance (subject to any evaporation) can be retained and recovered from
- emergency controls can be instituted which would prevent the hazard being manifested.

The objectives of containment systems are generally to prevent a liquid substance migrating either off the site, or more specifically, out of an area where some specific measures may be in place to prevent a hazard being manifested.

Secondary containment for surface (above ground) containers [Regs 37–39]

Where liquid hazardous substances are located above ground, the secondary containment requirements depend on the capacity of the containers and the total volume of substance held. Different requirements are provided for containers:

- up to 60 L
 - for aggregate quantity up to 5000 litres, containment must be at least 50% of volume held
 - for aggregate quantity between 5000 and 10,000 litres, containment must be at least 2500 litres
 - for aggregate quantity greater than 10,000 litres, containment must be at least 25% of volume held
- between 60 L and 450 L
 - for aggregate quantity up to 5000 litres, containment must be at least 100% of volume held
 - for aggregate quantity between 5000 and 10,000 litres, containment must be at least 5000 litres

- for aggregate quantity greater than 10,000 litres, containment must be at least 50% of volume held
- greater than 450 L
- containment capacity must be at least 110% of the capacity of the largest container

Secondary containment for underground containers [Reg 40]

Where liquid hazardous substances are located below ground level, the secondary containment system must be designed, constructed and operated so that

- if the substance escapes, it is retained within the boundaries of the site and is prevented from escaping through groundwater movement; and
- no more than 5% of the site's underground storage capacity is retained in the soil of the site over the total operating life of the site.

Signage [EM13, Reg 42]

Where hazardous substances are held at any fixed location in quantities above those specified in Schedule 5 of the Emergency Management Regulations, the regulations specify certain signage requirements. The signs must advise the action(s) to be taken in an emergency and could, for example:

- provide information to identify one or more of the emergency service providers or responsible personnel and the means of contacting them, and
- provide sufficient information to advise any of the trained persons and the emergency service provider(s) of the immediate emergency response actions for the hazardous substances present.

Signage at the external boundaries of a facility can assist in the initiation of an emergency response, when the facility does not have personnel on-site. Signage at entrances to specific locations is to provide information that enables an immediate emergency response without the need to refer to the emergency plan. Any sign must comply with the performance standards for signage for comprehensibility and clarity in the Identification Regulations

3.3. Detailed performance requirements

This section will follow at a later date

3.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

3.5. Comparison with previous controls

Controls under previous legislation

There is limited specific reference to emergency management in the legislation replaced by the HSNO Act. However, the matters in the HSNO regulations are generally covered explicitly or implicitly by specific previous regulations. There has always been a requirement for the provision of information, even if not at the level of detail or accessibility required by the HSNO regulations. Where flammable goods are stored or used, previous legislation provided that specifications for fire-fighting equipment exist. There was also a requirement for employees to receive instructions on the management of spillages or other emergencies. It is implicit that specific emergency plans would have been required in specific situations.

Comparison with HSNO controls

The HSNO regulations are based on a tiered approach relating to the degree of hazard and the quantity of the hazardous substances at individual locations. The regulations provide detailed direction, without being totally prescriptive, on how to attain the required level of performance, by specifying requirements for information, fire-fighting and other emergency response equipment, the contents of emergency plans, signage and secondary containment.

These regulations will bring a degree of consistency and formalisation to the emergency management requirements for hazardous substances. For most hazardous properties, the emergency management requirements under HSNO are more comprehensive than under previous legislation. They should not, however, be more demanding than current industry best practice.

The cost resulting from meeting the HSNO regulations will be borne largely by organisations whose emergency management procedures are currently not up to industry best practice. These costs are expected to reduce once an adequate emergency management system has been put in place.

The benefits will be less accidental injury, illness and death, less damage to property, fewer contaminated sites and less environmental damage. These benefits will be on-going and so will significantly outweigh any associated, relatively short-term costs.

4. Disposal

4.1. Introduction

Overview

The Hazardous Substances (Disposal) Regulations 2001 were made under Section 76(1)(c) of the HSNO Act for the purpose of prescribing requirements for disposal of hazardous substances. The disposal regulations reflect the purpose and principles of the Act, which require that the health and safety of people and the environment are protected from the adverse effects of hazardous substances. One such effect is when inadequate disposal results in the contamination of land, air or water. In addition, the lifecycle approach to the approval and management of hazardous substances in the HSNO Act requires effective controls to be applied at the end of the substance's lifecycle.

Scope

The Disposal regulations are divided into two parts:

Part 1

- disposal requirements for explosive, flammable and oxidising substances (physical hazards)
- disposal requirements for toxic and ecotoxic substances (biological hazards)
- disposal of packages and containers contaminated with any hazardous substance

Part 2

- Information to be provided about disposal

There is considerable overlap in intent between the HSNO disposal controls and those set under the RMA. As such, the disposal regulations have been designed to be flexible enough to allow for more stringent controls to be applied under the RMA if necessary.

The regulations follow the definition of disposal as provided in the HSNO Act. This means that disposal is limited to:

a. Treatment

Disposal by treatment is based on reducing the hazard below the HSNO threshold values for each hazardous property. Treating the substance through dilution is prohibited except for substances that will readily break down in the environment.

b. Discharge to the environment

The term "discharge to the environment" does not include deposition into a landfill or sewage treatment facility, but does include discharge from these facilities.

c. Export

Export from New Zealand has the same meaning as in the Customs and Excise Act 1996 and is subject to international agreements (eg the Basel Convention).

According to this definition, finding alternative uses or recycling a substance does not constitute 'disposal'. However, it should be noted that if a substance were to be used in ways that were significantly different from those on which its approval was based, there would be grounds for a reassessment of the substance under section 62(2)(c) of the HSNO Act.

The regulations do not prioritise any of the three options for disposal. Flexibility is left to the user to decide the best option on a case-by-case basis. However, the Authority can influence the preferred option for disposal during the attachment of controls to an approval. As an example, if highly stringent discharge controls are placed on a substance, disposal will be directed towards treatment rather than discharge.

The regulations do not provide for an exemption for the disposal of domestic hazardous substances. However, the small volumes of hazardous substances disposed domestically would be diluted by non-hazardous household waste so that the household's waste stream is unlikely to exceed any HSNO hazardous property threshold.

These regulations do not provide any specific disposal controls for substances that are metallic corrosive because these types of substances would either:

- also trigger another hazardous property threshold which has disposal requirements, or
- only be corrosive to metals (and no environmental or toxic residue from disposal is likely).

4.2. Summary of Controls

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one regulatory provision or a group of related provisions in the HSNO regulatory toolbox.

A summary of the controls for disposal prescribed in the Disposal Regulations, as outlined in the Controls Matrix, is provided below.

Disposal code	Disposal Regulation	Description
D1	Reg 5	Disposal requirements for class 1 substances (explosives)
D2,	Reg 6	Disposal requirements for class 2,3,4 substances (flammables)
D3	Reg 7	Disposal requirements for class 5 substances (oxidisers)

D4	Reg 8	Disposal requirements for class 6,8 substances (toxics and corrosives)
D5	Reg 9	Disposal requirements for class 9 substances (ecotoxics)
D6	Reg 10	Disposal requirements for packages
D7	Regs 11, 12	Information requirements for manufacturers, importers and suppliers, and persons in charge
D8	Regs 13, 14	Documentation requirements for manufacturers, importers and suppliers, and persons in charge

Disposal requirements for explosive, flammable and oxidising substances (physical hazards)

Explosive (class 1) substances [D1, Reg 5]

Disposal of substances or articles with explosive properties shall be by:

- treating the substance so that it is no longer hazardous - treatment can include controlled detonation, deflagration or burning that meets the requirements set out in regulations for control of explosive properties, which provide for a sufficient detonation zone and a competent person to undertake the detonation, or
- exporting the substance from New Zealand as waste.
- The regulations prohibit explosive substances from being deposited into a landfill or sewage treatment facility.

Flammable (classes 2, 3 and 4) substances [D2, Reg 6]

Disposal of substances with flammable properties shall be by:

- treating the substance so that it is no longer a hazardous substance - treatment can include controlled burning that meets the performance requirements set out in the regulations for flammable controls, or
- exporting the substance from New Zealand as a hazardous waste, or
- for flammable gases, aerosols and liquids (classes 2.1.1, 2.1.2, 3.1) or readily combustible solids of class 4.1.1, discharge to the environment or deposition into a landfill, provided the discharge location is managed so that:
 - the substance does not or will not come into contact with any substances with explosive or oxidising properties; and
 - no ignition source is present; and
 - in the event of an accidental fire, harm to people or environment does not occur - the performance requirements for intended burning of flammable substances in the flammable controls regulations are to be used to ensure that this condition is met.

Deposition of substances with flammable properties into a sewage treatment facility or sewage collection system is prohibited, unless the substance mixes with water and the mixture is below the flammable threshold level before it is discharged to the sewage system. This requirement is included to ensure that flammable substances do not collect in pockets in sewage collection systems with resultant fires or vapour explosions.

Desensitised explosives (classes 3.2 and 4.1.2), self-reactive substances (class 4.1.2), spontaneously combustible substances (4.2) and substances which are dangerous when wet (class 4.3) may not be discharged to landfill.

Oxidising (class 5) substances [D3, Reg 7]

Disposal of substances with oxidising properties shall be by:

- treating the substance so that it is no longer a hazardous substance which can include:
 - detonation, deflagration or controlled burning provided that the detonation, deflagration or controlled burning is done in a manner that meets the performance requirements set out in the regulations; or
- exporting the substance from New Zealand as a hazardous waste; or
- deposition into a landfill, provided that the discharge location is managed so that:
 - the substance does not come into contact with any substances with explosive or flammable properties; and
 - no ignition source is present; and
 - in the event of an accidental fire, the performance requirements for controlled detonation or burning, above, can be met.

Deposition of class 5 substances into a sewage treatment facility or sewage collection system is prohibited unless the waste has been treated to below the threshold level for oxidising capacity before it is discharged to the sewage system. .

Disposal requirements for toxic, biologically corrosive and ecotoxic substances (biological hazards)

Toxic (class 6) and corrosive (class 8) substances [D4, Reg 8]

A class 6 or 8 substance must be disposed of by:

- treating the substance so that it is no longer a hazardous substance, including depositing the substance in a landfill, incinerator or sewage facility if that facility will render the substance non-hazardous. However, in relation to class 6 substances, treating the substance does not include dilution of the substance with any other substance prior to discharge to the environment; or
- discharging the substance to the environment provided that, after reasonable mixing, the concentration of the substance in any part of the environment outside the mixing zone does not exceed any TEL (tolerable exposure limit) set by the Authority for that substance in the corresponding environmental medium. However, a class 6 or 8 substance may be discharged into the environment without having to comply with this requirement if the substance is rapidly degradable and the products of degradation are not hazardous; or
- exporting the substance from New Zealand as a hazardous waste.

Ecotoxic (class 9) substances [D5, Reg 9]

A class 9 substance must be disposed of by:

- treating the substance so that it is no longer a hazardous substance, including depositing the substance in a landfill, incinerator or sewage facility if that facility will render the substance non-hazardous. However, it does not include dilution of the substance with any other substance prior to discharge to the environment; or
- discharging the substance to the environment provided that, after reasonable mixing, the concentration of the substance in any part of the environment outside the mixing zone does not exceed any EEL (environmental exposure limit) corresponding to that part of the environment, set by the Authority for that substance; or
- exporting the substance from New Zealand as a hazardous waste.

There is an additional requirement for substances that are ecotoxic to the aquatic environment (class 9.1), or contain a component that is ecotoxic to the aquatic environment, which are also bio-accumulative and not rapidly degradable. As these substances pose a high long-term risk to the environment, they must be treated before discharge to the environment to the specifications outlined in the regulations (Reg 9(3)).

Where a toxic or ecotoxic substance is deposited into a landfill, no one may cause or allow a subsequent discharge from the landfill that results in an EEL or TEL being exceeded. This means that responsibility for care passes to anyone who might cause a breach in the landfill even after it has been closed.

These regulations will be partially dependent on persons responsible for disposal having adequate information to ensure compliance. Such guidance could be disposal acceptance criteria (such as the landfill acceptance criteria currently being developed by the Ministry for the Environment) or disposal guidelines or standards produced by industry or regulatory bodies. These could take the form of an approved code of practice.

Disposal requirements for hazardous substance packages/containers [D6, Reg 10]

Any package/container that used to contain a hazardous substance and is no longer to be used to contain that substance and which has not been decontaminated is still considered hazardous. Such packages must be either rendered incapable of containing any substance (hazardous or otherwise) and be disposed of in an appropriate manner that is not inconsistent with the disposal requirements for the substance it contained, or decontaminated.

The package has been considered decontaminated when:

1. for substances with explosive, flammable or oxidising properties, any residual substance has been treated so that it is no longer hazardous (ie below the relevant hazardous property thresholds)
2. for substances with toxic, corrosive or ecotoxic properties, the residual contents of the package have been diluted with a non-hazardous substance so that the diluted residues are below the thresholds for toxicity, corrosivity or ecotoxicity and the quantity of diluted residue is 1% or less of the volume of the package (eg 'triple rinsing' of agrichemical containers).

Information requirements

Information requirements for manufacturers, importers, suppliers and persons in charge of hazardous substances [D7, Regs 11–12]

Where the sale or supply of a hazardous substance exceeds the quantities specified in Schedule 1 (Disposal Regulations), information must be supplied with a hazardous substance on an appropriate method(s) of disposal that complies with the forgoing requirements. Information may also be included on disposal methods that should be avoided (ie that would not comply with the Disposal regulations). Such information must be immediately available to a person handling the substance (ie within 10 seconds) and must comply with the requirements for comprehensibility, clarity and durability given in the Identification Regulations. This information would normally be supplied on the product label.

Documentation requirements for manufacturers, importers, suppliers and persons in charge of hazardous substances [D8, Regs 13–14]

Where the sale or supply of a hazardous substance exceeds the quantities specified in Schedule 2 (Disposal Regulations), workplace documentation must be supplied that provides information on an appropriate method(s) of disposal and describes any precautions that must be taken when disposing of the substance. The documentation must be able to be accessed by a person handling the substance within 10 minutes and must comply with the requirements for comprehensibility and clarity given in the Identification Regulations. This information would normally be supplied on a MSDS.

Linkage to other HSNO Regulations:

Tracking Regulations

The tracking regulations require that the person in charge of the substance shall ensure that the fate of all highly hazardous substances is recorded, including the date and location of disposal, the manner of disposal, and the quantity of substance disposed of.

Personnel Qualifications Regulations

For certain levels of hazard, substances must be under the control of approved handlers throughout the lifecycle of the substance. This includes the disposal stage. Therefore, the user of the hazardous substance, or the waste manager that treats or discharges the hazardous substance must meet the competency requirements for an approved handler set out in the Personnel Qualifications Regulations.

Linkage with other Acts

The HSNO disposal regulations are designed to link with controls under other Acts as they are developed.

A minimum standard for hazardous substance disposal has been established with the HSNO disposal regulations. Controls imposed under the RMA can be more stringent but not less stringent (s142(2, 3) of HSNO Act). However, where there is a previously issued resource consent under the RMA, the HSNO controls will only apply when the conditions of the resource consent are reviewed in accordance with s.128 of the RMA.

Any controls on any hazardous substances under any other Act cannot contravene the HSNO s75 and s76 regulations except when the other Act explicitly allows for the contravention of the HSNO regulations (s142(6)).

4.3. Detailed performance requirements

This section will follow at a later date.

4.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date.

4.5. Comparison with previous controls

Controls under previous legislation

With the exception of controls on the disposal of containers, and very general instructions to make sure that certain goods were not discharged to water, drain or sewer, the Dangerous Goods Regulations did not deal with disposal. The Explosives Regulations simply required that explosives which had misfired should be disposed of “by some safe method” [r73(n)]. The Toxic Substances Regulations had minimal controls on disposal, relating mainly to disposal of containers.

The disposal of hazardous substances has been controlled mostly by RMA consents and plans, trade waste by-laws under the Local Government Act, or by best practice guidelines for specific disposal methods, such as the Ministry for the Environment’s Landfill Guidelines (1992).

Comparison with HSNO controls

The previous legislation and management tools were not consistently effective in ensuring the safe disposal of hazardous substances. They typically addressed only one hazardous property of substances that frequently have several such properties. With respect to toxic and ecotoxic substances, the HSNO regulations are more stringent than the previous controls and are thus expected to improve current disposal practices. One reason for this is that the HSNO regulations will enable the Authority to effectively set new minimum environmental exposure limits (EELs) for disposal.

The disposal requirements for substances with flammable, oxidising and explosive properties have been derived from current best practices within the limited requirements set down in previous legislation. The main difference is that the performance standard approach in the HSNO regulations means that managers will have more freedom in their methods of disposal provided they can meet the criteria set by the regulations. The only exception is the prohibition on disposal to sewer of flammable, oxidising and explosive substances and the prohibition of land filling explosives. It is considered that the risks associated with these types of disposal are sufficiently high to warrant restriction.

The HSNO regulations also require that labelling and workplace information include data on methods of disposal that should be avoided. Although this was already occurring in some situations, the disposal regulations provide a more comprehensive approach to the provision of such information. Information provided in MSDS, for example, should be practical and applicable to the New Zealand context, as well as being legally permissible.

5. Tracking

5.1. Introduction

Overview

The Hazardous Substances (Tracking) Regulations 2001 were made under Section 76(1)(e) of the HSNO Act for the purpose of prescribing requirements for tracking hazardous substances. In keeping with the purpose and principles of the HSNO Act of protecting people and the environment, substances of high hazard must be effectively managed during their entire lifecycle. Tracking assists in achieving this aim by reducing the risk of the substance going astray, by providing records to allow enforcement officers to monitor compliance at all stages of a substance's lifecycle, and by providing data necessary to enable informed response in an emergency involving that substance.

Scope

Tracking is required for:

- all highly hazardous substances except for corrosive substances. There are no tracking requirements for corrosive substances because highly (biologically) corrosive substances would generally always fall into one of the acute toxicity categories for which tracking is required.
- most explosive substances except for small fireworks, safety ammunition, some categories of flares and signalling devices for emergency use, model rocket engines, and some articles of class 1.4S, and small quantities of propellant powders and gunpowder.

5.2. Summary of Controls

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one regulatory provision or a group of related provisions in the HSNO regulatory toolbox.

A summary of the controls for tracking prescribed in the Tracking Regulations as outlined in the Controls Matrix is provided below.

Trackingcode	Tracking Regulation	Description
TR1	Regs 4(1), 5, 6	General tracking requirements
TR2	Reg 4 (2)	Requirement to track explosive (class 1) substances

General tracking requirements [TR1, Regs 4(1), 5, 6]

Requirement for tracking [Reg 4(1) (and Schedule 1)]

The location and movement of every tracked substance must be recorded at each stage of its lifecycle, through to the point of its final disposal. The hazard classifications of the substances requiring tracking are listed in Schedule 1 to the Tracking regulations.

Recording system for tracked substances [Reg 5 (and Schedule 2)]

The person in charge of the place where a tracked substance is present must ensure that a record is kept of the information specified in Schedule 2 of the Tracking Regulations (listed below). The record must meet the location and presentation requirements for documentation given in the Identification Regulations. That is, it must be accessible within 10 minutes and meet the performance standards for comprehensibility and clarity. The record must also be kept for a period of 12 months after the substance has been transferred to someone else. If substance is discharged into the environment or otherwise used or disposed of the record must be kept for 3 years.

Information collected by a tracking system may be inspected, upon request, by an enforcement officer. The information to be recorded for tracked substances as specified in Schedule 2 is:

The identity of the approved handler

For highly hazardous substances, the HSNO property controls regulations (Classes 1 to 5 Controls and Classes 6, 8 and 9 Controls) require a person(s) who meets the competency requirements specified in the Personnel Qualifications Regulations, for an approved handler, to be in charge of the substance throughout its lifecycle. This person is responsible for keeping a record of the location and movement of hazardous substances that require tracking at each stage of its lifecycle. There can only be one person in charge of the substance at any one time. If the substance is transferred to another person then the conditions and circumstances for the transfer must be recorded.

The approved handler shall be identified by the following:

- the person's name
- the person's position within their organisation
- the physical address of that person's place of work
- the hazard classifications, and lifecycle phases, of the hazardous substances for which that person has a test certificate as an approved handler, and the date on which the test certificate lapses or must be renewed.

Substance information

The following information must be provided:

- The unequivocal identification of the tracked substance must be provided. This could be achieved by use of the registered trade name, common name or name or number under which the substance is approved by the EPA, provided this is not used for any other substance.

- The record shall accurately reflect the total amount of the tracked substance that is under the control of the approved handler at any one time, ie as quantities of substances enter and leave the person's control, the record shall be updated.

Location of the substance

The information about location shall enable an enforcement officer to identify the location of the substance within 2 minutes of having obtained the record. To verify the record, an enforcement officer at the location described in the record must be able to physically locate the substance and sight it or its container within 1 hour of arriving at the location.

For managing an emergency, the substance must be able to be physically located by an enforcement officer (including emergency services personnel) or any other person required by the emergency plan to manage the substance either:

- within the time specified in any emergency plan. or
- where no plan is required, within sufficient time to allow the officer exercising emergency powers to take action to stabilise the situation.

Transfer of the substance

If a tracked substance is transferred to the control of another person, the person transferring the substance shall record the following information:

- the unequivocal identification and amount of the substance transferred
- the address of the place and the identity of the approved handler to whom the substance is passed and the position of that approved handler within their organisation
- the date on which the transfer occurred

Disposal of the substance

When a tracked substance has been:

- processed, used or otherwise consumed in a way that changes the substance and its hazardous properties, or
- intentionally or unintentionally discharged into the environment, or
- otherwise disposed of,

the following information must be recorded by the person in charge of the substance:

- the manner of disposal
- the date on which the disposal occurred
- the amount of substance disposed of
- the location of the place where the substance was disposed of.

Transfer of a tracked substance [Reg 6]

Before transferring a tracked substance from one place to another, the person in charge of the place where the substance is present, must receive confirmation that:

- there is an approved handler at the other place who holds a (current) relevant test certificate and who is prepared to accept responsibility for the substance
- if required, the other place has a test certificate for the amount and hazard classification of the substance
- any place where the substance is to be held during transit complies with the requirements of the Emergency Management Regulations and, where relevant, the transit depot requirements specified in the Classes 1 to 5 Controls Regulations.

Specific requirement to track explosives [TR2, Reg 4(2)]

There is a specific requirement that every time a class 1 (explosive) substance is imported into New Zealand, the importer must give to the New Zealand Customs Service, before uplifting the substance, written notice of the quantity of the substance, and the date and place of uplifting the substance. The importer must also provide to Customs a certificate signed by or on behalf of, the Authority, to show that the substance has an approval under section 29 of the Act.

5.3. Detailed performance requirements

This section will follow at a later date

5.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

5.5. Comparison with previous controls

Controls under previous legislation

The previous legislation provided some mechanisms for tracking of hazardous substances. For example, the explosives legislation required a manual point of sale recording system and a premises licensing system which enabled the OSH Explosives Inspectorate to identify the holder and whereabouts of explosives at all times. There were also a number of provisions in the Toxic Substances Act which required accessible records to be kept and reported at various stages in the substances lifecycle. Tracking or record keeping of substances was not directly required under the Dangerous Goods Act. However, the Dangerous Goods licensing system provided a way of determining whether a substance may have been present on a particular site as well as other useful information.

Comparison with HSNO controls

There will be essentially no change for explosive substances as the previous legislation already provided for a comprehensive tracking process that melds well with the requirements of the HSNO Act. However, the rest of the old legislation only covered certain types of hazard and for only certain parts of the substances' lifecycle, whereas HSNO requires that all highly hazardous substances be subject to comprehensive and

systematic tracking requirements throughout the lifecycle. Nevertheless, this is not expected to result in a net increase in tracking requirements as some substances which were tracked under previous legislation will not be subject to the HSNO regulations (eg some explosives and some standard poisons) whilst others (notably highly ecotoxic substances) will now need to be tracked

6. Personnel Qualifications

6.1. Introduction

Overview

The Hazardous Substances and New Organism (Personnel Qualifications) Regulations 2001 were made under section 76(1)(f) and section 140(1)(o) of the HSNO Act for the purpose of specifying “qualifications” of individuals undertaking various activities under the Act. The “qualifications” are expressed in terms of the competencies that will be required for a person to be approved/appointed to carry out the specified activities outlined below:

- handling restricted hazardous substances (approved handlers)
- undertaking enforcement (enforcement officers)
- issuing test certificates (test certifiers)

Scope

The primary purpose of prescribing competence requirements is to enable the community to be assured that:

- substances which are considered to be of high hazard are safely and effectively managed through being under the control of knowledgeable and responsible persons (approved handlers)
- enforcement officers have the necessary knowledge and training to carry out their duties
- test certifiers have the specialised knowledge and testing experience to ensure that specified performance requirements will be met.

It is intended that competence will be assessed in terms of both theoretical knowledge and the ability to put this knowledge into practice; and reconfirmed periodically to ensure that the skills and knowledge required are still current.

6.2. Summary of Controls

EPA Controls Matrix

Each HSNO hazard classification category triggers a number of regulatory default controls. The EPA Controls Matrix provides a useful illustration of which default controls are triggered by each classification category (see Table 2 in Part A of this Guide). The Controls Matrix utilizes a coding system whereby each unique code represents one regulatory provision or a group of related provisions in the HSNO regulatory toolbox.

Although the Personnel Qualification Regulations cover competencies for approved handlers, enforcement officers and test certifiers, the only one of these relevant to the Controls Matrix is approved handlers. A summary of the controls for approved handlers as prescribed in these regulations and outlined in the matrix is provided below.

Approved handler code	Personnel Qualification Reg #	Description
AH1	Regs 4-6	Approved Handler requirements (including test certificate and qualification requirements)

Approved Handler Requirements [AH1, Regs 4–6]

An approved handler is a person who holds a current test certificate certifying that they have met the competency requirements specified by the Personnel Qualification Regulations in relation to handling specific hazardous substances during specified parts of the lifecycle.

For several of the hazardous property subclasses, substances with the highest levels of hazard are required to be tracked. All tracked substances and some substances in slightly lower hazard levels have been classified as 'restricted hazardous substances' and must be under the control of an 'approved handler'. This competency requirement does not apply below certain trigger quantities to allow the routine use of substances such as petrol and LPG by otherwise unskilled people. The quantities of substances that trigger approved handler requirements are listed in the schedules in the relevant property controls regulations (Classes 1 to 5 Controls Regulations and Classes 6, 8, and 9 Controls Regulations).

The requirements for substances to be under the "personal control of an approved handler" make provision for the substance to be handled by a person who is not an approved handler if they are directly supervised. 'Direct supervision' means an approved handler is present at the site, has provided guidance to, and is available to provide assistance, if necessary, to the person handling the substance. Where a hazardous substance can be used under supervision, the approved handler must ensure that every person under supervision is instructed in the need, and procedures, to keep the substance secure, and the level of security required.

Test certification system for approved handlers [Reg 4]

The Personnel Qualifications regulations require that a test certificate must be issued to a person to certify competence as an approved handler. The test certificate provides for a formal means for approval, and a means for amending or terminating such approval. To be certified as an approved handler of restricted hazardous substances, the person must fulfil the competency requirements listed below and obtain a test certificate as an approved handler. The test certificate can be issued for any specific combination of hazardous substance properties and elements of the lifecycle. The test certificate must record the name of the individual, contact details, and the substances, or substance properties, and phases of the lifecycle for which he/she is approved as a handler.

Generally, a test certificate as an approved handler will remain valid for a period of 5 years from the date of issue. However, during the initial phase of the HSNO regime, there is a transitional provision for test certificates to be issued for a period of 2 years on the basis of an individual's prior experience and competence under certain other legislation (see below). At the end of this two-year period, a new 5-year certificate will need to be obtained, on the basis of the competency requirements below.

Before renewing test certificates at the end of the 5 year periods, the test certifier will need to be assured that the approved handler meets the listed competency requirements with respect to any changes in relevant working practices, regulations, or codes of practice which have occurred since the previous certificate was issued.

Competency (knowledge and skill) requirements of approved handlers [Reg 5]

For those restricted hazardous substances, or for the particular hazardous property or nature, for which he/she is to be an approved handler, the person must be able to:

1. explain the hazard classifications and the adverse effects that could be caused by any of the hazardous substances or properties
2. know and describe the controls imposed under the Act that are relevant to the hazardous substances handled
3. generally explain their obligations and liabilities under the Act
4. explain which regulations and codes of practice apply, and know how to access the relevant information
5. know and describe any conditions of their approved handler certification
6. explain the precautions required to prevent injury to a person or damage to the environment and the procedures to respond to an emergency

In addition, the person must have comprehensive practical experience and have demonstrated the practical skills to be able to handle hazardous substances. This includes being able to demonstrate a working knowledge of the operating procedures (including use of protective clothing and equipment) necessary to manage those hazardous substance(s) relevant to their approved handler certification.

In deciding on whether to issue a test certificate as an approved handler, a test certifier may use a written record, signed by a training course provider or a work supervisor, describing the assessment method and the results of this assessment, as sufficient evidence that a person has the required knowledge and skills.

Transitional qualification for approved handlers [Reg 6]

There is provision for test certificates to be issued to existing handlers of restricted substances without the requirement to initially demonstrate the knowledge and skills listed above. A person who can provide evidence of handling restricted hazardous substances for at least two years under other legislation (specified in regulation 6 of the Personnel Qualification Regulations) may be issued a test certificate for a period of 2 years and continue to handle those hazardous substances, or any other substance with similar hazardous properties, in the relevant lifecycle phase(s). The intent of this provision is to allow existing handling activities to continue as usual with the understanding that, during the 2-year period after the regulations take effect for those substances, those persons would obtain the necessary training to meet the competency requirements of the HSNO legislation.

Enforcement Officers [Regs 7 – 8]

Enforcement System

The HSNO Act assigns primary enforcement responsibility to a number of agencies. Enforcement agencies warrant suitably qualified enforcement officers to carry out its enforcement responsibilities. While the Authority may appoint enforcement officers, or authorise others to do so, the principal role of the Authority is the supervision of the inspection and enforcement regime. The HSNO Act assigns responsibility for enforcement to the following agencies:

OSH	any place of work
Ministry of Consumer Affairs	around any gas distribution system, installation, or appliance
Land Transport Safety Authority	with road, rail and vehicles (optional)
Police	road, rail and vehicles
Civil Aviation Authority	any aircraft
Maritime Safety Authority	any ship
Ministry of Health	where necessary to protect public health
Territorial Authorities	other premises where enforcing the Resource Management Act where given the function by another enforcement agency where dangerous goods licenses apply during the transitional period

Areas of competency

Enforcement activities will cover all hazard classifications and all phases of the lifecycle, including hazardous substances in containment. Enforcement officers will be operating in the following fields:

- inspecting areas for compliance with controls required under the approval of the substance, eg compliance with the regulations which form part of the approval conditions or checking for the presence of a valid/current test certificate
- responding to and taking control of an emergency situation
- giving advice on the properties and effects of hazardous substances and appropriate management controls.

It is intended that qualification requirements for enforcement officers will generally be specific to the particular sector they are employed in, (as specified in section 97 of the Act – see box above).

Competency (knowledge and skill) requirements of enforcement officers [Reg 7]

Hazardous substance enforcement officers must be able to:

1. describe the hazard classifications of the hazardous substances to which his/her functions relate, the adverse effects that could be caused by them, and any controls which may be imposed on those substances
2. describe the provisions of the Act that are relevant to enforcement officers, including the purpose and principles of the Act, the offence and defence provisions of the Act, the penalties and liabilities imposed by the Act, and the procedures related to the functions and duties of an enforcement officer
3. describe any transition provisions under the Act that are applicable
4. describe the scope of relevant approved codes of practice
5. describe and demonstrate the common procedures and equipment used to meet the controls imposed, the likely situations and circumstances in which those procedures and equipment may fail to comply, and the steps that should be taken to ensure compliance.

The person must also have had at least 6 months practical experience in the relevant sector under the guidance of a qualified enforcement officer.

Transitional qualifications for enforcement officers [Reg 8]

During the transitional phase of the HSNO regime, there is provision to enable a person to be appointed as an enforcement officer without the requirement to demonstrate the knowledge and skills listed above. For a period of 2 years after commencement of these regulations, a person is deemed to be qualified for appointment as an enforcement officer in their relevant areas if they fulfil either of the following criteria:

- they have been continually undertaking enforcement duties under other legislation (specified in regulation 8(1)(a) of the Personnel Qualification Regulations) during the 12 months prior to commencement of these regulations
- they were warranted as an inspector under the Health and Safety in Employment Act 1992 before the commencement of these regulations and they have, in the opinion of the Secretary of Labour, demonstrated reasonable knowledge of the management of hazardous substances.

The intent of this provision is to allow existing enforcement systems to continue as usual with the understanding that, during the 2-year period after the regulations come into force, those persons would obtain the necessary training to meet the competency requirements of the HSNO legislation.

Test Certifiers [Reg 11]

Test certifiers are individuals who are approved by the Authority to issue test certificates. A test certificate can be issued to either a person (to certify competence as an approved handler) or to a specific site or location (to certify compliance with certain safety and procedural requirements).

The approval process to become a test certifier and the process of issuing of a test certificate is specified in sections 82-86 of the Act, and covered in detail in the EPA User Guide to Becoming a Test Certifier.

Any person may apply to the Authority for approval to become a test certifier. An application must include written evidence and as relevant, signed records of the demonstrated knowledge and the practical or test

certification experience, or a statutory declaration by the applicant. After considering the application, the Authority shall grant the approval if it is satisfied that the applicant has the appropriate qualifications, sufficient knowledge of the relevant requirements and complied with any other prescribed conditions. The approval will include the expiry date of that approval, which is typically 5 years after the date on which it was given. However, the Authority has the discretion to specify an earlier expiry date if considered appropriate.

Competency (knowledge and skill) requirements

The required knowledge and skills necessary for test certifiers are listed below. They are more generally more specific than the requirements for enforcement officers. Test certifiers must be able to:

1. describe the hazard classifications of any hazardous substance associated with the test certificate requirement, the adverse effects that could be caused by them, and any controls which may be imposed on those substances
2. explain his/her obligations and liabilities under the Act including:
 - the purpose and principles of the Act
 - the offence and defence provisions of the Act
 - the penalties and liabilities imposed by the Act
 - the effect of a compliance order
 - the provisions applicable to test certifiers
3. describe those regulatory requirements or conditions imposed and any codes of practice approved as a means of meeting those requirements
4. describe any testing equipment or procedures required to issue the certificate and demonstrate the use of the equipment or procedures
5. describe commonly used operating equipment and systems, including personal protective clothing and equipment, to meet the test certificate requirements, and demonstrate procedures necessary to use this equipment.

In addition to the demonstration of knowledge and expertise, to be approved as a test certifier, the person must have either:

- a minimum of 2 years relevant practical experience actively undertaking testing, inspection, enforcement, or handling duties, under one or more of the pieces of legislation specified in regulation 11(3)(a) of the Personnel Qualification Regulations; or
- a minimum period of between 3 and 24 months (to be specified by Authority) of practical experience under the supervision of a qualified test certifier, covering the types of equipment, qualifications or situations for which approval is sought to issue test certificates.

In deciding whether or not to approve a test certifier, the Authority may use a written record, signed by a training course provider or assessor, describing the assessment method and the results of this assessment, as sufficient evidence that a person has the required knowledge and skills. With regard to the requirements

for practical experience, a written record signed by the person's supervisor or by an enforcement officer, or a statutory declaration made by the person themselves, will be sufficient evidence.

6.3. Detailed performance requirements

This section will follow at a later date

6.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

6.5. Comparison with previous controls

Controls under previous legislation

Under previous legislation, the competency requirements for individuals responsible for handling hazardous substances were not specified to the same degree as in the HSNO regulations. The old legislation generally contained requirements for substances to be under the control of responsible, competent, or fit and proper persons, but detailed competency requirements were not usually specified. Rather, there would be a more general requirement that the person should be acquainted with the provisions of the regulations, with an additional requirement that a copy of the regulations be held in the workplace. Examples of competency requirements under other legislation follow:

Explosives Act 1957

Under the Explosives Act, licences to manufacture explosives were not issued to any person unless satisfactory evidence was provided of the person's experience. Licences to sell or carry explosives were only issued to 'known' persons but there were no competency/experience requirements.

Dangerous Goods Act 1974

Various regulations made under this Act specified that competent persons must be in charge of every vehicle conveying liquefied flammable gases and flammable liquids. A competent person was also required to be in charge of any operation involving the transfer of liquefied flammable gases to or from any road or tank vehicle. 'Competence' was not defined in any of these situations but it was implied that the person should have been acquainted with the provision of the regulations.

Toxic Substances Act 1979

Under this legislation, a certificate was required to sell or pack poisons, signed by a person approved by the Medical Officer of Health, and stating that the applicant was well known to the person issuing the certificate, was of good character and was considered to be a fit and proper person to be so licensed. In addition to a requirement that the applicant have sufficient knowledge of the hazards associated with the relevant

poisons, the Medical Officer of Health could also require the applicant to sit and pass any written, oral or practical tests that he considered necessary.

Pesticides Act 1979

This Act stated that no person could apply or use any controlled pesticide unless they were licensed as an approved operator, were under the control of an approved operator, or had prior permission from the Pesticides Board. Prior to being issued a licence, applicants were required to demonstrate that they had sufficient knowledge and practical experience of the pesticides for which the licence was sought.

Land Transport Act 1993

The Land Transport Rule requires transport service operators to be licensed through an endorsement on their driver's licence. The current practice is that this endorsement follows satisfactory completion of a training course on transporting dangerous goods.

In addition, there is a general duty under the Health and Safety in Employment Act 1992 for employers to provide information and training to employees with respect to the handling and management of hazardous substances. This requirement was also included in some of the specific legislation described above.

Comparison with HSNO controls

Compared to previous legislation, the HSNO (Personnel Qualification) Regulations provide for more detailed competency requirements for approved handlers. Under HSNO, the substance must be under the control of an approved handler at all stages of its lifecycle. There are specific requirements that approved handlers must have particular knowledge and experience with regard to the substance, its hazardous properties and the adverse effects caused by those substances. In addition, the approved handler is required to demonstrate knowledge of emergency management procedures, knowledge of any relevant controls and regulation imposed under the Act, and knowledge of relevant codes of practice.

Part E Additional Controls

General Introduction

The Act also provides for other controls (section 140 of the Act) that are not directly related to a substance's hazard classification or lifecycle. These include:

- **Exempt Laboratory Regulations:** These regulations prescribe requirements for laboratories involved in the small-scale use of hazardous substances in research and development or teaching, that are eligible for exemption from the provisions of the Act under section 33
- **Fireworks Regulations:** These regulations cover restrictions on fireworks available for public sale
- **Compressed Gases:** These regulations cover the control of compressed gases, (hazardous and non-hazardous) largely focussing on the containers (cylinders, aerosol canisters) and fittings (valves, etc).
- **Road and Rail Tank Wagons for Liquid Hazardous Substances.** These regulations cover the performance requirements for the design, operation and maintenance of road and rail tank wagons for liquid hazardous substances.
- **Bulk Storage Tanks for Liquid Hazardous Substances.** These regulations cover the performance requirements for the design, operation and maintenance of bulk fixed storage tanks for liquid hazardous substances.

Glossary

firework:	an object containing small quantities of hazardous substances with explosive properties enclosed in a case of paper or similar material of such a strength, construction or character that the ignition or explosion of one such firework will not cause the explosion en masse of similar fireworks kept or carried with it, and whose sole or principal effect is not percussive or vertical or horizontal flight
laboratory:	a vehicle, room, building or any structure set aside and equipped for scientific experiments or research, for teaching science, or for the development of chemical or medicinal products

1. Exempt Laboratories

1.1. Introduction

Overview

The Hazardous Substances (Exempt Laboratories) Regulations 2001 were made under Section 140(1)(g) of the HSNO Act for the purpose of prescribing controls to be met by laboratories eligible for exemption from the provisions of the Act under section 33. The intention of these regulations is to allow such laboratories to operate outside the EPA substance approval process and not be subject to the controls imposed by the Act, but still be subject to prescribed containment conditions in order to reduce the possibility of substances escaping containment and adversely affecting people or the environment.

Scope

Under section 33 of the Act, eligible laboratories are those involved in the small-scale use of hazardous substances in research and development or teaching if ALL of the follow criteria apply:

- the use occurs in a laboratory that meets the requirements prescribed by these regulations
- the use does not create or involve a hazardous substance for which any application for approval has been declined under this Act
- the importation, storage, and transportation of the hazardous substances each meets the requirements prescribed by these regulations (to be included in a subsequent amendment to the regulations)
- no such hazardous substance, nor any substance created from that use, is sold as a substance or in a product containing or derived from that substance.

This exemption for laboratories can cover the use of any of the following three types of substances:

- approved substances which have either a Part V approval from the Authority or which are covered by the transitional provisions
- new (imported) substances that have not been assessed or approved by the Authority
- de novo synthesis of hazardous substances whose nature has not been defined.

It is emphasised that this exemption does not apply to substances that have been declined approval by the Authority or to substances that are sold (either as a substance or in a product containing or derived from that substance)

1.2. Summary of Controls

The Hazardous Substances (Exempt Laboratories) Regulations 2001 prescribes a series of performance-based requirements for laboratories eligible for exemption from the provisions of the Act under s 33. The controls include strict containment measures to ensure the protection of the outside environment, eg by specifying the requirement for impervious construction materials and safe disposal systems. The level of control applied in some areas reflects whether the substance has an EPA approval or is of “unknown hazard”.

The regulations prescribe requirements relating to:

- the design/construction of the laboratory, including signage at entrances
- recording the quantities of hazardous substances kept in a laboratory
- the handling and storage of hazardous substances, including the information provided on the container holding the substance
- personnel requirements, including the designation of a laboratory manager
- emergency response plan requirements

Laboratory design requirements [Regs 5–8]

The laboratory design requirements are intended to ensure that people working inside the s.33 laboratory, and the environment and people outside the laboratory, are protected from the adverse effects of any hazardous or potentially hazardous substance contained inside the laboratory. These controls apply to the construction or design of the place(s) where the hazardous substance will be managed, and include requirements for imperviousness, disposal, signage and security.

Imperviousness [Reg 5]

All parts of the place which may come into contact with the hazardous substance (eg work surfaces, storage spaces, etc.) must be made of materials that do not absorb or retain that substance, or be treated to that level of imperviousness or otherwise be covered by a disposable impervious material.

Design of laboratories using approved hazardous substances [Reg 6]

When an approved substance is used or held in a laboratory, the laboratory shall be designed and operated so that the approved substance cannot escape and enter the environment, unless disposal requirements, or other controls imposed at the time of approval, have been met. The disposal of approved substances will reflect the disposal controls as provided under the Hazardous Substances (Disposal) Regulations.

Design of laboratories using unapproved hazardous substances [Reg 7]

When substances that have not been assessed by the Authority are used or held in a laboratory, the laboratory shall be designed and operated so that the substance cannot escape and enter the environment. The laboratory must have storage facilities in which to store this substance while awaiting disposal. This substance must remain stored in this way until:

- an approval for the substance is granted with the appropriate controls; or
- it is treated to be no longer hazardous; or
- it is lawfully exported from New Zealand.

Entry to laboratories [Reg 8]

Signage [Reg 8(1)]

Signs indicating that authorised persons only are permitted inside the laboratory must be placed at all points of entry (including storage areas, etc.) to the laboratory. Signage must meet the comprehensibility and clarity requirements of signage in the Hazardous Substances (Identification) Regulations.

Security [Reg 8(2)]

When no authorised person is present, the laboratory must be secured against entry, such that an authorised person can only enter the laboratory by using a tool, a key, or any other device used to operate a lock. That is, this securing must be able to prevent entry through manual force.

Recording of hazardous substances [Reg 9]

Substances that are highly hazardous to humans or the environment require tracking controls for the lifetime of the substance. Accordingly, an accurate record must be kept of the quantities of the following types of substances in a laboratory:

- any approved substances that would be subject to the Tracking regulations if they were outside the laboratory
- any substances that are likely to be hazardous substances but which have not been assessed and approved by the Authority

Records must be kept for at least 12 months after the substance is used or removed from the laboratory.

Handling and storage of hazardous substances [Reg 10–12]

These controls apply to the procedures used to manage or handle hazardous substances (store, use, etc.) within the laboratory.

Handling and storage of approved hazardous substances [Reg 10]

General Management

Approved hazardous substances must be handled and stored in the laboratory in an equivalent manner to which a substance with the same hazard classification must be managed under the applicable provisions of the property controls regulations (ie Classes 1 to 5 Controls and Classes 6, 8 and 9 Controls regulations). The exception to this is the regulations requiring that the substances be under the control of an approved handler.

Identification

When an approved substance is being used in a laboratory (or is held in small containers in the laboratory ready for use) it must be provided with information giving the name and concentration of any hazardous substance(s) present and a warning of the hazardous properties if it is highly hazardous. This information must be available within 10 seconds (ie a label) and must meet the requirements in the Identification Regulations for comprehensibility, clarity and durability.

Substances that have not been assessed and approved by the Authority

For substances that have not been approved by the Authority (ie those created by scientific investigation, or imported under section 33 without a HSNO assessment), some characterisation of their hazards is necessary, in order to guide their management. This characterisation will be based on several parameters

such as physical/chemical properties, and observed or predicted hazardous properties and should be consistent with the criteria for classification contained in the Classification regulations.

Handling and storage of unapproved hazardous substances [Reg 11]

General Management

A substance likely to be hazardous, but which has not been assessed and approved by the Authority, must be handled and stored in the laboratory in a way that similar quantities of an approved hazardous substance with similar hazardous properties and equivalent degrees of hazard must be managed under the applicable provisions of the property controls regulations (ie Classes 1 to 5 Controls and Classes 6, 8 and 9 Controls regulations).

In managing unapproved hazardous substances, the laboratory manager must take into account:

- the hazardous properties of all products likely to result from a reaction used to form the substance
- any known physical or chemical properties of the substance or components (including functional groups) that make up the substance
- any known hazardous properties of substances with a similar chemical structure
- if the substance is a mixture, any known or likely interactions between components
- if the substance was imported from another jurisdiction, any information available from that jurisdiction

Identification

When a substance that has not yet been assessed and approved by the Authority is handled and stored in the laboratory (or is held in small containers in the laboratory ready for use), it must be provided with information giving its identity (eg name or other identification code), information on any hazardous properties (if available), and general precautions to be taken when handling the substance. This information must be available within 10 seconds (ie a label) and must meet the requirements in the Identification Regulations for comprehensibility, clarity and durability.

Containers/Packaging [Reg 12]

A small container in a laboratory used for holding hazardous substances must:

- be able to completely contain the hazardous substance when closed, within the range of temperatures in which the container will be used
- be resistant to the substance (structurally and chemically) so that the container's integrity is not compromised
- prevent any organism from penetrating the container and transporting the substance out of the laboratory (eg cardboard boxes that insects or vermin can gnaw through would not be suitable). This definition of organism excludes humans.

'Small container' is defined in these regulations as being 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.

Personnel requirements for laboratories [Regs 13–15]

Laboratory managers [Reg 13 and 14]

Every section 33 laboratory where hazardous substances are contained must have a person designated as a laboratory manager who has overall responsibility. There may be more than one manager appointed to the laboratory (or designated parts within the laboratory) as long as only one is clearly identified as having overall responsibility at any one time. The conditions and circumstances for any such arrangement must be documented. The laboratory manager may nominate any other person to be in charge in his or her absence.

A laboratory manager must have the skill and knowledge to ensure the safety of those using the laboratory, as well as ensuring that the environment and people outside the laboratory are protected from the effects of hazardous substances. He/she must have:

- enough technical knowledge of the physical/chemical properties of substances being used to predict their hazardous properties and prevent/manage any adverse effects
- knowledge of; precautions for handling the hazardous substances in the laboratory, requirements for disposal including any relevant controls prescribed by the Disposal Regulations, and any relevant codes of practice
- the knowledge and skills required by the laboratory's emergency response plan
- knowledge/experience of the correct operation and maintenance of any equipment used, including personal protective clothing and equipment, to manage the substances in the laboratory throughout their lifecycle.

In the case of an approved hazardous substance which has a tolerable exposure limit (TEL) or a workplace exposure standard (WES) attached to its approval, it is the laboratory manager's responsibility to ensure that no person inside the laboratory (for the WES) or outside the laboratory (for the TEL), will be exposed to a level greater than that set in the approval.

Persons handling hazardous substances [Reg 15]

The laboratory manager's role is one of overall responsibility and it is not the intention of the regulations that this person must be physically present at all times when hazardous substances are being used in the laboratory. However, he/she must ensure that every person handling hazardous substances has been provided with the following information:

- procedures to prevent the contamination of any equipment, clothing or part of the laboratory
- procedures to prevent exposure of the workers that may result in adverse effects
- procedures for disposal in accordance with these regulations
- actions required in the event of an emergency as detailed in the laboratory's emergency response plan.

This extends to teaching situations where (for example) high school chemistry pupils handling substances as part of an experiment must have been given the above information. However, it would not be necessary for the pupils to have been given this information where the experiment is being demonstrated to the class.

Emergency response plan requirements [Reg 16]

Every section 33 laboratory must have an emergency response plan that addresses that the same requirements for emergency response plans as in Part 4 of the Hazardous Substance (Emergency Management) Regulations, irrespective of the quantity of hazardous substances held. The plan can be for the individual laboratory or it can be generic to a number of s33 laboratories within an organisation or area. The plan can be part of any other emergency preparations already required under any other Act. For example, an emergency response plan meeting the more general requirements of the HSE Act could also meet this requirement.

1.3. Detailed performance requirements

This section will follow at a later date

1.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

1.5. Comparison with previous controls

Controls under previous legislation

Places where scientific investigations and teaching are carried out are subject to controls under the Building Act 1991, the Health and Safety in Employment (HSE) Act 1992 and the Resource Management Act 1991.

Laboratories are deemed “places of work” and therefore there is some overlap with requirements under the Health and Safety in Employment Act 1992. It should be noted that the Department of Labour, Occupational Safety and Health staff, will have the prime responsibility for enforcing this part of the Act.

There is also overlap with the Resource Management Act 1991. Some structural or operational aspects of laboratories may require resource consents; such as land use requirements in a district plan or discharge consents for emissions from fume cupboards.

If the laboratory “entity” is contained within a “building” as defined in the Building Act 1991, any significant modification to its structure will be subject to the requirements of that Act. This also applies for construction of new laboratories. The Building Act is not retrospective so laboratories constructed or modified before 1991 are not covered by the Building Act.

These areas of control will continue in tandem with the HSNO regime.

Laboratories were previously also subject to certain of the controls under the Toxic Substances Act and the Dangerous Goods Act and their regulations. These areas of control will be replaced by the HSNO regulatory controls.

Under previous legislation, environmental aspects of hazardous substances in containment were not particularly considered

Comparison with HSNO controls

The Exempt Laboratories Regulations extend the previous regime in order to fulfil the environmental protection dimension of the Act.

Most places where scientific investigations and teaching are carried out are already well equipped to meet the minimum HSNO requirements and few additional requirements will be involved. Adherence to a code of practice approved by the EPA would be a means of meeting the prescribed requirements and would provide people with advance certainty that they are in compliance.

The HSNO regulations will result in reduced contamination of the environment outside of places where hazardous substances are contained, as well as a reduced likelihood of chemical injuries and adverse health effects as a result of exposure to chemicals. Places and practices that do not meet the required standards may incur costs as these are updated to reach the minimum standard necessary to obtain the section 33 exemption. Costs may also be incurred across the board as codes of practice are modified or developed. There may also be costs arising from any training of personnel that is needed.

It should be noted, however, that it is not mandatory for laboratories to seek section 33 exempt status and therefore have to comply with the prescribed requirements in the Exempt Laboratories regulations. They may choose instead to comply with the applicable controls (depending on the substances involved) from the suite of property controls and lifecycle controls regulations comprising the HSNO regulatory toolbox. This could be an applicable option when the only substances involved in the laboratories are ones that have approvals under the Act.

2. Small Fireworks

2.1. Introduction

Overview

The Hazardous Substances (Fireworks) Regulations 2001 were made under Sections 75(1)(a) and 140(1)(r) of the HSNO Act for the following purposes:

- to restrict the period during which fireworks can be sold to the public, and the age of persons able to purchase them
- to restrict the type of fireworks that can be approved for public sale
- to require that a test certificate be issued for every shipment of imported fireworks, and for every batch of fireworks manufactured in New Zealand

These regulations reflect the purpose and principles of the HSNO Act by providing a level of restriction on fireworks that will minimise any injury or damage to people or the environment that can occur from their use, whilst at the same time, allowing people to enjoy fireworks at cultural and social events eg Guy Fawkes.

Scope

The HSNO Act defines firework as ‘an object containing small quantities of hazardous substances with explosive properties enclosed in a case of paper or similar material of such a strength, construction or character that the ignition or explosion of one such firework will not cause the explosion en masse of similar fireworks kept or carried with it, and whose sole or principal effect is not percussive or vertical or horizontal flight’.

This definition distinguishes fireworks that are available for public sale prior to 5 November each year from pyrotechnic substances, which are those more substantial articles used by trained personnel in commercial fireworks displays. These pyrotechnic articles and the displays involving them are covered by requirements in the Classes 1 to 5 Controls regulations.

In accordance with this definition, fireworks specifically excluded from sale to the public are cannons, bangers, bungers, skyrockets and tourbillions.

Bearing in mind the definition of ‘firework’ and the distinction with pyrotechnic substances above, these regulations apply only to fireworks with the explosive hazard classifications 1.3G, 1.4G, or 1.4S (ie hazard classifications which represent only a minor fire hazard) that fulfill the criteria listed under “Test Certificate for Fireworks” below. [Reg 11]

These regulations do not apply to pyrotechnic novelties such as bob-bon crackers, party poppers, streamer bombs and ‘caps’ which are considered to present negligible hazard during and after retail sale. Similarly, nothing in these regulations limits or affects the operation of Part XV of the Act (transitional provisions for explosives) until such time as explosives are transferred from these transitional provisions into the new HSNO regulatory framework.

The Fireworks Regulations also exclude the fireworks covered by the regulations from the controls on explosives contained in the Classes 1 to 5 Controls Regulations and the Tracking Regulations after the point of retail sale.

2.2. Summary of Controls

Display and sale of fireworks [Regs 6–8]

Fireworks may be displayed for retail sale, or sold by a retailer, only during the period beginning on 27 October and ending at the close of 5 November in each year, and only to persons over 14 years of age. At any other time, fireworks can only be sold if the retailer obtains a written approval from the Authority. The Authority may issue such an approval if the fireworks are to be sold for use at gathering held for cultural or religious purposes and the use of the fireworks is a traditional feature at the gathering. The approval must set out details of

- the event or gathering that the fireworks are being bought for
- the period of time that the retailer may sell the fireworks
- the people who will be buying the fireworks
- any other conditions imposed on the approval

A retailer must not sell fireworks unless a test certificate for those fireworks has been issued (see below).

Requirement for importers and manufacturers to obtain a test certificate [Reg 9]

The importer of a consignment of fireworks into New Zealand must obtain a test certificate for all fireworks of each type within that consignment. This certificate will be required before the consignment can be released by Customs. This is consistent with the requirement in regulation 4(2) of the Tracking regulations.

Similarly, the manufacturer of a batch of fireworks in New Zealand must obtain a test certificate for each batch before they can be released from the manufacturing site.

In both cases, the test certificate must be obtained before the fireworks are supplied to any retailer and the retailer must be provided with a copy of the test certificate on request.

Test certificate requirements [Reg 11]

The test certificate must certify that the objects of the consignment or batch are fireworks, within the context of these regulations, and must identify the consignment or batch (eg by batch number). The test certificate must also certify that the fireworks contained in that particular consignment or batch:

- do not contain more than 40 g of pyrotechnic substances
- do not contain any chlorate mixed with sulphur, phosphorus or any sulphide (except for amorces containing more than 5 mg of pyrotechnic substance)
- do not contain any toxic substances of hazard classifications 6.1A, 6.1B or 6.1C other than traces of antimony, arsenic, cadmium, chromium, lead, mercury, nickel, selenium, zinc and their compounds

- are constructed in a manner that does not allow pyrotechnic substances to escape at any time (except during use)
- do not have their own means of ignition
- do not, if they are shaped as a hand-held firework, discharge fire on ignition and conclude with an explosion which bursts the casing
- have instructions for use on its outer case, or packet if there is no outer case
- do not, on discharge, result in hot or burning material falling to the ground in such a manner as to create a hazard, when used in accordance with the instructions
- have a fuse burning time of between 3 seconds and 11 seconds

The test certifier must provide a copy of the test certificate to the Authority as soon as practicable after the certificate has been issued.

2.3. Detailed performance requirements

This section will follow at a later date

2.4. Means of meeting performance requirements

Approved Codes, Standards, other – this section will follow at a later date

2.5. Comparison with previous controls

Controls under previous legislation

The display and sale of fireworks for public sale was previously under the control of the Explosives Act 1957 and the Explosives Regulations 1959. However, fireworks have been subject to various amendments over the years, (details below), in an effort to reduce injuries to people or damage to the environment from fireworks.

Explosives (Fireworks Safety) Amendment 1985

Prohibited the sale of fireworks to persons under 14 years of age.

Explosives (Fireworks) Order 1990

Banned from public sale those fireworks whose sole or principal effect is percussive eg bangers, bungers, canons.

Explosives (Skyrocket Restriction) Amendment 1994

Banned from public sale those fireworks whose sole or principal effect is vertical or horizontal flight eg skyrockets, tourbillions.

Comparison with HSNO controls

The HSNO (Fireworks) Regulations have incorporated all the restrictions, prohibitions and amendments of previous legislation covering the sale of fireworks to the public.

The restriction on the sale of fireworks to persons under 14 years of age as provided in the Explosives (Fireworks Safety) Amendment 1985, is contained in regulation 6(3) of the HSNO (Fireworks) Regulations.

The banning from public sale of fireworks whose sole or principal effect is percussive or vertical or horizontal flight is achieved through the HSNO Act definition of firework.

The requirement to obtain a test certificate for the testing of fireworks replaces the previous provision in the Explosives Act (s.13) for samples of fireworks to be submitted for testing to the Chief Inspector of Explosives prior to their importation. The requirement to submit a certificate of approval to Customs before uplifting an import consignment of fireworks corresponds to the Explosives Act requirement for import entry permits (s.12 Explosives Act).

3. Compressed Gases

This section will follow at a later date

3.1. Introduction

3.2. Summary of Controls

3.3. Detailed performance requirements

3.4. Means of meeting performance requirements

3.5. Comparison with previous controls

4. Road and Rail Tank Wagons for Liquid Hazardous Substances

This section will follow at a later date

4.1. Introduction

4.2. Summary of Controls

4.3. Detailed performance requirements

4.4. Means of meeting performance requirements

4.5. Comparison with previous controls

5. Bulk Storage Tanks for Liquid Hazardous Substances

This section will follow at a later date

5.1. Introduction

5.2. Summary of Controls

5.3. Detailed performance requirements

5.4. Means of meeting performance requirements

5.5. Comparison with previous controls



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