

Assigning a Product to a HSNO Approval

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Environmental
Protection Authority
Te Mana Rauhi Taiao

$5 < LC_{50} \leq$
 $mg \geq 5\%$
 $2\mu \times 100$
 $M \times LD_{50}$
 $T_{mix} = 30mg$
 $HSNO$

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Abbreviations and definitions

Approval	an approval of a hazardous substance under the HSNO Act
Assigned	a substance 'assigned' to an approval under the HSNO Act
Bioaccumulative	any substance that has a bioconcentration factor (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 precedence over estimated values
Bioconcentration	the steady state concentration of a substance in an aquatic organism divided by the concentration of the substance in the surrounding water
CAS	Chemical Abstract Service
CAS number	this is a number given to a specific chemical compound by the Chemical Abstract Service
CCID	HSNO Chemical Classification and Information Database
Chemical	any element or compound in its natural state or obtained by any production process, including any impurities and any additive necessary to preserve the stability of the chemical, but excluding any solvent which may be separated without affecting the stability of the chemical or change its composition
CMR	carcinogen, mutagen, reproductive toxicant
Dusts and mists	Dusts and mists in relation to a substance in the atmosphere, means 90% of the substance is in the form of particles with an aerodynamic diameter of less than 10 microns.
EC ₅₀	the median effect concentration, being a statistically derived concentration of a substance that can be expected to cause: (a) an adverse reaction in 50 percent of organisms; or (b) a 50 percent reduction in growth or in the growth rate of organisms
Flashpoint	the lowest temperature at which a flammable liquid gives off sufficient vapour to form a flammable mixture with air that ignites momentarily, when tested in any closed cup flashpoint test
Gas	A substance that: (a) is completely gaseous at 20°C and at 101.3 kPa absolute pressure; or (b) has a vapour pressure of more than 300 kPa absolute pressure.
GHS	Globally Harmonized System of Classification and Labelling of Chemicals (United Nations, 2007)
g/L	grams per litre
g/kg	grams per kilogram
Group standard	an approval for a group of hazardous substances of a similar type, nature or having a similar circumstance of use

Hazardous chemical	means the same as hazardous substance where the substance meets the definition of chemical
Hazardous substance	<p>unless expressly provided otherwise by regulations, means any substance—</p> <p>(a) With one or more of the following intrinsic properties:</p> <ul style="list-style-type: none"> (i) Explosiveness: (ii) Flammability: (iii) A capacity to oxidise: (iv) Corrosiveness: (v) Toxicity (including chronic toxicity): (vi) Ecotoxicity, with or without bioaccumulation; or <p>(b) Which on contact with air or water (other than air or water where the temperature or pressure has been artificially increased or decreased) generates a substance with any one or more of the properties specified in paragraph (a) of this definition</p>
HSNO	Hazardous Substances and New Organisms Act 1996
HSNO threshold	a measure of whether or not a substance is likely to cause an adverse effect on people or the environment (thresholds set the level of hazard below which any substance is not considered hazardous under the HSNO Act)
Inventory	New Zealand Inventory of Chemicals
K_{ow}	the steady state ratio of the solubility of a substance in n-octanol to the solubility of that substance in water
LC_{50}	the median lethal concentration, being a statistically derived concentration of a substance that can be expected to cause death in 50 percent of organisms, units mg/L, ppm (air or mg/L (air) for toxicity; units mg/L (water) or ppm (diet) for ecotoxicity (see tables 4, 15 and 17)
LD_{50}	the median lethal dose, being a statistically derived single dose of a substance that can be expected to cause death in 50 percent of animals, units mg/kg body weight
$L(E)C_{50}$	either LC_{50} or EC_{50} data
LOEC	the lowest observed effect concentration, being the lowest concentration of a substances that produces a significant ecotoxic effect in an organism or organism population
M	multiplication factor
MATAC	the maximum acceptable toxicant concentration, being the geometric mean of the NOEC and LOEC where the NOEC and LOEC are derived from the same study

mg/kg bw	milligrams of substance per kilogram of bodyweight
mg/L	milligrams per litre
NOEC	the no observed effect concentration, being the highest concentration of a substance that does not produce a significant ecotoxic effect in an organism or organism population
NZIoC	New Zealand Inventory of Chemicals
NOTS	notified toxic substances
ppm	parts per million
R-phrase	European Union Risk Phrase
Scope	sets the allowed use and hazard parameters of the group standard, and may also set other limitations
SDS	safety data sheet
Soil DT ₅₀	the half-life of a substance in soil, which is the time required to reduce the original concentration of the substance in the soil by 50 percent
the Act	the Hazardous Substances and New Organisms Act, 1996
Transfer	the process by which the existing hazardous substances (substances present in New Zealand prior to July 2001) were given approvals under HSNO
µg	micrograms
User Guide	<i>User Guide to the HSNO Thresholds and Classifications</i> , published by ERMA New Zealand in 2008, http://www.epa.govt.nz/Publications/ER-UG-03-2.pdf

Executive summary

This document is aimed at importers and manufacturers of hazardous substances (products) to New Zealand. It leads the user through a process to 'assign' a product to an existing approval under the Hazardous Substances and New Organisms (HSNO) Act 1996, and provides examples and references throughout the document. It replaces Assigning a Hazardous Substance to a Group Standard, published by ERMA New Zealand in 2008.

Under HSNO, all hazardous substances require a HSNO approval, and it is an offence under the Act to import or manufacture a hazardous product that does not have one. There are two types of approvals: individual substance approvals and group standard approvals.

The HSNO system approves substances, not products. All explosives, fuels and pesticide products, as well as many single component chemicals are covered under individual substance approvals. Most other products are covered by group standards. Group standards can provide an approval for either formulated products or individual (single-component) chemicals. Background information on individual substance approvals and the scope of a group standard is given in section 2.

A step-by-step process on how to assign a product to a group standard or individual substance approval is described in sections 3 and 4. When you assign a product to a group standard approval, a record must be kept. You should also keep a record if you assign a product to an existing individual approval.

Before you can determine whether you can assign your product to an existing approval, the substance must be classified for its hazardous properties. This includes any physical hazards (for example, flammability), toxic and ecotoxic properties. The preferred approach to classification is to use hazard data on the product itself. If you have formulation data for your product refer to the ***User Guide to the HSNO Thresholds and Classifications*** for how to apply the classification criteria to test data. If you do not have hazard data, information on the individual components in the product can be used. The EPA has made available classification information on several thousand individual components. The EPA Chemical Classification and Information Database (CCID) is a good place to start looking for component classification information. The process for classifying products from component data is described in section 5.

An alternative to using product or component data is to derive HSNO classifications using information such as GHS categories, risk phrases (R-phrases) or hazard statements. Such information can commonly be found on the product's safety data sheet. This process is explained in section 6.

To use this document you will need sufficient knowledge and experience to determine whether a product is hazardous or not, and, if it is a hazardous product, to be able to classify it for its hazardous properties. If you feel you are unable to address these technical issues, you should seek independent technical advice or contact the EPA.

Introduction

The purpose of the Hazardous Substance and New Organisms (HSNO) Act 1996 is to protect the environment and health and safety of people and communities by preventing or managing the adverse effects of hazardous substances and new organisms. The HSNO system approves substances, not products. If you want to import or manufacture a product that is a hazardous substance you must have an approval under the Act. Section 25(1)(a) of the Act states:

No hazardous substance shall be imported or manufactured ... otherwise than in accordance with an approval issued under this Act ...

A substance is considered to be a 'hazardous substance' when it has a level of hazard greater than the threshold(s) for one or more of the following intrinsic properties:

- ✦ explosiveness;
- ✦ flammability;
- ✦ oxidising capacity;
- ✦ corrosiveness;
- ✦ toxicity;
- ✦ ecotoxicity.

The thresholds for the HSNO hazardous properties are set out in Schedules 1 to 6 of the Hazardous Substances (Minimum Degrees of Hazard) Regulations 2001. The classification systems for these hazardous properties are set out in the Hazardous Substances (Classification) Regulations 2001. Further details on the thresholds and classification systems are given in the User Guide to the **HSNO Thresholds and Classifications**, published by ERMA New Zealand in 2008 (the User Guide)¹.

Products can be approved under individual substance approvals or group standards.

Individual substance approvals can cover more than one product with similar composition and the same hazard profile. All explosives, fuels and pesticide products as well as many single chemicals are covered under individual substance approvals. Most other products are covered by group standards.

A group standard is an approval for a group of hazardous substances of a similar, nature, type or use. Group standards set out conditions that enable the group of hazardous substances to be managed to minimise adverse effects.

This document provides guidance on how to classify and assign a product to either of these types of approvals.

¹ <http://www.epa.govt.nz/Publications/ER-UG-03-2.pdf>

Assigning a product to an existing HSNO approval

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To determine if your product is a hazardous substance, and if it is covered by an existing approval there are several matters to consider.

A substance is considered to be a 'hazardous substance' when it has a level of hazard greater than the threshold(s) for one or more of the following intrinsic properties:

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

A product must be classified for the above hazards and approved under HSNO to be imported or manufactured in NZ.

Under HSNO you can assign your product to an individual substance approval or a group standard approval. The pathway you choose will depend on the type of substance your product is.

Individual substance approvals generally cover products and single component chemicals such as pesticides, explosives, fuels, timber treatment chemicals, fumigants, and vertebrate toxic agents. Each approval can cover multiple products with similar composition and the same hazard profile. This means if you import a new pesticide it may already be covered by an existing approval because it is very similar to another product.

Group standard approvals cover a group of hazardous substances of a similar nature, type or use. Appendix 1 gives an overview of the categories of group standard approvals that have been issued by the EPA. Guidance on how to assign a product to the appropriate group standard is given in section 3.

To see if your product is an approved hazardous substance you should first see if it fits a type of group standard. If a group standard doesn't exist for your type of product or your product doesn't meet the scope of a group standard, you need to assign your product to an individual substance approval. Guidance on how to assign a product such as a pesticide to an individual substance approval is given section 4.

If your product is not covered by an existing HSNO approval you need to make an application to the EPA.

Substances exempt from the HSNO Act:

- Substances only being used in an exempt laboratory, except where those substances are persistent organic pollutants (POPs);
- Radioactive material;
- Medicine;
- Food;
- Manufactured articles; or
- Infectious substances.

Exempt laboratories must meet the requirements of the Hazardous Substances (Exempt Laboratories) Regulations. Small amounts of substances are permitted to be imported or manufactured in New Zealand for the purposes of scientific investigation, teaching or research and development provided they are made and kept in an Exempt Laboratory. Additional information on exempt laboratories is available here: <http://www.epa.govt.nz/hazardous-substances/about/what-is-hs/Pages/Exempt-laboratories.aspx>

Radioactive substances (UN Class 7) are not included unless they are flammable, explosive, corrosive, oxidising, toxic or ecotoxic.

Ready-to-eat food is not covered by the HSNO Act. Food additives are covered by the HSNO Act and require approval.

Medicines are covered by MedSafe. The ingredients used to manufacture the medicines are covered by the HSNO Act.

Manufactured articles containing hazardous substances (with properties other than explosives) do not need approval. Products such as glues, paints or pesticides do require HSNO approval. A manufactured article is something for which its intended use is mainly to do with its design or physical shape, rather than its chemical composition. Further information about manufactured articles is available here: <http://www.epa.govt.nz/Publications/is11-may2001.pdf>

Infectious substances (UN Class 6, Division 6.2) are also not covered by the hazardous substances part of the HSNO Act.

2.1 Scope of a group standard

The key part of a group standard is its 'scope'. The scope sets the allowed use and hazard parameters of the group standard, and may also set other limitations.

The scope of each group standard lists specific hazard classifications that the product **must** have in order to be assigned (that is, approved) to that group standard. It also lists certain hazard classifications that the product may or may not have. The scope precludes products that have hazardous properties other than those specified. In addition, the scope may contain specific use restrictions or exclusions.

For a product to be approved under a group standard, it **must** fit within the scope of the group standard. That is, the product must:

1. have the **physical form** specified (the scope specifies whether the substance must be a liquid, a liquid or solid, an aerosol or a compressed gas);
2. **be used** for the purpose set out in the group standard, and meet the relevant definition(s) for the particular type of substance;
3. comply with any **use restrictions** that may be specified in the group standard (for example, many group standards exclude pesticide actives and formulated pesticide products);
4. have **only those hazardous properties** that are specifically allowed under the scope of the group standard;
5. if it is a hazardous chemical (single chemical substance), be **listed on the New Zealand Inventory of Chemicals (NZIoC) for use as a single component chemical**. (Any chemical that is 'new' to New Zealand must have its own (individual) HSNO approval before it can be imported or manufactured in New Zealand as that chemical (see section 3, step 3).

Any product that fits the scope of a group standard is a deemed HSNO approved substance. No further approval from the EPA is required. There is also no requirement for the manufacturer or importer of a substance who assigns a product to a group standard to notify the EPA of this approval.

Where a product contains a component not on the NZIoC, you must notify the EPA and provide the required information. See appendix 2 or refer to: <http://www.epa.govt.nz/hazardous-substances/approvals/group-standards/Pages/NZIoC>.

Hazardous properties not included in group standards

If a product has one or more of the following hazard classifications, then it will not fit within the scope of any group standard issued by the Authority. Contact the EPA for further advice.

- **class 1** (explosives)
- **3.1A** (extremely flammable liquids)
- **all class 3.2** (liquid desensitised explosives)
- **all class 4.1.2** (self-reactive substances), and **4.1.3** (desensitised explosive)
- **4.2A** (pyrophoric substances)
- **4.3A** (release flammable gas on contact with water)
- **5.1.1A, 5.1.2A, 5.2A** (extremely oxidising substances)
- **6.1A*** (acutely toxic)
- **8.2A*** (highly corrosive)

*These hazardous properties are permitted under the *Pharmaceutical Actives Group Standard* and the *Active Ingredients for use in the Manufacture of Agricultural Compounds Group Standard*

Assigning a product to a group standard

The process for assigning a product to a group standard is summarised in Figure 1 (page 7). Certain steps are highlighted and an explanation of each is given below.

Step 1: Is your product exempt or excluded from HSNO?

Certain substances are exempt or excluded from the Act. These include non-hazardous substances, substances for use in an exempt laboratory, manufactured articles², radioactive and infectious materials, foods (but not food additives) and ready-to-use human medicines.

Further information is given in the following information sheets:

- **Exemptions from the Provision of the HSNO Act for Small-Scale Research on Hazardous Substances (No. 127, January 2012)**, <http://www.epa.govt.nz/Publications/is8-may2001.pdf>.
- **Manufactured articles** (No. 11, May 2001), <http://www.epa.govt.nz/Publications/is11-may2001.pdf>.

Step 2: Is your substance a single component chemical or formulated product?

If your substance is a:

- **single component chemical** – follow Path A in Figure 1 (unless your substance is a pharmaceutical, pesticide or veterinary medicine active ingredient)
- **formulated product** – follow Path B in Figure 1.

Note that, although water is a chemical in its own right, a component mixed or diluted with water may still be considered to be a single component chemical. Contact the EPA for specialist advice in this situation.

Step 3: Is your chemical existing in New Zealand?

This step applies to Path A only.

No single component chemical can be assigned to a group standard approval unless that chemical is on the NZIoC. Here, a chemical means:

... any element or compound in its natural state or obtained by any production process, including any impurities and any additive necessary to preserve the stability of the chemical, but excluding any solvent which may be separated without affecting the stability of the chemical or change its composition.

If your substance is a single component chemical, you must check to see that it is listed for use as a chemical in its own right on the NZIoC. You can check the inventory at <http://www.epa.govt.nz/search-databases/Pages/nzioc-search.aspx/search-databases/Pages/nzioc-search.aspx>. You will need to know the Chemical Abstract Service (CAS) number for each single component chemical you wish to check.

If your chemical is listed on the NZIoC for use as a chemical in its own right, go to step 6.

If your chemical is not on the NZIoC, or is listed but for use as a component in a substance approved under a group standard only, you must contact the EPA for a separate HSNO approval.

Information on the operational procedures and policies for the NZIoC is available at: <http://www.epa.govt.nz/Publications/pp-nzioc-March-07.pdf>.

² Manufactured articles may be included under group standards in some circumstances. Contact the EPA for further information.

Step 4: Does a category of group standard exist for the use of the product?

This step applies to Path B only.

If your substance is a formulated product, your next step is to check whether there is a category of group standard under which it may possibly fit³. To do this, you must check that the intended 'use' of the product fits with that allowed under the group standard. The allowed use is specified in the scope of each group standard (see section 2.1).

When a product is assigned to a group standard, the product may only be used for the purpose specified in that group standard, and it must meet all the relevant definition(s) of that use.

For example, for a product to be assigned to a Leather and Textile Products Group Standard, the product must be:

- *imported or manufactured for use as a leather or textile product*

where the following definitions apply:

- **leather** means a material made from the skin of an animal by tanning or similar processes
- **leather and textile product** means any product or raw material used in the pretreatment, treatment, colouring, fibre manufacturing and processing of leather or textiles
- **textile** means a woven, knitted, tufted, non-woven, or other form of fabric (including carpet) and the natural and man-made fibres and yarns that form these fabrics.

Not all categories of group standards have a specified use; some are 'generic' (that is, they are non-use specific). Different types of product having different uses may be approved under these 'generic' group standards. The Aerosol Group Standards, for example, include within their scope products of different uses (such as aerosol paints or aerosol cleaners), provided that the substance is an aerosol.

The generic group standards are:

- aerosols;
- class 4 Substances;
- class 5.1.1 Oxidising Substances;
- class 5.2 Organic Peroxides;
- N.O.S (Not Otherwise Specified).

The N.O.S. Group Standards were created for the notified toxic substances (NOTS) that do not fit within the scope of any other product-specific group standard. They were created for the sole purpose of transferring these NOTS, and **cannot** be used as an approval for a 'new' hazardous substance. In this context, a 'new' hazardous substance is one that is manufactured or imported into New Zealand for the first time after 1 July 2006.

Appendix 1 provides a full list of the categories of group standards and their HSNO approval numbers issued by the Authority or refer to:

<http://www.epa.govt.nz/hazardous-substances/approvals/group-standards/Pages/default.aspx>.

³ There are many categories of group standards (appendix 1). Within each category, there may be one or more individual group standards. These individual group standards are distinguished from each other by the allowed hazard classifications. Within a category, the 'use' and use definitions are the same for all of the individual group standards.

If there is a category of group standards available for the intended use of your product (for example, Leather and Textile Products Group Standards), the next step is to classify the hazardous properties of the product. This will enable the individual group standard within that category (under which the product may be approved) to be determined. Go to step 5.

If there is no category of group standard available for the intended use of the product, you may be able to assign your product to an existing approval. This is explained in section 4. If no existing approval for your product exists, you will need to make an application to the EPA.

Step 5: Do you want to self-classify your product?

Whether your substance is a single component chemical (Path A of Figure 1) or a formulated product (Path B), it will need to be classified for its HSNO hazardous properties. You can either do this yourself or you can obtain assistance from the EPA.

If you wish to self-classify your product, go to step 6.

If you do not wish to self-classify, the EPA can do this for you. There is a fee for this service and you will need to submit a completed HS6A application form, available at:
<http://www.epa.govt.nz/Publications/HS6A-sos.doc>.

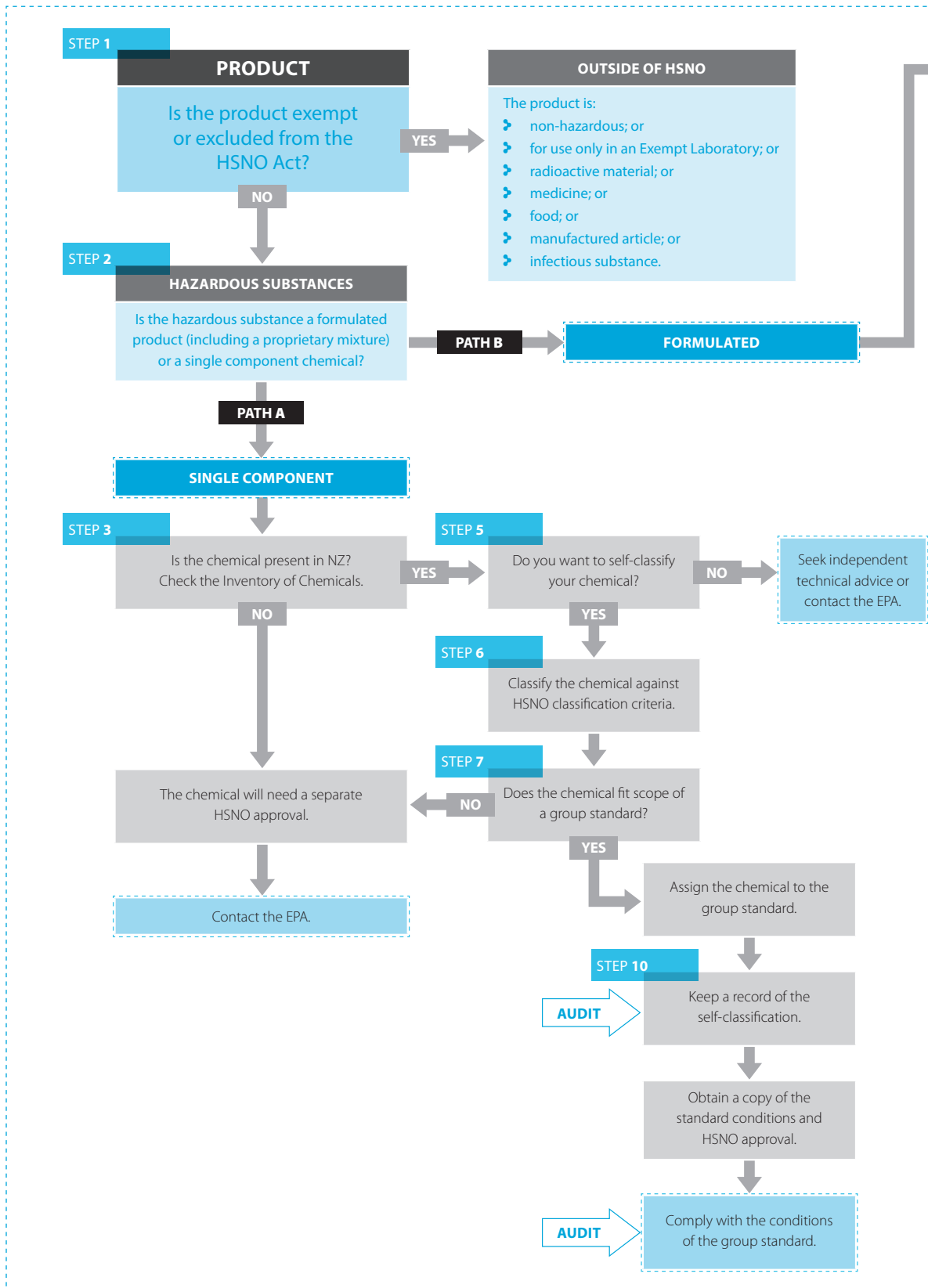
You will receive from us the classification of the product and the group standard under which the substance is HSNO approved. If the product is not able to be put in any existing group standard, you will be advised of this and what you need to do to obtain a HSNO approval.

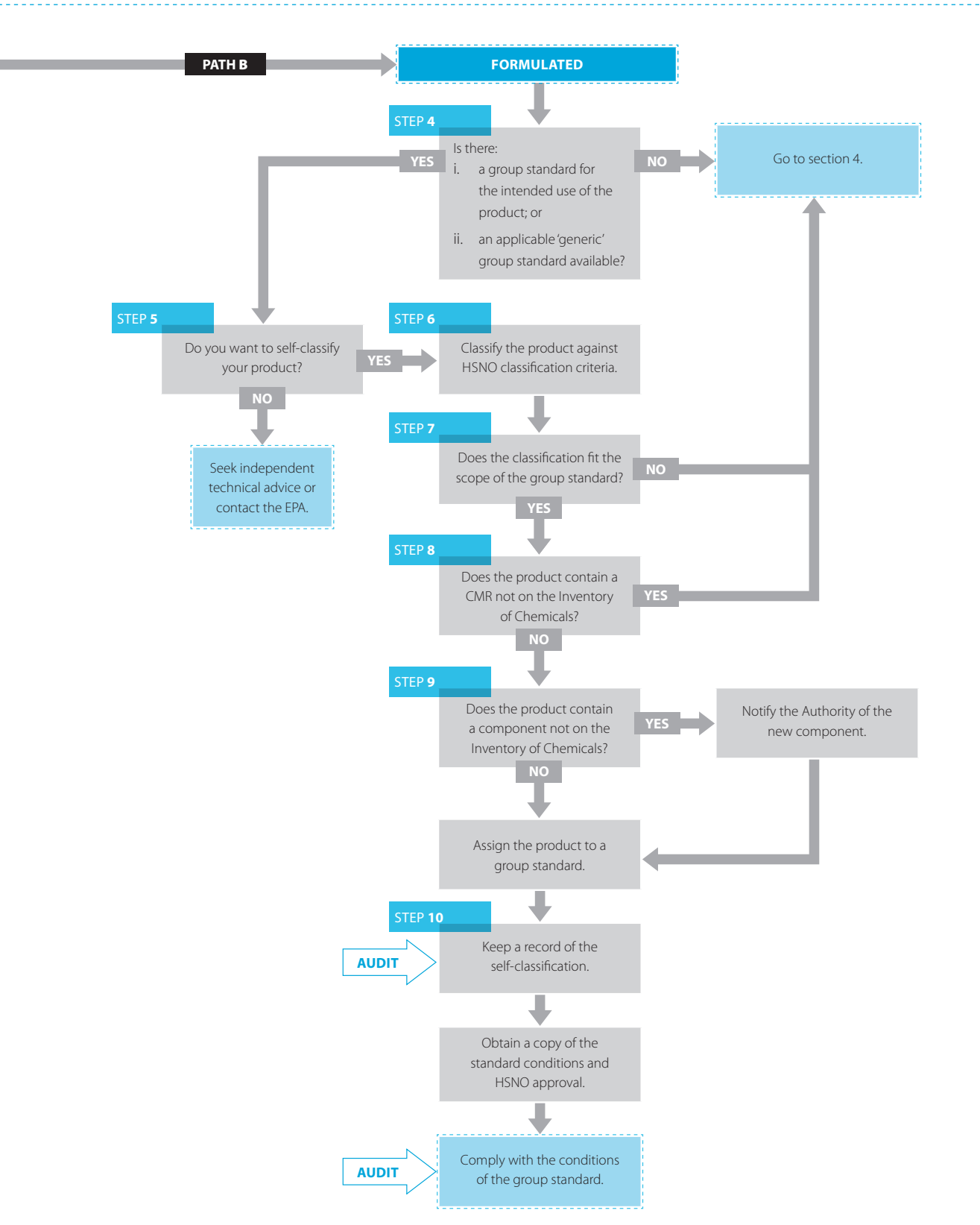
If the product is non-hazardous you will be informed that it is outside the coverage of the HSNO Act. In this situation, there is nothing further that you need to do.

Further information on the EPA classification service is available at:
<http://www.epa.govt.nz/hazardous-substances/about/SOS/Pages/default.aspx>.

Caution: The classification of a product is a technical process, and you should ensure you are familiar with, and fully understand, what is involved before you decide to self-classify. If you are at all uncertain, we strongly advise that you seek independent technical advice, or contact the EPA.

Figure 1: Assigning a product to a group standard





Step 6: Classifying your product for its HSNO hazardous properties

If you chose to self-classify your product, there are three ways in which you can do this, each of which requires different information. The way you choose will depend on what information you have, or, if you are importing the product, what information you can source from your supplier. Depending on the information available, you should follow the classification hierarchy given in table 1 (section 5).

The three ways for classifying your product are:

1. **Hazard data on the product.** This is the preferred approach. For this, you need to have physical property data (for example, for flammability), toxicity and ecotoxicity data on the formulated product. If toxicity and ecotoxicity information is not available, as is commonly the case for industrial and consumer products, then you should classify the product using component data.
2. **Component data.** For this, you will need to know the full composition of the product. Further details are given in section 5.
3. **Risk phrases or other hazard information.** This is the least preferred approach. For this, you will need to have a safety data sheet (SDS) for the product, which should provide some hazard information. Further details are given in section 6.

Step 7: Does the product fit the scope of a group standard?

At this point, you will know:

1. that there is a category of group standard available given the intended use of the product; and
2. the HSNO hazard classification for the product.

From this information, you will be able to determine whether the product can be assigned to a group standard. For it to be assigned a group standard approval, it must meet the scope of the group standard (see section 2.1).

The hazard classification of the product must fit with the classifications set out in the scope of the group standard. Certain hazard classifications of a group standard will be mandatory (that is, for a product to be assigned to the group standard, it **must** have those hazards), whereas other hazard classifications will be optional.

In general, the mandatory hazards of a group standard are from the following classes.

- **2.1.1A, 2.1.1B** (flammable gases)
- **2.1.2A** (flammable aerosols)
- **3.1B, 3.1C, 3.1D** (flammable liquids)
- **4.1.1A, 4.1.1B** (readily combustible solids)
- **4.2B, 4.2C** (pyrophoric substances)
- **4.3B, 4.3C** (release flammable gas on contact with water)
- **5.1.1B, 5.1.1C, 5.1.2A** (oxidising substances)
- **all class 5.2** (organic peroxides)
- **6.1B, 6.1C** (acutely toxic)
- **6.7A, 6.7B** (carcinogenic)
- **8.2B, 8.2C** (corrosive)

For example, for a product to be assigned to the Leather and Textile Products (Flammable) Group Standard 2006, it must have a 3.1B or 3.1C classification⁴. If the product has a 3.1D flammability hazard, it cannot be approved under this group standard, but will be assigned to the Leather and Textile Products (Combustible) Group Standard 2006.

If there is no category of group standard available for the intended use of the product, you may be able to assign your product to an existing approval. This is explained in section 4. If no existing approval for your product exists, you will need to make an application to the EPA.

Step 8: Does the product contain a CMR?

This step applies to Path B only.

A group standard has now been identified to which your product can possibly be assigned. However, some group standards place restrictions on products containing components that are carcinogenic, mutagenic or reproductive (CMR) toxicants.

If your product does not contain any CMR component, then you can proceed immediately to step 9.

If your product has any one or more of the following classifications, then you must check that the component that is giving rise to this hazard classification is listed on the NZIoC.

- **6.6A, 6.6B** (mutagenic component is present in the product)
- **6.7A, 6.7B** (carcinogenic component is present in the product)
- **6.8A, 6.8B, 6.8C** (a reproductive or developmental toxicant is present in the product)

Refer to section 5.3 to determine whether or not your product has one of these classifications.

If the component is not listed on the NZIoC, then, generally, the product cannot be assigned to the group standard. The only exception is when an existing product approved under the group standard is being reformulated and a CMR component is being replaced with another CMR of a lower hazard classification. In this situation, we strongly advise that you contact EPA for further advice. Because the component is not on the inventory, you will be required to notify this new component to us (see step 9).

It is possible for a substance to have more than one component triggering these classifications. This means that every component that is a carcinogenic, mutagenic or reproductive toxicant will need to be checked to ensure it is listed on the NZIoC.

Step 9: Does the product contain a component not on the NZIoC?

This step applies to Path B only.

Any product that is imported into, or manufactured in, New Zealand for the first time must be checked to see whether it contains a chemical that is not listed on the NZIoC. A chemical not listed on the inventory is considered to be a chemical that is 'new' to New Zealand.

If the product does not contain a 'new' chemical, then it can be assigned to the group standard. A record of that assignment must be kept (see step 10).

⁴ <http://www.epa.govt.nz/hazardous-substances/approvals/group-standards/Pages/leather-textile.aspx>

If your product contains a 'new' chemical, then, before you can assign it to the group standard, you must notify the EPA. Once the EPA has been notified, the product can be assigned to the group standard and it becomes a HSNO approved substance under that group standard.

The information required by this notification is given in appendix 2. Any new chemical notified to the EPA will be added to the NZIoC for use as a component in a product approved under a group standard.

To check whether your product contains a 'new' chemical, see the NZIoC at:
<http://www.epa.govt.nz/search-databases/Pages/nzioc-search.aspx>.

Further information on notifying for the NZIoC is given at:
<http://www.epa.govt.nz/hazardous-substances/approvals/group-standards/Pages/NZIoC.aspx>.

Most, but not all, group standards contain this notification requirement for new chemicals⁵. See Part 10 ('Other Matters') of the particular group standard to find out if it contains the notification condition.

Step 10: Keeping a record of the self-classification and group standard assignment

Once a product has been assigned to a group standard, a record of the self-classification and assignment must be made. This record must be kept by the importer or manufacturer and must be available for inspection at the request of a HSNO enforcement officer. The record must contain sufficient information to allow for third party verification of the product classification and group standard assignment.

You must retain a copy of the record of the assignment of the product to the group standard (see appendix 3: Keeping a record)

A template that can be used to prepare a record is provided in appendix 3. While it is not mandatory to use it, the template sets out the minimum standard of information that should be kept on any record.

Once the importer or manufacturer has assigned a product to a group standard and completed the record, there is **no need to notify the EPA**. A copy of the record does not need to be provided to the EPA.

If the importer or manufacturer of a product has chosen not to self-classify their product, and has used the classification service provided by the EPA, they will have been sent a letter from the EPA advising of the product classification and the group standard under which the product is approved. This letter is the record, and a further record as per appendix 3 does not need to be kept.

Suppliers do not need to keep a record if they are not the importer, but you must provide the name of the group standard and/or the approval number of the product to those you supply. This information is required on the SDS, which you must also be able to supply to your customers. Appendix 9 outlines the details you must include in a HSNO compliant SDS.

⁵ The exceptions are the Cosmetics Products Group Standard 2006, fragrance materials covered by the Food Additives and Fragrance Materials Group Standard 2006, and the N.O.S Group Standard 2006.

Assigning a product to an individual substance approval

If your product does not fit under a group standard it may be covered by an existing individual substance approval. You may be aware of a similar substance containing the same active ingredient as your product. In this case you can see if your product can be assigned to an existing approval by using the search function of the Controls for Approved Hazardous Substances Database on the EPA website.

The process for assigning a product to an individual approval is summarised in Figure 2 (page 15). Certain steps are highlighted and an explanation of each is given below.

Step 1: Classifying your product for its HSNO hazardous properties

To assign your product to an existing approval you need to classify your product. There are three ways in which you can do this, each of which requires different information. The way you choose will depend on what information you have, or, if you are importing the product, what information you can source from your supplier. Depending on the information available, you should follow the classification hierarchy given in table 1 (section 5).

The three ways for classifying your product are:

1. **Hazard data on the product.** This is the preferred approach. For this, you need to have physical property data (for example, for flammability), toxicity and ecotoxicity data on the formulated product. If toxicity and ecotoxicity information is not available, as is commonly the case for industrial and consumer products, then you should classify the product using component data.
2. **Component data.** For this, you will need to know the full composition of the product. Further details are given in section 5.
3. **Risk phrases or other hazard information.** This is the least preferred approach. For this, you will need to have a safety data sheet (SDS) for the product, which should provide some hazard information. Further details are given in section 6.

Caution: The classification of a product is a technical process, and you should ensure you are familiar with, and fully understand, what is involved before you decide to self-classify. If you are at all uncertain, we strongly advise that you seek independent technical advice, or contact the EPA.

If you do not wish to self-classify, the EPA can do this for you. There is a fee for this service and you will need to submit a completed HS6A application form, available at: <http://www.epa.govt.nz/Publications/HS6A-sos.doc>.

Step 2: Are there existing individual substance approvals with the same active ingredient as your product?

Once you have classified your product you can use the Controls for Approved Hazardous Substances Database to see if your product can be assigned to an existing approval. To do this, go to the database at <http://www.epa.govt.nz/search-databases/Pages/controls-search.aspx>.

Enter the active ingredient of your product into the database with percentage symbols on either side. This will generate a list of approved substances with the same active ingredient as your product. For example, if the active ingredient is diazinon, enter **%diazinon%** into the database.

Example: Screenshot of Controls for Approved Hazardous Substances Database with search results for diazinon.

Search the Controls for Approved Hazardous Substances database

Name/Synonym

%diazinon%

Search ?

CAS Number	Synonym / Name
333-41-5	Diazinon
	Emulsifiable concentrate containing 800 g/litre diazinon (Substance A)
	Granular material containing 200 g/kg diazinon
	Granular material containing 50 - 54 g/kg diazinon
	Wettable powder containing 500 g/kg of diazinon
	Emulsifiable concentrate containing 200 g/litre diazinon
	Emulsifiable concentrate containing 500 g/litre diazinon and 25 g/litre permethrin
	Emulsion (oil in water) containing 600 g/litre diazinon
	Emulsion (oil in water) containing 500 - 600 g/litre diazinon
	Emulsifiable concentrate containing 800 g/litre diazinon (Substance B)
	Emulsifiable concentrate containing 95 g/litre diazinon
	Emulsifiable concentrate containing 800 g/litre diazinon (Substance C)
	Emulsifiable concentrate containing 600 g/litre diazinon
	Collar containing 140 - 180 g/kg diazinon and 1.7 - 3.2 g/kg pyriproxyfen
	Collar containing 140 - 180 g/kg diazinon
	Solid containing 20 - 50 g/kg diazinon
	Flammable liquid containing 360 - 440 g/litre diazinon
	Flammable liquid containing 0.26 - 5% diazinon

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You must assign your product to an approval that has the same classification, physical form and has a similar use pattern to your product. The concentration of active ingredient/s must also be the same as your product (within the tolerances listed in the table below). If no approval meets these criteria you must contact the EPA.

Table 1: Active ingredient concentration tolerances for matching substances

Concentration of the active ingredient in your substance	Tolerance
< or = 25g/kg (< or = 2.5%)	+/- 15%
25 - 100g/kg (2.5% - 10%)	+/- 10%
> 100g/kg (> 10%)	+/- 5%

Step 3: Does your product match the HSNO classification of the existing approval and have the same physical form?

You must ensure your product has the same HSNO classification as the existing approval. This means your product must have all the hazards listed under the approval you have selected.

When you select an existing approval in the Controls for Approved Hazardous Substances Database the hazard classification for that approval is given.

Your product must also have the same physical state and form as the existing approval. For example, if your product is a solid granule you can only match it to an approval that is in granular form.

If your product's hazard classification and physical form does not match the approval you will need to contact the EPA to make an application.

Step 4: Do the uses of your product match the existing approval?

Before you assign your product to an existing approval you must ensure its use is allowed by the HSNO controls. You need to read all the controls that apply to the approval you want to assign your product to. The Controls for Approved Hazardous Substances Database lists all the controls that apply to an approval.

You must ensure that your product will not be used for purposes that do not comply with conditions of the approval.

Step 5: Keeping a record of the self-classification and individual substance approval assignment

Once a product has been assigned to an existing approval, a record of the self-classification and assignment should be made. This record should be kept by the importer or manufacturer and should be available for inspection at the request of a HSNO enforcement officer. The record should contain sufficient information to allow for third party verification of how the product was classified and assigned to an existing approval.

You should retain a copy of the record that shows how you assigned your product to an individual substance approval (see appendix 3: Keeping a record)

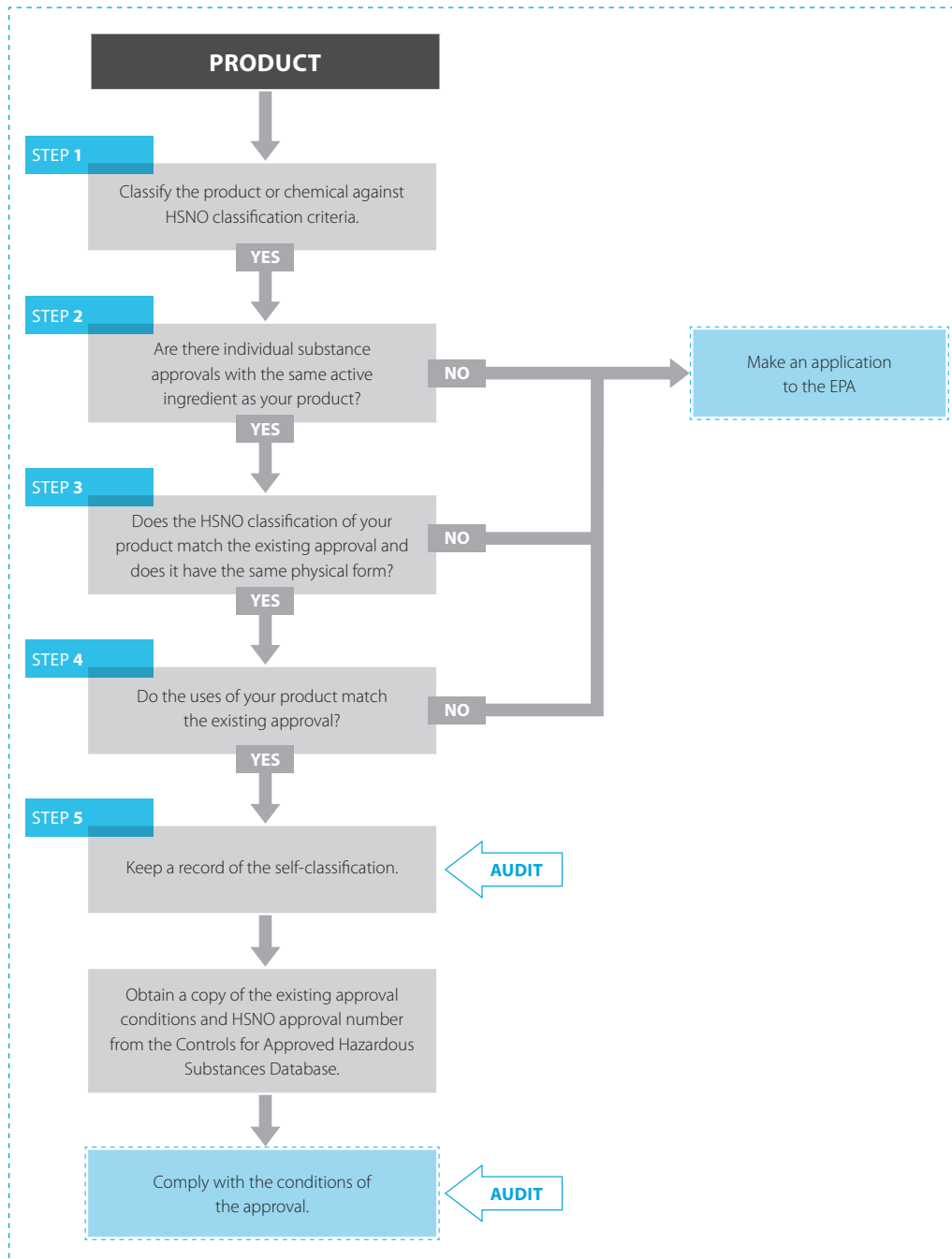
A template that can be used to prepare a record is provided in appendix 3. While it is not mandatory to use it, the template sets out the minimum standard of information that should be kept on any record.

Once the importer or manufacturer has assigned a product to an individual substance approval and completed the record, there is **no need to notify the EPA**. A copy of the record does not need to be provided to the EPA.

If the importer or manufacturer of a product has chosen not to self-classify their product, and has used the classification service provided by the EPA, they will have been sent a letter from the EPA advising of the product classification and the approval under which the product is approved. This letter is the record, and a further record as per appendix 3 does not need to be kept.

Suppliers do not need to keep a record if they are not the importer, but you must provide the name of the individual substance approval and/or the approval number of the product to those you supply. This information is required on the SDS, which you must also be able to supply to your customers. Appendix 9 outlines the details you must include in a HSNO compliant SDS.

Figure 2: Assigning a product to an individual substance approval



Classifying from product data or composition

The preferred approach to determine the HSNO classification of a product is to use 'product data'. This is hazard data (such as LD₅₀ and EC₅₀ values) that is available on the formulated product. However, it is quite uncommon to have product data such as this, particularly for industrial and consumer type products. If product data is not available, then it is **not** expected that tests are carried out on the formulated product to generate such data. Some classifications can be assigned from the physical and chemical properties of a product, such as pH and flashpoint.

In the absence of product data, the alternative is to classify the product from data available on the individual components present in the product; that is, from its composition.

In the absence of individual component data, it is acceptable to classify the product based on R-phrases, GHS categories or hazard statements (refer to section 6).

Table 1 shows the hierarchy of preferred approaches to classifying a product with 1 being most favoured and 6 least favoured.

Table 2: Hierarchy for classifying a product			
	Data	GHS Categories/ R-phrases	Hazard statements
Product	1	3	5
Component	2	4	6

A series of 'mixture rules' are used to assign a classification to the product based on the classification of the constituent components (refer to sections 5.3 and 5.4). When applying the mixture rules, for some classification endpoints, it is necessary to take account of reactions that may occur between components. For example, acid-base neutralisation reactions may result in only an irritancy classification, despite the product containing corrosive components (the separate acid and base). For this reason, the classification is preferably done from what is in the final formulated product rather than the individual components in the 'recipe' used to make the product.

The physical form of the product must also be taken into account when deciding whether some component classifications should be conferred to the formulated product. For example, if a product has a component that is classified as 6.7B by the inhalation route and the physical form of the product is a solid granule, then the 6.7B classification should not be assigned to the final product.

In order to classify your product based on its composition, you will need the **full** composition of the product. This will include, where available, information on any impurities that may be present in any of the components. You will also need to know the physico-chemical, toxicity and ecotoxicity properties of the components.

The EPA has classified several thousand chemicals that were transferred in the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substance) Transfer Notice 2004 and the Hazardous Substances (Chemicals) Transfer Notice 2006. These classifications, and the data used to derive them, are available in the HSNO Chemical Classification and Information Database (CCID) at: <http://www.epa.govt.nz/search-databases/Pages/HSNO-CCID.aspx>. Refer to appendix 7 for guidance on how to use the CCID.

Classifications of many other components commonly used in formulated products are also available in the Controls for Approved Hazardous Substances Database: <http://www.epa.govt.nz/search-databases/Pages/controls-search.aspx>.

There are several international databases available that provide information on the hazardous properties of chemicals. A list of databases containing information on toxic, ecotoxic and physical properties is provided in appendix 6.

5.1 Guidelines for calculating hazard classifications

The information provided in this document is intended to be a relatively simple introductory guide. This means it cannot capture all the detailed technical issues that will apply in all instances, and it cannot be considered authoritative on all questions. The User Guide provides information for dealing with more complex issues.

If you are uncertain about classifying your product, the EPA can provide informal advice. You will need to submit the full composition of the product and information on its use. The advice provided will include the classification of the product and will identify the group standard that the product belongs to. An application form can be found at: <http://www.epa.govt.nz/hazardous-substances/about/SOS/Pages/default.aspx>.

If you have a large number of relatively similar compounds, it may be useful to make an HS6A application for some representative examples first. This should then provide information that will enable you to classify other similar products yourself.

Sections 5.2 to 5.4 explain how to go about classifying a substance, with worked examples being provided in appendix 8.

5.2 Physical/chemical properties

This category includes substances with explosive⁶, flammable and oxidising properties. There are no “rules” for calculating physical hazards and product testing is the best way to determine the physical properties.

The flammability of liquids is graded according to flashpoint, as set out in table 2. Determination of the product flashpoint is a simple and inexpensive test that should be carried out for new products.

For aerosols a product is classified as flammable when the concentration of the flammable ingredients is > 45%.

Classification criteria for hazardous properties

The classification criteria for the HSNO Act hazardous properties are set out in Schedules 1 to 6 of the Hazardous Substances (Classification) Regulations 2001.

The hazard classes are:

- ✦ Class 1 – explosiveness
- ✦ Class 2 – flammability, gases
- ✦ Class 3 – flammability, liquids
- ✦ Class 4 – flammability, solids
- ✦ Class 5 – capacity to oxidise
- ✦ Class 6 – toxicity
- ✦ (Class 7 is unallocated; radioactivity is subject to separate legislation)
- ✦ Class 8 – corrosiveness
- ✦ Class 9 – ecotoxicity

The classification systems comprise:

- ✦ numbered classes (for example, class 6), indicating the intrinsic hazardous property;
- ✦ numbered subclasses (for example, subclass 6.1), indicating the type of hazard; and
- ✦ lettered categories (for example, category A) indicating the degree of hazard.

The combination of numbers and letters used in the classification system (eg, 6.1A) constitutes a hazard classification of a substance

Appendix 10 provides a full list of the HSNO classifications and their hazard statements.

⁶ No group standards were issued for substances with explosive (class 1) hazards.

If the product itself has not been tested to determine its physical hazards but you have other products of similar composition that are already approved and classified, bridging principles can be used to read across information and assign classifications.

If you have no similar products, one way to determine the physical properties, such as oxidising, is to use a weight of evidence approach. If you have a product that contains an oxidising chemical but you are not certain if you should classify your product as oxidising, search for other products that contain the oxidising chemical at about the same percentage. If these products are all classified as oxidising this indicates that your product should be assigned an oxidising classification. If these products are not classified as oxidising, this information can be used as a justification for not assigning an oxidising classification to your product.

For further detailed explanations of the physical and chemical properties and thresholds refer to the User Guide. The transport section of a safety data sheet can also provide good examples of physical hazards, using UN classes.

Table 3: HSNO classification of flammable liquids

HSNO classification	Flashpoint	Boiling point	UN class	UN packing group
3.1A	< 23°C	≤ 35°C	3	I
3.1B	< 23°C	> 35°C	3	II
3.1C	≥ 23°C and ≤ 60°C	> 35°C	3	III
3.1D	> 60°C and ≤ 93°C	> 35°C	-	-

Remember to consider the full composition and likely routes of exposure before you classify a product that is in liquid or solid form. However, for aerosol products, the propellant component must not be included in mixture calculations except when you calculate toxicity for the inhalation route of exposure. This is because a person is less likely to be exposed to the propellant.

5.3 Toxic properties

Acute toxicity

Acutely toxic substances are assigned the HSNO classifications of 6.1A to 6.1E. This category includes oral, dermal or inhalation as relevant exposure routes.

LD₅₀ or LC₅₀ values are used to calculate the classification of acutely toxic substances (class 6.1). The estimated LD₅₀ or LC₅₀ values should be calculated for each exposure route. Once the classifications for all three exposure routes have been calculated an overall classification is assigned to the product. This is the highest toxicity classification. For example, for a product with the classifications 6.1D (oral), 6.1E (dermal) and 6.1E inhalation the overall classification is 6.1D. To calculate the classification of a product the LD₅₀ or LC₅₀ values of the components should be added using the following 'summation formula'. Where a specific LD₅₀ or LC₅₀ for a component in a product is not available use the point estimates provided in table 5.

$$T_{\text{mix}} = 100 / (C_a / T_a + C_b / T_b \dots)$$

C_a = percent of component in the product

T_a = oral LD₅₀ or dermal LD₅₀ or inhalation LC₅₀ of the component in mg/kg body weight or mg/L air or ppm air

T_{mix} = estimated LD₅₀ or LC₅₀ of the product

To determine the classification of a product compare T_{mix} with the hazard cut-off levels (tables 3 or 4) below.

Table 4:	Hazard thresholds for oral and dermal acute toxicity	
HSNO classification	Oral (mg/kg bw)	Dermal (mg/kg bw)
6.1A	$LD_{50} \leq 5$	$LD_{50} \leq 50$
6.1B	$5 < LD_{50} \leq 50$	$50 < LD_{50} \leq 200$
6.1C	$50 < LD_{50} \leq 300$	$200 < LD_{50} \leq 1,000$
6.1D	$300 < LD_{50} \leq 2000$	$1,000 < LD_{50} \leq 2000$
6.1E	$2,000 < LD_{50} \leq 5000$	$2,000 < LD_{50} \leq 5000$

Table 5:	Hazard thresholds for acute toxicity by inhalation	
HSNO classification	Inhalation	
6.1A ⁴	$LC_{50} \leq 100 \text{ ppm} - \text{gas}^1$	
	$LC_{50} \leq 0.5 \text{ mg/L} - \text{vapour}^2$	
	$LC_{50} \leq 0.05 \text{ mg/L} - \text{dust or mist}^3$	
6.1B ⁴	$100 \text{ ppm} < LC_{50} \leq 500 \text{ ppm} - \text{gas}$	
	$0.5 \text{ mg/L} < LC_{50} \leq 2 \text{ mg/L} - \text{vapour}$	
	$0.05 \text{ mg/L} < LC_{50} \leq 0.5 \text{ mg/L} - \text{dust or mist}$	
6.1C ⁴	$500 \text{ ppm} < LC_{50} \leq 2500 \text{ ppm} - \text{gas}$	
	$2 \text{ mg/L} < LC_{50} \leq 10 \text{ mg/L} - \text{vapour}$	
	$0.5 \text{ mg/L} < LC_{50} \leq 1 \text{ mg/L} - \text{dust or mist}$	
6.1D ⁴	$2,500 \text{ ppm} < LC_{50} \leq 5,000 \text{ ppm} - \text{gas}$	
	$10 \text{ mg/L} < LC_{50} \leq 20 \text{ mg/L} - \text{vapour}$	
	$1 \text{ mg/L} < LC_{50} \leq 5 \text{ mg/L} - \text{dust or mist}$	

1. Thresholds for gases should be used for substances that are gases at room temperature and atmospheric pressure.
2. Thresholds for vapours apply to liquids with a vapour pressure greater than that of water, 2,500 Pa (Pascals).
3. Thresholds for dusts and mists should be used for dusts and liquids with a vapour pressure lower than water (Note that the decision to use the vapour or mist threshold values makes a large difference to the resulting classification.). Dust is generally formed by mechanical processes while mist is generally formed by the condensation of super-saturated vapours or by the shearing of liquids.
4. Cut-off values are based on four-hour test exposures.

For further guidance on classification of toxicity by inhalation refer to the User Guide.

For class 6 substances, the UN packing group corresponds to HSNO categories A, B and C in the case of oral, dermal and inhalation (dust or mist) toxicity. That is:

- UN Class 6 Packing Group I corresponds to 6.1A;
- UN Class 6 Packing Group II corresponds to 6.1B;
- UN Class 6 Packing Group III corresponds to 6.1C.

For inhalation toxicity from vapours, the classification categories do not necessarily align because the UN packing groups depend on the volatility of the substance as well as the LD_{50} .

For mixtures, inhalation toxicity is generally classified as a dust/mist. If the mixture contains components that have LC_{50} values for a vapour exposure route this value needs to be converted to a dust/mist value. To do this, the vapour component HSNO classification should be used and converted into a dust/mist point estimate. For example, if the vapour component of a mixture was a 6.1D the dust/mist point estimate for a class 6.1D component of 1.5 should be used to calculate the mixture classification.

Toxic gases are classified as class 2.3 under the UN system for the transportation of dangerous goods.

Where a specific LD_{50} or LC_{50} value is not available, the range estimate should be converted to a point estimate as described in table 5. The point estimate can then be used in the mixture calculation. For example, if a component has been classified from the R phrase, R22, which is equivalent to a HSNO 6.1D (oral), the 6.1D oral point estimate of 500 mg/kg bw should be used in the calculation for this component.

Table 6: Converting LD_{50} or LC_{50} range estimates to point estimates

Exposure routes	HSNO classification	Experimentally obtained or derived LD_{50} or LC_{50} range estimate	Converted LD_{50} or LC_{50}
Oral (mg/kg bw)	6.1A	$0 < LD_{50} \leq 5$	0.5
	6.1B	$5 < LD_{50} \leq 50$	5
	6.1C	$50 < LD_{50} \leq 300$	100
	6.1D	$300 < LD_{50} \leq 2,000$	500
	6.1E	$2,000 < LD_{50} \leq 5,000$	2,500
Dermal (mg/kg bw)	6.1A	$0 < LD_{50} \leq 50$	5
	6.1B	$50 < LD_{50} \leq 200$	50
	6.1C	$200 < LD_{50} \leq 1,000$	300
	6.1D	$1,000 < LD_{50} \leq 2,000$	1,100
	6.1E	$2,000 < LD_{50} \leq 5,000$	2,500
Gases (ppm in air)	6.1A	$0 < LC_{50} \leq 100$	10
	6.1B	$100 < LC_{50} \leq 500$	100
	6.1C	$500 < LC_{50} \leq 2,500$	700
	6.1D	$2,500 < LC_{50} \leq 5,000$	3,000
Vapours (mg/L in air)	6.1A	$0 < LC_{50} \leq 0.5$	0.05
	6.1B	$0.5 < LC_{50} \leq 2.0$	0.5
	6.1C	$2.0 < LC_{50} \leq 10.0$	3.0
	6.1D	$10.0 < LC_{50} \leq 20.0$	11.0
Dust/mist (mg/L in air)	6.1A	$0 < LC_{50} \leq 0.05$	0.005
	6.1B	$0.05 < LC_{50} \leq 0.5$	0.05
	6.1C	$0.5 < LC_{50} \leq 1.0$	0.5
	6.1D	$1.0 < LC_{50} \leq 5.0$	1.5

Aspiration hazard

Some liquid substances and preparations present an aspiration hazard in humans because of their low viscosity.

The 6.1E acute oral toxicity is triggered if the substance has the following physical properties or has known aspiration hazards in humans.

The 6.1E acute oral toxicity classification is triggered if:

- a. The substance is a hydrocarbon with a kinematic viscosity of $\leq 20.5 \text{ mm}^2/\text{s}$ measured at 40°C or there is reliable and good quality human evidence to indicate a human aspiration (note this is essentially the same as GHS Aspiration hazard category 1); or
- b. The substance has a kinematic viscosity $\leq 14 \text{ mm}^2/\text{s}$ at 40°C , with evidence from existing animal studies, and expert judgment which takes into account surface tension, water solubility, boiling point and volatility (note this is essentially the same as GHS Aspiration hazard category 2).

A mixture is classified as 6.1E acute oral toxicity (aspiration hazard) if it contains:

- $\geq 10\%$ of a substance classified under criterion a, and has a kinematic viscosity of viscosity of $\leq 20.5 \text{ mm}^2/\text{s}$ measured at 40°C (GHS Aspiration hazard category 1); or
- $\geq 10\%$ of a substance classified under criterion b, and has a kinematic viscosity of viscosity of $\leq 14 \text{ mm}^2/\text{s}$ measured at 40°C (GHS Aspiration hazard category 2).

A mixture is also assigned an aspiration classification if it separates into two or more distinct layers, one of which contains $\geq 10\%$ of an ingredient classified according to either criterion.

A hazard classification relating to aspiration hazards will not generally be applicable for aerosol products. The key consideration for aspiration hazards is whether a pool may be formed in the mouth that can then be aspirated.

Skin irritation/corrosivity

Skin irritation or corrosivity is assigned to a substance based on studies of the local effect of the substance on the skin. If the effect is reversible, then the substance is classified as an irritant. If the effect is irreversible, then the substance is classified as corrosive.

Skin irritant/corrosive classifications are calculated by 'summation'. This is where the concentration of the components that trigger an irritant (class 6.3) or corrosive (class 8.2) classification are summed together. The hazard cut-off levels for mixtures are given in table 6.

When determining the classification of a mixture, it is first necessary to decide whether the mixture is corrosive or not, then work down the table. A weighting system is used whereby the concentration of a corrosive component is multiplied by a factor of 10 before adding its contribution to the calculation as an irritant. This reflects the higher contribution of the corrosive components when assessing the irritancy hazard of a substance.

Table 7: Hazard thresholds for skin irritancy and corrosivity

Sum of components classified as:	Cut-off values/concentrations limits triggering classification of a mixture as category:				
	Skin corrosive			Skin irritant	
	8.2A	8.2B	8.2C	6.3A	6.3B
Category 8.2A, 8.2B or 8.2C (alone or sum)	≥ 5%	≥ 5%	≥ 5%	≥ 1% but < 5%	
Category 6.3A (alone or sum)	-	-	-	≥ 10%	≥ 1% but < 10%
Category 6.3B (alone or sum)	-	-	-	-	≥ 10%
Sum of (10 x Category 8.2A, 8.2B, 8.2C) + Category 6.3A	-	-	-	≥ 10%	≥ 1% but < 10%
Sum of (10 x Category 8.2A, 8.2B, 8.2C) + Category 6.3A + 6.3B	-	-	-	-	≥ 10%

To determine whether a classification should be assigned, start at the top left column of the table and work down.

When the sum of all ingredients classified as category 8.2A, 8.2B or 8.2C is:

- each ≥ 5 percent, then the mixture is classified in the same subclass (for example, if the sum of 8.2A ≥ 5 percent then classify as 8.2A);
- if the sum of 8.2A is < 5 percent but the sum of 8.2A + 8.2B is ≥ 5 percent, then classify the mixture as 8.2B;
- if the sum of 8.2A + 8.2B is < 5 percent but the sum of 8.2A + 8.2B + 8.2C is ≥ 5 percent, then classify the mixture as 8.2C.

For mixtures containing strong acids or bases (where neutralisation has not occurred) the pH should be used as the classification criteria because the pH will be a better indicator of corrosion than will the concentration limits in table 6.

It may be possible to calculate the molar balance of an acid and base in a neutralisation reaction. This would allow the determination of residual acid or base and whether the residual acid or base should trigger a classification in the product.

Table 7 outlines the approach for products where summation does not apply.

Table 8: Hazard thresholds for skin corrosivity (using pH)

Component	Concentration	Mixture classified as:
pH ≤ 2	≥ 1%	8.2A, 8.2B or 8.2C
pH ≥ 11.5	≥ 1%	8.2A, 8.2B or 8.2C

To determine whether a product should be classified as an 8.2A, 8.2B or 8.2C refer to the UN packing group. For skin corrosivity, the UN packing group **typically** corresponds to HSNO categories A, B and C. That is:

- UN Class 8 Packing Group I corresponds to 8.2A;
- UN Class 8 Packing Group II corresponds to 8.2B;
- UN Class 8 Packing Group III corresponds to 8.2C.

Eye irritation/corrosivity

A HSNO class 6.4A (irritancy) or class 8.3A (corrosivity) classification is assigned to a substance based on studies of the effect of the substance on the eye. If the effect is reversible, then the substance is classified as an irritant. If the effect is irreversible, then the substance is classified as corrosive.

In the case of a solid, it is important to distinguish between irritation arising as a result of the chemical properties of the substance, and irritation that may be caused by physical abrasion. The latter hazard should not be assigned a HSNO 6.4A classification.

If a substance is found to be a corrosive in skin studies, it is not necessary to undertake tests to determine effects on the eye, because they will usually be even more marked. That is, a substance that is a skin corrosive will also be an eye corrosive.

Eye irritant/corrosive classifications are calculated by 'summation'. This is where the concentration of the components classified as 6.4A or 8.3A are summed together. The hazard cut-off levels for mixtures are given in table 8.

When determining the classification of a mixture, it is first necessary to decide whether the mixture is corrosive or not, then work down the table. A weighting system is used whereby the concentration of a corrosive component is multiplied by a factor of 10 before adding its contribution to the calculation as an irritant.

Table 9: Hazard thresholds for eye irritancy and corrosivity		
Sum of components classified as:	Cut-off values/concentrations limits triggering classification of a mixture as category:	
	Eye corrosive, 8.3A	Eye irritant, 6.4A
Category 8.3A	≥ 3%	≥ 1% but < 3%
Category 6.4A	-	≥ 10%
Sum of (10 x Category 8.3A) + Category 6.4A	-	≥ 10%
Sum of Category 8.2A, 8.2B, 8.2C + Category 8.3A	≥ 3%	≥ 1% but < 3%
Sum of (10 x Category 8.2A, 8.2B, 8.2C + Category 8.3A) + Category 6.4A	-	≥ 10%

For mixtures containing strong acids or bases (where neutralisation has not occurred), the pH should be used as the classification criteria because the pH will be a better indicator of corrosion than will the concentration limits in table 8.

Table 9 outlines the approach for products where summation does not apply.

Table 10: Hazard thresholds for eye corrosivity (using pH)		
Component	Concentration	Mixture classified as:
pH \leq 2	\geq 1%	8.3A
pH \geq 11.5	\geq 1%	8.3A

It may be possible to calculate the molar balance of an acid and base in a neutralisation reaction. This would allow the determination of residual acid or base and whether the residual acid or base should trigger a classification in the product.

Sensitisation

HSNO Class 6.5A – substances that are **respiratory** sensitisers.

HSNO Class 6.5B – substances that are **contact** sensitisers.

Sensitisation is the potential for the substance to cause an allergic response following exposure by the dermal (contact) or inhalation (respiratory) route. There are various types of allergic reactions, but all involve at least one exposure to initiate the process of sensitisation. The sensitisation response (for example, airway constriction or runny nose for class 6.5A, and skin rash for class 6.5B) occurs on a subsequent exposure to the substance after an immune response has occurred.

A product is given a 6.5 classification if any **individual component** in the mixture that is a sensitiser is present at a concentration that exceeds 0.1 percent (table 10). Components must not be added together.

For example, a product containing Component X, which has a 6.5B classification, at a concentration of 0.17 percent will be assigned a 6.5B classification.

Table 11: Hazard thresholds for sensitisation		
Component HSNO classification	Concentration	Mixture classified as:
6.5A	\geq 0.1%	6.5A
6.5B	\geq 0.1%	6.5B

The generic hazard cut-off values or concentration limits do not apply, if test data demonstrates that the substance causes a sensitisation hazard at a level that differs from the generic hazard cut-off values or concentration limits. For example, BIT (1,2-Benzisothiazol-3(2H)-one), CAS 2634-33-5, is a sensitiser (6.5B) at a concentration as low as 0.05 percent.

If the EPA knows a chemical has a hazard cut-off that is different from 0.1 percent there will be a “note” on the CCID. If there is no note on the CCID but you have information to indicate a different cut-off, you should use the information available to you.

Mutagenicity

HSNO Class 6.6A – substances that are **known or presumed** human mutagens.

HSNO Class 6.6B – substances that are **suspected** human mutagens.

A HSNO class 6.6 is given to substances that do, or may, cause mutations in the germ cells of humans and these mutations can be transmitted to the progeny. However, mutagenicity/genotoxicity tests in vitro and in mammalian somatic cells in vivo are also considered in classifying substances and mixtures within this hazard class.

A product is given a 6.6 classification if any **individual component** in the mixture having a mutagenicity hazard is present at a concentration that exceeds the relevant hazard cut-off in table 11. Components must not be added together.

For example, a product containing Component X, which has a 6.6B classification, at a concentration of 2 percent will be assigned a 6.6B classification.

Table 12: Hazard thresholds for mutagenic toxicants

Component HSNO classification	Category A	Mixture classified as:
6.6A	$\geq 0.1\%$	6.6A
6.6B	$\geq 1\%$	6.6B

Carcinogenicity

HSNO Class 6.7A – substances that are **known or presumed** human carcinogens.

HSNO Class 6.7B – substances that are **suspected** human carcinogens.

The presence of a carcinogenic hazard is generally identified from test animals following prolonged and repeated exposure of the substance by an appropriate route, for a major portion of the animal's lifespan. Such studies generally involve various doses of the substance and looking for the development of neoplastic lesions (tumours) during or after exposure. Human epidemiological studies (if available) that show a substance may have carcinogenic properties can be used to assign a 6.7 classification.

The product is given a 6.7 classification if any **individual component** in the mixture that has a carcinogenic hazard is present at a concentration that exceeds the relevant hazard cut-off in table 12. Components must not be added together.

For example, a product containing Component X, which has a 6.7A classification, at a concentration of 0.15 percent will be assigned a 6.7A classification.

Table 13: Hazard thresholds for carcinogenic toxicants

Component HSNO classification	Concentration	Mixture classified as:
6.7A	$\geq 0.1\%$	6.7A
6.7B	$\geq 0.1\%$	6.7B

Reproductive and developmental effects

Reproductive and developmental toxicity covers the areas of reproduction, fertility and teratogenicity. Fertility can be affected in males and females, and effects can range from slightly decreased reproductive capability and sexual function to complete sterility. Teratogenicity deals with the adverse effects of a substance on the developing embryo and foetus.

HSNO Class 6.8A – substances that are **known or presumed** human reproductive or developmental toxicants.

HSNO Class 6.8B – substances that are **suspected** human reproductive or developmental toxicants.

HSNO Class 6.8C – substances that produce toxic human reproductive or developmental effects on or **via lactation**⁷. Substances with a class 6.8C classification may also be classified as a class 6.8A or 6.8B.

The product is given a 6.8 classification if any **individual component** in the mixture that has reproductive or developmental toxicity is present at a concentration that exceeds the relevant hazard cut-off in table 13. Components must not be added together.

For example, a product containing Component X, which has a 6.8B classification, at a concentration of 0.27 percent will be assigned a 6.8B classification.

Table 14: Hazard thresholds for reproductive toxicants

HSNO classification	Concentration	Mixture classified as:
6.8A	≥ 0.1%	6.8A
6.8B	≥ 0.1%	6.8B
6.8C	≥ 0.1%	6.8C

Specific target organ toxicity

HSNO Class 6.9A – substances that are **toxic** to human target organs or systems.

HSNO Class 6.9B – substances that are **harmful** to human target organs or systems.

Specific target organ toxicity can cause significant effects on the function or morphology of an organ or on the biochemistry or haematology of a human. The effects may be both reversible and irreversible, and arise following repeated or long-term exposure to a substance. The classification of a substance as class 6.9 is only made if the toxic effect is not covered by other specific toxic endpoints (that is, acute toxicity, eye and skin corrosivity/irritation, skin and respiratory sensitisation, carcinogenicity, mutagenicity and reproductive toxicity). These effects can occur by any route that is relevant for humans, principally oral, dermal or inhalation.

The product is given a 6.9 classification if any **individual component** in the mixture that has specific target organ toxicity is present at a concentration that exceeds the relevant hazard cut-off in table 14. Components must not be added together.

⁷ Note that the 6.8C classification refers to a different outcome (lactation); it is not a lower severity of hazard.

For example, a product containing Component X, which has a 6.9A classification, at a concentration of 5 percent will be assigned a 6.9B classification.

Table 15: Hazard thresholds for target organ toxicants

Component HSNO classification	Concentration	Mixture classified as:
6.9A	≥ 10%	6.9A
	≥ 1 but < 10%	6.9B
6.9B	≥ 1%	6.9B

5.4 Ecotoxic properties

Aquatic toxicity

This category applies to substances that are toxic to the aquatic environment. Assessment of an aquatic toxicity hazard is based on the ecotoxicity to fish, algae and crustaceans. The 9.1 classification also takes into consideration bioaccumulation and persistence of the substance in the environment.

HSNO Class 9.1A – substances that are **very ecotoxic** in the aquatic environment.

HSNO Class 9.1B – substances that are **ecotoxic** in the aquatic environment.

HSNO Class 9.1C – substances that are **harmful** in the aquatic environment.

HSNO Class 9.1D – substances that are **slightly harmful** to the aquatic environment or are otherwise designed for **biocidal** action.

The LC_{50} range values for aquatic classification of single component substances are given below. Essentially, if the substance has an LC_{50} :

- ≤ 1 mg/L, the substance is 9.1A;
- > 1 but ≤ 10 mg/L, **and** the substance is bioaccumulative or persistent, the substance is class 9.1B;
- > 10 but ≤ 100 mg/L, **and** the substance is bioaccumulative or persistent, the substance is 9.1C;
- > 1 but ≤ 100 mg/L, **and** the substance is **NOT** bioaccumulative or persistent, the substance is 9.1D.

Reputable sources for the determination of the bioaccumulative and persistent classifications, such as the European Chemical Bureau, must be used.

If there is not enough information that can be used to indicate bioaccumulation and persistence, the default assumption is that the substance is bioaccumulative or persistent.

Fish, crustaceans and algae can be affected differently by a substance. This means substances may have more than one LC_{50} or EC_{50} value, if separate values for the different taxa have been determined. If a substance has more than one value available the lowest LC_{50} or EC_{50} value must be used to calculate the HSNO classification of an individual component.

If a product is a mixture, the category 9.1 classification is calculated by 'summation' of the lowest LC_{50}/EC_{50} values for each component of the substance (these values could be derived from fish, crustacean or algae).

This means a product must have a single 9.1 classification across all taxonomic groups; that is, a separate 9.1 classification is **not** calculated for fish, crustacean and algae. For example, where a product has two components that have a class 9.1 classification: one is a 9.1B (20% of product) based on its toxicity to fish and the second has a 9.1B (10% of product) classification based on its toxicity to crustaceans (but not for fish). The product classification is determined by adding these components together to get 30%, which is greater than 25 %, therefore the product would be classified as 9.1B. If we calculated each taxonomic group separately this mixture would not be a 9.1B.

When calculating the overall HSNO classification of a product that is a mixture a multiplying factor is applied to very ecotoxic ($LC_{50} \leq 0.1$ mg/L or $EC_{50} \leq 0.1$ mg/L) components of the mixture.

The classification criteria can be found in table 15. The multiplying factors for very ecotoxic components are also given. Note that multiplying factors can only apply to components that are classified as 9.1A.

Table 16: Hazard thresholds and multiplying factors for aquatic toxicity

LC_{50}/EC_{50} value (mg/L)		Multiplying factor – M (class 9.1A only)	
$0.1 < L(E)C_{50}$		No multiplying factor	
$0.01 < L(E)C_{50} \leq 0.1$		10	
$0.001 < L(E)C_{50} \leq 0.01$		100	
$0.0001 < L(E)C_{50} \leq 0.001$		1,000	
$0.00001 < L(E)C_{50} \leq 0.0001$		10,000	

Level	Sum of components classified as:	Cut-off	Mixture classified as:
1	$\Sigma(9.1A \times M)$	$\geq 25\%$	9.1A
2	$\Sigma(M \times 10 \times 9.1A) + 9.1B$	$\geq 25\%$	9.1B*
3	$\Sigma(M \times 100 \times 9.1A) + (10 \times 9.1B) + 9.1C$	$\geq 25\%$	9.1C*
4	$9.1A + 9.1B + 9.1C + 9.1D$	$\geq 25\%$	9.1D

*The classification of a mixture is reduced, if the weighted sum of components that are not rapidly degradable or are bioaccumulative is < 25 percent. Therefore, if the components driving the classification are not bioaccumulative and are rapidly degradable then a substance can be downgraded from a 9.1B to a 9.1D. You need to consider the weighted sum at each step of the process.

*Where there is no degradability or bioaccumulation data available for a component we assume that the component is not rapidly degradable or is bioaccumulative.

For example, if component A was present at 2 percent and was classified as 9.1A, and component B was present at 7 percent and was classified as 9.1C, then the following formula should be applied: $(100 \times 9.1A) + 9.1C = 207$ percent, that is, ≥ 25 percent (level 3). The product has a classification of 9.1C if the weighted sum of components that are not rapidly degradable or are bioaccumulative is ≥ 25 percent.

In the above example, if the weighted sum of components that are not rapidly degradable or bioaccumulative is < 25 percent then the classification is downgraded to 9.1D.

Soil toxicity

This category applies to substances that are ecotoxic to the soil environment.

HSNO Class 9.2A – substances that are very ecotoxic in the soil environment.

HSNO Class 9.2B – substances that are ecotoxic in the soil environment.

HSNO Class 9.2C – substances that are harmful in the soil environment.

HSNO Class 9.2D – substances that are slightly harmful in the soil environment.

A 9.2 classification applies to a substance that meets the criteria in table 16.

Table 17: Soil classification for a single component substance		
Classification	Acute EC_{50}	Soil $DT_{50} > 30$ days*
9.2A	≤ 1 mg/kg	Not applicable
9.2B	> 1 and ≤ 10 mg/kg	Not applicable
9.2C	> 10 and ≤ 100 mg/kg	Yes
9.2D	> 10 and ≤ 100 mg/kg	No

* Where no data on degradation assume that the substance has a $DT_{50} > 30$ days.

For products that are mixtures, category 9.2 classifications are calculated by 'summation'. The classifications of all **components can be added together** if one of the components is not at a high enough concentration to trigger a classification by itself. Where there is no component data available for this classification, this classification cannot be applied.

When calculating the overall HSNO classification of a product that is a mixture a multiplying factor is applied to the components of the mixture that have a very high soil ecotoxicity ($EC_{50} \leq 0.1$ mg/kg).

The classification criteria can be found in table 17. The multiplying factors for components with very high soil toxicity are also given.

Table 18: Hazard thresholds and multiplying factors for soil toxicity	
EC_{50} value (mg/kg dry weight solid)	Multiplying factor – M (class 9.2A only)
$0.1 < EC_{50}$	No multiplying factor
$0.01 < EC_{50} \leq 0.1$	10
$0.001 < EC_{50} \leq 0.01$	100
$0.0001 < EC_{50} \leq 0.001$	1,000
$0.00001 < EC_{50} \leq 0.0001$	10,000

Level	Sum of components classified as:	Cut-off	Mixture classified as:
1	$\Sigma(9.2A \times M)$	$\geq 25\%$	9.2A
2	$\Sigma(M \times 10 \times 9.2A) + 9.2B$	$\geq 25\%$	9.2B
3	$\Sigma(M \times 100 \times 9.2A) + (10 \times 9.2B) + 9.2C$	$\geq 25\%$	9.2C*
4	$9.2A + 9.2B + 9.2C + 9.2D$	$\geq 25\%$	9.2D

* If the weighted sum of components with $DT_{50} > 30$ days (or no data on degradation) is < 25 percent then classify as 9.2D.

For example, if component A was present at 2 percent and was classified as 9.2B, and component B was present at 7 percent and was classified as 9.2C, then the following formula should be applied: $(10 \times 9.2B) + 9.2C = 27\%$, that is, ≥ 25 percent (level 3). The product has a classification of 9.2C if the DT_{50} of both components is > 30 days.

In the above example, if one of the components has a DT_{50} of < 30 days then the classification is downgraded to 9.2D. This is because the weighted sum of components with $DT_{50} > 30$ days would be < 25 percent.

Terrestrial vertebrate toxicity

This category applies to substances that are ecotoxic to terrestrial vertebrates. This classification applies to both mammalian and avian ecotoxicities.

HSNO Class 9.3A – substances that are **very ecotoxic** to terrestrial vertebrates.

HSNO Class 9.3B – substances that are **ecotoxic** to terrestrial vertebrates.

HSNO Class 9.3C – substances that are **harmful** to terrestrial vertebrates.

A 9.3 classification applies to a substance that meets the criteria in table 18.

Table 19:	Terrestrial vertebrate hazard classification of a single component substance
Classification	Acute LD_{50}
9.3A	≤ 50 mg/kg bw (oral or dermal) or ≤ 500 ppm (diet)
9.3B	$50 < LD_{50} \leq 500$ mg/kg bw; or $500 < LD_{50} \leq 1,000$ ppm (diet)
9.3C	$500 < LD_{50} \leq 2,000$ mg/kg bw; or $1,000 < LD_{50} \leq 5,000$ ppm (diet); or A chronic MATAC ≤ 100 ppm (diet), but which does not meet the criteria for classifications 9.3A or 9.3B

For products that are mixtures, category 9.3 classifications are calculated by 'summation'. The classifications of all **components can be added together** if one of the components is not at a high enough concentration to trigger a classification by itself.

When calculating the overall HSNO classification of a product that is a mixture a multiplying factor is applied to the components of the mixture which have a very high terrestrial vertebrate ecotoxicity ($LD_{50} \leq 5 \text{ mg/kg bw}$ or $LC_{50} \leq 50 \text{ ppm}$).

The classification criteria can be found in table 19. The multiplying factors for components with very high terrestrial vertebrate toxicity are also given.

Table 20: Hazard thresholds and multiplying factors for terrestrial vertebrate toxicity			
LD_{50} (mg/kg bw) – oral / dermal		LC_{50} (ppm) - diet	Multiplying factor M (class 9.3A only)
$5 < LD_{50}$		$50 < LC_{50}$	No multiplying factor
$0.5 < LD_{50} \leq 5$		$5 < LC_{50} \leq 50$	10
$0.05 < LD_{50} \leq 0.5$		$0.5 < LC_{50} \leq 5$	100
$0.005 < LD_{50} \leq 0.05$		$0.05 < LC_{50} \leq 0.5$	1,000
$0.0005 < LD_{50} \leq 0.005$		$0.005 < LC_{50} \leq 0.05$	10,000

Level	Sum of components classified as:	Cut-off	Mixture classified as:
1	$\Sigma(9.3A \times M)$	$\geq 25\%$	9.3A
2	$\Sigma(M \times 10 \times 9.3A) + 9.3B$	$\geq 25\%$	9.3B
3	$\Sigma(M \times 100 \times 9.3A) + (10 \times 9.3B) + 9.3C$	$\geq 25\%$	9.3C

For example, if component A was present at 7 percent and was classified as 9.3B, and component B was present at 20 percent and was classified as 9.3C, then the following formula should be applied: $(9.3B \times 10) + 9.3C = 90$ percent, that is, ≥ 25 percent (level 3). Therefore the product has a classification of 9.3C.

Terrestrial invertebrate toxicity

This category identifies substances that are ecotoxic to terrestrial invertebrates.

HSNO Class 9.4A – substances that are **very ecotoxic** to terrestrial invertebrates.

HSNO Class 9.4B – substances that are **ecotoxic** to terrestrial invertebrates.

HSNO Class 9.4C – substances that are **harmful** to terrestrial invertebrates.

A 9.4 classification applies to a substance that meets the criteria in table 20.

Table 21: Terrestrial invertebrate hazard classification of a single component substance	
Classification	Acute LD_{50}
9.4A	$< 2 \mu\text{g/terrestrial invertebrate}$
9.4B	$2 \leq LD_{50} < 11 \mu\text{g/terrestrial invertebrate}$
9.4C	$11 \leq LD_{50} < 25 \mu\text{g/terrestrial invertebrate}$

For products that are mixtures, category 9.4 classifications are calculated by 'summation'. The classifications of all **components can be added together** if one of the components is not at a high enough concentration to trigger a classification by itself. Where there is no component data available for this classification this classification cannot be applied.

When calculating the overall HSNO classification of a product that is a mixture a multiplying factor is applied to the components of the mixture which have a very high terrestrial invertebrate ecotoxicity ($LD_{50} \leq 0.2 \mu\text{g}$).

The classification criteria can be found in table 21. The multiplying factors for components with very high terrestrial invertebrate ecotoxicity are also given.

Table 22: Hazard thresholds and multiplying factors for terrestrial invertebrate toxicity		
$LD_{50}(\mu\text{g/terrestrial invertebrate})$		Multiplying factor – M (class 9.4A)
$0.2 < LD_{50}$		No multiplying factor
$0.02 < LD_{50} \leq 0.2$		10
$0.002 < LD_{50} \leq 0.02$		100
$0.0002 < LD_{50} \leq 0.002$		1,000
$0.00002 < LD_{50} \leq 0.0002$		10,000

Level	Sum of components classified as:	Cut-off
1	$\Sigma(9.4A \times M)$	$\geq 25\%$
2	$\Sigma(M \times 10 \times 9.4A) + 9.4B$	$\geq 25\%$
3	$\Sigma(M \times 100 \times 9.4A) + (10 \times 9.4B) + 9.4C$	$\geq 25\%$

For example, if component A was present at 15 percent and was classified as 9.4B, and component B was present at 9 percent and was classified as 9.4C, then the following formula should be applied: $(10 \times 9.4B) + 9.4C = 159\%$, that is, ≥ 25 percent (level 3). Therefore the product has a classification of 9.4C.

Biocidal classification

A 9.1D biocidal classification applies to a product that meets the following criteria.

A product that is designed for biocidal action, other than a product that is designed for biocidal action against a virus, protozoan, bacterium or an internal organism in humans or in other vertebrates, but does not otherwise meet the criteria for any hazard classification in class 9.

What this means is that a substance that is designed to kill, other than a substance that is designed for biocidal action against a virus, protozoan, bacterium or an internal organism in humans or in other vertebrates, that does not already trigger any class 9 classification, is given a default 9.1D classification.

For example, a fungicide that did not meet the criteria to trigger any class 9 classification would be given a 9.1D biocide classification. However, when added to a paint to prevent fungus growing in the paint, then the paint would not be considered biocidal (because it is not designed for biocidal action).

Classifying from hazard information

In the absence of product data or full composition data, it is acceptable to classify substances using information provided on an SDS, such as R-phrases and GHS categories.

To classify your product based on R-phrases or hazard statements, use appendix 4 to convert the R-phrases or hazard statements (or words similar to the hazard statements) to HSNO equivalent classifications. Use appendix 5 to classify your products based on GHS categories.

R-phrases for physical hazards are not easily translated to HSNO classifications; the UN classifications will be more useful because they are more closely aligned to HSNO classifications. Some classifications are indicated by the UN packing group, and should be used as a guide when assigning the category of certain hazards.

Labelling and safety data sheet requirements

If you import, manufacture or supply a hazardous product you must ensure that your product label and safety data sheet (SDS) have the correct information on them. The type of information that is required depends on the classification of your product and its hazardous components. Identifying the hazards of your product is one of the things you need to do.

If your product is classified as a toxic or corrosive substance not all the components of your product need to be shown on a label or safety data sheet (SDS). The toxic or corrosive components of your product must be identified on your product label or SDS, if they exceed the amounts specified in table 22.

Table 23: Cut-off levels for identifying hazardous components on product labels and SDSs			
Hazard Category	Classification cut-off (%)	Label identification cut-off (%)	Safety data sheet cut-off (%)
6.1A-D	various	various ^a	various ^a
8.2A, B or C	Summation of all components 5%	5% ^a	5% ^a
8.3A	3%	3% ^a	3% ^a
6.5A	0.1	0.1 ^b	0.1
6.5B	0.1	0.1 ^b	0.1
6.6A	0.1	0.1	0.1
6.6B	1	1	1
6.7A	0.1	0.1	0.1
6.7B	0.1	1	0.1
6.8A	0.1	0.3	0.1
6.8B	0.1	3	0.1
6.8C	0.1	0.3	0.1
6.9A ^c	1	10	1
6.9B ^c	1	10	1

- A component will only need to be identified on a label or SDS if it triggers a toxic (class 6), skin corrosive (8.2) or eye corrosive (8.3) classification on its own.
- The target organ also needs to be identified.
- The concentration cut-offs may vary if test data show that a product is hazardous at a concentration that is different to the classification cut-off value. For example, if your product is sensitising at 0.05 percent, the sensitising component must be identified on the label and SDS.

Appendix 1: Group standard categories and their HSNO approval numbers

The categories of group standards issued by the Authority are:

Active ingredients used for the manufacture of agricultural compounds

Additives, process chemicals and raw materials

Aerosols

Agricultural compounds

Animal nutritional and animal care products

Class 4 substances

Cleaning products

Compressed gas mixtures

Construction products

Corrosion inhibitors

Cosmetic products

Denatured ethanol

Dental products

Embalming products

Fertilisers

Fire fighting chemicals

Food additives and fragrance materials

Fuel additives

Graphic materials

Laboratory chemicals and reagent kits

Leather and textile products

Lubricants

Metal industry products

Not Otherwise Specified (N.O.S.) substances

Oxidising substances (class 5.1.1) and organic peroxides (class 5.2)

Pharmaceutical active ingredients

Pheromone containing products

Photographic chemicals

Polymers

Refining catalysts

Solvents

Surface coatings and colourants

Tattoo inks

Veterinary medicines

Water treatment chemicals

To find an up to date list of all the group standards refer to:

<http://www.epa.govt.nz/hazardous-substances/approvals/group-standards/Pages/default.aspx>

A full list of the group standards approved under the HSNO Act as of May 2013:

Group standards	HSNO approval number	Examples of products
Active Ingredients for Use in the Manufacture of Agricultural Compounds Group Standard 2012	HSR100756	
Additives, process chemicals and raw materials	Combustible HSR002490 Corrosive HSR002491 Corrosive, Combustible HSR002492 Corrosive, Toxic [6.7] HSR002493 Corrosive, Combustible, Toxic [6.7] HSR002494 Flammable HSR002495 Flammable, Corrosive HSR002496 Flammable, Corrosive, Toxic [6.7] HSR002497 Flammable, Toxic [6.1 + 6.7] HSR002498 Flammable, Toxic [6.1 + 6.7], Corrosive HSR002499 Flammable, Toxic [6.1] HSR002500 Flammable, Toxic [6.1], Corrosive HSR002501 Flammable, Toxic [6.7] HSR002502 Subsidiary hazard HSR002503 Toxic [6.1 + 6.7] HSR002504 Toxic [6.1 + 6.7], Combustible HSR002505 Toxic [6.1 + 6.7], Corrosive HSR002506 Toxic [6.1 + 6.7], Corrosive, Combustible HSR002507 Toxic [6.1] HSR002508 Toxic [6.1], Combustible HSR002509 Toxic [6.1], Corrosive HSR002510 Toxic [6.1], Corrosive, Combustible HSR002511 Toxic [6.7] HSR002512 Toxic [6.7], Combustible HSR002513	
Aerosols	Corrosive HSR002514 Flammable HSR002515 Flammable, Corrosive HSR002516 Flammable, Toxic HSR002517 Non-hazardous HSR002518 Subsidiary hazard HSR002519 Toxic [6.7] HSR002520	Oven cleaners Stainless steel cleaners Furniture cleaners Air fresheners Aerosol primers Lubricants for medical devices
Agricultural compounds special circumstances	HSR100592	
Animal nutritional and animal care products	HSR002521	Animal shampoos Nutritional supplements Vitamin supplements Performance enhancing supplements for racing animals

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Group standards	HSNO approval number	Examples of products
Class 4 substances	Class 4 Substances HSR002522 Class 4, Toxic [6.1] HSR002523 Class 4, Toxic [6.7] HSR002524	
Cleaning products	Combustible HSR002525 Corrosive HSR002526 Corrosive, Combustible HSR002527 Flammable HSR002528 Flammable, Corrosive HSR002529 Subsidiary hazard HSR002530 Toxic [6.7] HSR002531 Oxidising HSR002590 Oxidising, Corrosive HSR002591 Combustible, Toxic [6.7] HSR002651 Corrosive, Toxic [6.7] HSR002588 Flammable, Toxic [6.7] HSR002589 Toxic [6.1 +6.7] HSR002592 Toxic [6.1] HSR002593 Toxic [6.1], Combustible HSR002594 Toxic [6.1], Corrosive HSR002595	Degreasers Dishwashing products Disinfectants Hand sanitizer Shower cleaner Toilet cleaner Washing powder Industrial cleaning products Agricultural cleaning products Odour masking substances Caustic cleaning products Outdoor cleaner for removal of algae, mould, mildew Disinfectants for use in agriculture Furniture polish
Compressed gas mixtures	Flammable HSR002532 Non-hazardous HSR002533 Oxidising HSR002534 Subsidiary hazard HSR002535 Toxic [6.1] HSR002536 Toxic [6.1], Corrosive HSR002537 Toxic [6.1], Flammable HSR002538 Toxic [6.1], Flammable, Corrosive HSR002539 Toxic [6.1], Oxidising HSR002540 Toxic [6.1], Oxidising, Corrosive HSR002541	Gases used in agriculture or engineering Refrigerant gases
Construction products	Corrosive HSR002542 Corrosive, Toxic [6.7] HSR002543 Subsidiary hazard HSR002544 Toxic [6.7] HSR002545	Cement dispersing agents
Corrosion inhibitors	Combustible HSR002546 Corrosive HSR002547 Flammable HSR002548 Subsidiary hazard HSR002549 Toxic [6.1] HSR002550 Toxic [6.7] HSR002551	Water treatment inhibitors Anti-rust products Film-formers Oxygen scavengers

Group standards	HSNO approval number	Examples of products
Cosmetic products	HSR002552	Body wash Shampoo Hand sanitizer Hair gel Sunscreen Cleansing wipes Nappy cream
Denatured ethanol	HSR002553	Methylated spirits
Dental products	Combustible HSR002554 Corrosive HSR002555 Flammable HSR002556 Oxidising HSR002557 Subsidiary hazard HSR002558 Toxic [6.1], Corrosive HSR002559 Toxic [6.7] HSR002560	Teeth whitener Teeth whitening strips Products that treat dental conditions
Embalming products	Combustible HSR002561 Corrosive HSR002562 Flammable HSR002563 Flammable, Toxic [6.1], Corrosive HSR002564 Subsidiary hazard HSR002565 Toxic [6.1], Corrosive HSR002566 Toxic [6.1], Corrosive, Combustible HSR002567 Toxic [6.7] HSR002568	Embalming powders, Embalming adhesives Embalming fragrances Embalming fluids
Fertilisers	Corrosive HSR002569 Oxidising HSR002570 Subsidiary hazard HSR002571 Toxic [6.1] HSR002572	Fertilisers for domestic or agricultural use
Fire fighting chemicals	HSR002573	Fire-fighting foams Fire-retardant chemicals
Food additives and fragrance materials	Combustible HSR002574 Corrosive HSR002575 Flammable HSR002576 Flammable, Toxic [6.1] HSR002577 Subsidiary hazard HSR002578 Toxic [6.1] HSR002579 Toxic [6.1], Combustible HSR002580	Plug in scent releasers Fragrant mist sprayers Animal repellents Additives that affect the food's make up
Fuel additives	Combustible HSR002581 Corrosive HSR002582 Flammable HSR002583 Flammable, Toxic [6.7] HSR002584 Subsidiary hazard HSR002585 Toxic [6.7] HSR002586 Toxic [6.7], Combustible HSR002587	Fuel additive packages Corrosion inhibitors Fuel detergents Anti-knock agents Combustion improvers

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Group standards	HSNO approval number	Examples of products
Graphics materials	HSR008053	Children's graphics materials: crayons, finger paints, water colour paints, pastels, chalk, coloured pencils, felt pens
Laboratory chemicals and reagent kits	HSR002596 Class 4 HSR002692 Oxidising [5.1.1] HSR002693 Reagent kits HSR002647	Chemicals/ reagents used for analytical and diagnostic test kits
Leather and textile products	Combustible HSR002597 Corrosive HSR002598 Flammable HSR002599 Subsidiary hazard HSR002600 Toxic [6.7] HSR002601	Leather fungicides Leather flame retardants Shoe shine products Leather tanning agents Leather softening agents
Lubricants	Combustible HSR002602 Flammable HSR002603 Flammable, Toxic [6.7] HSR002604 Low hazard HSR002605 Subsidiary hazard HSR002606 Toxic [6.7] HSR002607 Toxic [6.7], Combustible HSR002608	Conveyor lubricants Insulating lubricants Hydraulic lubricants Brake fluids Coolants and antifreeze agents Metalworking fluids and pastes
Metal industry products	Corrosive HSR002609 Corrosive, Toxic [6.7] HSR002610 Flammable HSR002611 Subsidiary hazard HSR002612 Toxic [6.1 + 6.7] HSR002613 Toxic [6.1] HSR002614 Toxic [6.1], Corrosive HSR002615 Toxic [6.7] HSR002616	Lubricating oil for metalwork Substances used for electroplating Welding substances
Not Otherwise Specified (N.O.S.) substances	HSR002617 HSR002618 HSR002619 HSR002620 HSR002621 HSR002622 HSR002623 HSR002624 HSR002625 HSR002626 HSR002627 HSR002628	These are closed group standards. They were created for the purpose of transferring these products only and cannot be used as an approval for a new hazardous substance.

Group standards	HSNO approval number	Examples of products
Oxidising substances (class 5.1.1) and organic peroxides (class 5.2)	Organic peroxides HSR002629 Organic peroxides, Corrosive HSR002630 Oxidising HSR002631 Oxidising, Corrosive HSR002632 Oxidising, Toxic [6.1 + 6.7], Corrosive HSR002633 Oxidising, Toxic [6.1] HSR002634 Organic peroxides, Toxic [6.1], Corrosive HSR100055	Water treatment chemicals/ biocides Rocket propellant
Pharmaceutical active ingredients	HSR100425	Active ingredients used in the manufacture of pharmaceuticals
Pheromone containing products	HSR100628	Pheromone containing products that are used to disrupt the behaviour of insects
Photographic materials	Combustible HSR002635 Corrosive HSR002636 Flammable HSR002637 Subsidiary hazard HSR002638 Toxic [6.7] HSR002639	Developers, bleaches Fixing agents, stabilisers Drying aids Replenishers starters Reversing agents Neutralisers Accelerators Desensitisers Anti-fogging agents
Polymers	Combustible HSR002640 Flammable HSR002641 Flammable, Corrosive HSR002642 Flammable, Toxic [6.7] HSR002643 Subsidiary hazard HSR002644 Toxic [6.1] HSR002645 Toxic [6.7] HSR002646	Polymers used as components/ raw materials of a formulated or manufactured polymer product
Refining catalysts	HSR002648	Catalysts used in the petrochemical industry for the refinement of crude oil and fuel Catalysts in methanol production and ammonia purification

Group standards	HSNO approval number	Examples of products
Solvents	Combustible HSR002649 Flammable HSR002650 Flammable, Toxic [6.7] HSR002652 Subsidiary hazard HSR002653 Toxic [6.1] HSR002654 Toxic [6.7] HSR002655 Toxic [6.7], Combustible HSR002656	Industrial solvents Laboratory chemicals Paint strippers
Surface coatings and colourants	Combustible HSR002657 Corrosive HSR002658 Corrosive, Combustible HSR002659 Corrosive, Toxic [6.7] HSR002660 Corrosive, Toxic [6.7], Combustible HSR002661 Flammable HSR002662 Flammable, Corrosive HSR002663 Flammable, Corrosive, Toxic [6.7] HSR002664 Flammable, Toxic [6.1 + 6.7] HSR002665 Flammable, Toxic [6.1 + 6.7], Corrosive HSR002666 Flammable, Toxic [6.1] HSR002667 Flammable, Toxic [6.1], Corrosive HSR002668 Flammable, Toxic [6.7] HSR002669 Subsidiary hazard HSR002670 Toxic [6.1 + 6.7] HSR002671 Toxic [6.1 + 6.7], Combustible HSR002672 Toxic [6.1 + 6.7], Corrosive HSR002673 Toxic [6.1 + 6.7], Corrosive, Combustible HSR002674 Toxic [6.1] HSR002675 Toxic [6.1], Combustible HSR002676 Toxic [6.1], Corrosive HSR002677 Toxic [6.1], Corrosive, Combustible HSR002678 Toxic [6.7] HSR002679 Toxic [6.7], Combustible HSR002680	Paints Adhesives Lacquers Pigments Raw materials used in manufacture of surface coatings Varnish
Tattoo inks	HSR100580	
Veterinary medicines	Limited pack size, Finished dose HSR100757 Non-dispersive Closed System Application HSR100758 Non-dispersive Open System Application HSR100759	
Water treatment chemicals	Corrosive HSR002681 Flammable HSR002682 Oxidising HSR002683 Subsidiary hazard HSR002684 Toxic [6.1] HSR002685 Toxic [6.1], Corrosive HSR002686 Toxic [6.7] HSR002687	Aquarium products for water treatment Swimming pool chemicals

Appendix 2: New Zealand Inventory of Chemicals (NZIoC)

With a few exceptions, group standards contain the following 'notification' condition⁸.

- (1) Where a substance is imported into, or manufactured in, New Zealand, contains a hazardous chemical that is not listed on the Inventory of Chemicals, then the importer or manufacturer of the substance must at the time they first import or manufacture the substance, notify the Authority in writing of—
 - (a) the name of the substance; and
 - (b) the HSNO approval number and/or title of the Group Standard under which the substance has a deemed approval; and
 - (c) the name and CAS number of the chemical not listed on the Inventory of Chemicals that is present in the substance; and
 - (d) the concentration of that chemical in the substance; and
 - (e) the hazardous properties of the chemical, including the provision of the relevant hazard data used to assign the substance to the Group Standard; and
 - (f) the proposed use of the substance.

A chemical is defined as:

... any element or compound in its natural state or obtained by any production process, including any impurities and any additive necessary to preserve the stability of the chemical, but excluding any solvent which may be separated without affecting the stability of the chemical or change its composition.

The operational policies and procedures document for the NZIoC can be found on the EPA website at the following address: <http://www.epa.govt.nz/Publications/pp-nzioc-March-07.pdf>.

To check if all the components in your product are on the NZIoC you can search the inventory on the EPA website at the following address: <http://www.epa.govt.nz/search-databases/Pages/nzioc-search.aspx/search-databases/Pages/nzioc-search.aspx>.

Example: NZIoC search

Step 1: Enter substance name or CAS number

New Zealand Inventory of Chemicals (NZIoC)

The NZIoC is a database of all the hazardous chemical components of products approved under group standards.

Many group standards require the hazardous components of products covered under these approvals to be listed on the NZIoC. If you have a new product, you can check whether you comply with the group standard condition.

For further information on the NZIoC including details on how to notify a new chemical component, updates to the database, and the operational policies and procedures, see:

- About the New Zealand Inventory of Chemicals (NZIoC)

Search the NZIoC

CAS Number

Search ?

⁸ The exceptions are the Cosmetics Products Group Standard 2006, fragrance materials covered by the Food Additives and Fragrance Materials Group Standards 2006 and the N.O.S. Group Standards 2006.

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Step 2: Inventory status of the search substance is displayed

Hexane

CAS Number:	110-54-3
Synonyms:	n-Hexane
Approval Status:	HSNO Approval Code HSR001166
Restrictions / Exclusions:	
Date Added to Inventory:	1/12/2006

Approval status

There are three options associated with the approval status:

1. Where a substance has an individual HSNO approval. The HSNO approval code will be displayed.
2. The substance is present in New Zealand in its own right but does not have an individual approval. These substances can be used as single component products under an appropriate group standard approval. For example CAS 100085-40-3.
3. The substance can only be used as a component in a product assigned to a group standard approval. It cannot be used as a product in its own right. For example, CAS 1000-90-4.

Restrictions and exclusions

Where a substance has specific restrictions or exclusions under a group standard approval, these will be shown.

Appendix 3: Keeping a record

When a manufacturer or importer of a product assigns that substance to an existing approval, a record of the self-classification and assignment must be made. This is irrespective of whether the manufacturer or importer classifies the product themselves, or they have it done on their behalf.

This record must be kept by the importer or manufacturer and must be available for inspection at the request of a HSNO enforcement officer. The record must contain sufficient information to allow for third party verification of the product classification and the approval a product has been assigned.

This appendix provides a template that can be used to prepare a record. A copy of this template is available as a word document from the EPA website. (<http://www.epa.govt.nz/Publications/form-hs-gs-record.doc>) While it is not mandatory to use it, the template sets out the minimum standard of information that should be kept on any record.

There is no requirement to provide a copy of this record to the EPA.

If the importer or manufacturer of a product has chosen not to self-classify their product, and has used the classification service provided by the EPA, they will have received a letter from the EPA advising of the product classification and approval under which the product is approved. This letter is the record, and a further record in the format recommended in this appendix does not need to be kept.

Record of approval assignment

A copy of this record does not need to be provided to EPA.

This record should be retained by the importer or manufacturer of the product. It must be available for inspection if requested by a HSNO enforcement officer.

The importer or manufacturer may find it useful to give a copy of this record (or the non-confidential parts of this record) to companies to whom this product is supplied. If they do not, they must, as a minimum, advise that the product they are supplying is HSNO approved and give the approval number and name of the group standard or individual approval under which the product is approved. This information could be provided on the safety data sheet (SDS).

The assessor is the person who classifies the substance, assigns it to an approval and completes this record of assignment.

Product Name:	
Product Type/Use:	
Company Name:	Contact Name:
Company Address:	
Name and company of Assessor:	

Product assigned to (HSR number and name of group standard or approval):

Signature of Assessor _____

HSNO classification of Product: _____

Primary hazards of group standard assigned to: _____

HSNO classification of individual approval assigned to: _____

Was this product classified using:

- ☐ Full composition
- ☐ GHS categories
- ☐ R-Phrases
- ☐ Other – please specify

Does the use of the product meet that specified for the HSNO approval?

- ☐ Yes ☐ No

⁹ Products assigned to an individual substance approval must have the same hazard profile as that approval. For example, if your product is classified as a substance with the following hazards: 6.1E, 6.3A and 6.4A. The approval your product is assigned to must also be classified as 6.1E, 6.3A and 6.4A.

Classifying from Composition

For guidance on how to classify a product from its composition, refer to section 5 of the document *Assigning a Product to a HSNO Approval*

The full composition of the product must be recorded in the table below.

CAS number	Component name	Function of component	Concentration of component (g/L or g/kg)	Percentage of component
Total percentage				

The full composition of the product must add up to 100 percent.

Calculating the HSNO classification

The calculations used to derive the HSNO classifications must be shown. You should record these on additional paper and attach to this form.

You must:

1. Clearly set out all your calculations.
2. List all your assumptions used to determine the HSNO classification.
3. List all databases/references consulted to determine the HSNO classification.

Each HSNO hazardous property must be considered. Sometimes there is no, or insufficient, data to determine whether one or more HSNO hazardous property is triggered. In this instance, the property is not triggered. The attached working should indicate what data, if any, was located and comment on where there was insufficient data to assign the classification.

These calculations and assumptions must be attached and form part of the record.

If you are classifying from GHS Categories, R-phrases or other hazard property information, this suggests that you do not know the composition of the product for it to be classified from compositional data.

Classifying from compositional data is preferred over the use of GHS Categories or R-phrases.

Do you have information on the composition of the product?

☐ Yes ☐ No

If you have to classify from GHS Categories, R-phrases or use other hazard information, you will need a current version of the SDS for the product. The SDS should list any hazardous properties of the product and its components. As best practice, the SDS that you use should have been prepared within the last five years. If it is older than this, then obtain a current version

For guidance on converting R-phrases to their equivalent HSNO classification, refer to section 6 and appendix 4 of the document *Assigning a Product to a HSNO Approval*

For guidance on converting GHS categories to their equivalent HSNO classification, refer to section 6 and appendix 5 of the document *Assigning a Product to a HSNO Approval*.

When classifying by conversion from GHS categories or R-phrases, you must complete the following table.

A full copy of the safety data sheet must be attached and forms part of the record.

[illegible]

Appendix 4: R-phrases and HSNO equivalents

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This appendix sets out the conversion of R-phrases to their HSNO equivalent. R-phrases should be available from a safety data sheet.

In some cases, there is not a direct correlation between R-phrases and HSNO classifications; some R-phrases cross the threshold for two HSNO classifications. Expert judgement may be required, preferably based on the data that trigger the R-phrases. In some instances, other information may be available (such as the UN packing group) that can be used to determine which HSNO classification should be chosen.

Physical hazards

Hazard phrases reflect UN classifications, and UN classifications relate directly to HSNO classifications. Use the UN classifications, not R-phrases, to translate to HSNO classifications.

Toxicological hazards

R-phrases/Hazard statement		R-phrases details (where needed)	HSNO classification			Default HSNO
R20	Harmful by inhalation		6.1C	6.1D		6.1D for particulates/aerosols/mists 6.1C for vapours
R21	Harmful in contact with skin		6.1C	6.1D		6.1D
R22	Harmful if swallowed		6.1C	6.1D		6.1D
R23	Toxic by inhalation		6.1B	6.1C		6.1C dust/mists 6.1B for vapour
R24	Toxic in contact with skin		6.1B	6.1C		6.1C
R25	Toxic if swallowed		6.1B	6.1C		6.1C
R26	Very toxic by inhalation		6.1A	6.1B		6.1A if PGI 6.1B if PGII
R27	Very toxic in contact with skin		6.1A			6.1A
R28	Very toxic if swallowed		6.1A	6.1B		6.1A if PGI 6.1B if PGII
R29	Contact with water liberates toxic gas	Details suggest toxic/very toxic gas	6.1A	6.1B	6.1C	6.1A if PGI 6.1B if PGII 6.1C if PGIII
R30	Can become highly flammable in use					No HSNO equivalent

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R-phrase/Hazard statement		R-phrase details (where needed)	HSNO classification			Default HSNO
R31	Contact with acid liberates toxic gas					No HSNO equivalent
R32	Contact with acid liberates very toxic gas					No HSNO equivalent
R33	Danger of cumulative effects	Suggest apply when accumulation is likely and may cause concern, but not sufficient to justify R48	6.9B			6.9B
R34	Causes burns		8.2B	8.2C	8.3A	8.2B & 8.3A if PGII 8.2C & 8.3C if PGIII
R35	Causes severe burns		8.2A			8.2A, 8.3A
R36	Irritating to eyes		6.4A			6.4A
R37	Irritating to respiratory system		6.1E			6.1E
R38	Irritating to skin		6.3A	6.3B		6.3A
R39	Danger of very serious irreversible effects	Toxic and very toxic substances causing irreversible effects other than CMR, by a single exposure	6.9A			6.9A
R40	Limited evidence of a carcinogenic effect		6.7B			6.7B
R41	Risk of serious damage to eyes		8.3A			8.3A
R42	Sensitisation by inhalation		6.5A			6.5A
R43	Sensitisation by skin contact		6.5B			6.5B
R44	Risk of explosion if heated under confinement		–			Check UN number
R45	May cause cancer		6.7A			6.7A
R46	May cause heritable genetic damage		6.6A			6.6A

R-phrases/Hazard statement		R-phrases details (where needed)	HSNO classification			Default HSNO
R47	May cause birth defects					Superseded
R48	Danger of serious damage to health by prolonged exposure		6.9A	6.9B		6.9A if T (EU) 6.9B if Xn (EU)
R49	May cause cancer by inhalation		6.7A			6.7A
R60	May impair fertility	Cat 1 and 2	6.8A			6.8A
R61	May cause harm to the unborn child	Cat 1 and 2	6.8A			6.8A
R62	Possible risk of impaired fertility	Cat 3	6.8B			6.8B
R63	Possible risk of harm to the unborn child	Cat 3	6.8B			6.8B
R64	May cause harm to breast-fed babies		6.8C			6.8C
R65	Harmful: may cause lung damage if swallowed		6.1E			6.1E
R66	Repeated exposure may cause skin dryness or cracking.					Essentially defatting No HSNO equivalent
R67	Vapours may cause drowsiness and dizziness					No HSNO equivalent
R68	Possible risk of irreversible effects		6.6B	6.9A	6.9B	6.9B or 6.6B

Environmental hazards			
R-phrases/Hazard statement		HSNO classification	Default
R50	Very toxic to aquatic organisms	9.1A	9.1A
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment	9.1A	9.1A
R51	Toxic to aquatic organisms	9.1D	9.1D (but if no data on aquatic fate then 9.1B)
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment	9.1B 9.1D	9.1B
R52	Harmful to aquatic organisms	9.1D	9.1D unless there is no data to indicate the substance is rapidly degradable or not bioaccumulative in which case 9.1C applies
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment	9.1C	9.1C
R53		9.1D	9.1D
R54, R55, R56, R57, R58		No HSNO equivalent	No data (There are no criteria for these R-phrases and therefore we cannot determine HSNO equivalents)

In order to indicate route of administration/exposure, combinations of numbers are often used.

R48/20 = Danger of serious damage to health by prolonged exposure if inhaled.

This does not mean the substance is classified as R20. So R20 should not be applied, the HSNO classification assigned would be 6.9A.

Where more than one exposure route causes harm, all exposure routes are indicated. R48/20/21/22 = Danger of serious damage to health by prolonged exposure if inhaled, in contact with skin or swallowed. The HSNO classification assigned would also be 6.9A.

Appendix 5: Correlation between GHS categories and HSNO hazard classifications

A5

This appendix sets out the conversion of GHS categories to their HSNO equivalent. GHS categories should be available from a safety data sheet.

Physical hazards		
Class	GHS Category	HSNO classification
Explosives	Unstable explosives	a
	Division 1.1	1.1
	Division 1.2	1.2
	Division 1.3	1,3
	Division 1.4	1.4
	Division 1.5	1.5
	Division 1.6	1.6
Flammable gases	Category 1	2.1.1A
	Category 2	2.1.1B
Flammable aerosols	Category 1	2.1.2A ^b
	Category 2	b
Oxidising gases	Category 1	5.1.2A
Gases under pressure	Compressed gases	c
	Liquefied gases	c
	Refrigerated liquefied gases	c
	Dissolved gas	c
Flammable liquids	Category 1	3.1A
	Category 2	3.1B
	Category 3	3.1C
	Category 4	3.1D
Liquid desensitized explosives		3.2A ^d
		3.2B ^d
		3.2C ^d
Flammable solids	Category 1	4.1.1A
	Category 2	4.1.1B
Self-reactive substance and mixtures	Type A	4.1.2A
	Type B	4.1.2B

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Class	GHS Category	HSNO classification
	Type C	4.1.2C
	Type D	4.1.2D
	Type E	4.1.2E
	Type F	4.1.2F
	Type G	4.1.2G
Solid desensitized explosives		4.1.3A ^d
		4.1.3B ^d
		4.1.3C ^d
Pyrophoric liquids	Category 1	4.2A
Pyrophoric solids	Category 1	4.2A
Self-heating substances and mixtures	Category 1	4.2B
	Category 2	4.2C
Substances and mixtures, which in contact with water, emit flammable gases	Category 1	4.3A
	Category 2	4.3B
	Category 3	4.3C
Oxidising liquids	Category 1	5.1.1A
	Category 2	5.1.1B
	Category 3	5.1.1C
Oxidising solids	Category 1	5.1.1A
	Category 2	5.1.1B
	Category 3	5.1.1C
Organic peroxides	Type A	5.2A
	Type B	5.2B
	Type C	5.2C
	Type D	5.2D
	Type E	5.2E
	Type F	5.2F
	Type G	5.2G
Corrosive to metals	Category 1	8.1A

Toxicity hazards		
Class	GHS Category	HSNO classification
Acute toxicity: Oral	Category 1	6.1A
	Category 2	6.1B
	Category 3	6.1C
	Category 4	6.1D
	Category 5	6.1E
Acute toxicity: Dermal	Category 1	6.1A
	Category 2	6.1B
	Category 3	6.1C
	Category 4	6.1D
	Category 5	6.1E
Acute toxicity: Inhalation	Category 1	6.1A
	Category 2	6.1B
	Category 3	6.1C
	Category 4	6.1D
	Category 5	6.1E
Skin corrosion/irritation	Category 1A	8.2A
	Category 1B	8.2B
	Category 1C	8.2C
	Category 2	6.3A
	Category 3	6.3B
Serious eye damage/eye irritation	Category 1	8.3A
	Category 2A	6.4A
	Category 2B	6.4A ^e
Respiratory sensitization	Category 1	6.5A
Skin sensitization	Category 1	6.5B
Germ cell mutagenicity	Category 1A	6.6A
	Category 1B	6.6A
	Category 2	6.6B
Carcinogenicity	Category 1A	6.7A
	Category 1B	6.7A
	Category 2	6.7B

Class	GHS Category	HSNO classification
Reproductive toxicity	Category 1A	6.8A
	Category 1B	6.8A
	Category 2	6.8B
	Effects on or via lactation	6.8C
Specific target organ systemic toxicity (single exposure)	Category 1	6.9A
	Category 2	6.9B
	Category 3	^f
Specific target organ systemic toxicity (repeated exposure)	Category 1	6.9A
	Category 2	6.9B
Aspiration hazard	Category 1	6.1E ^g
	Category 2	6.1E ^g

Environmental hazards

Class	GHS Category	HSNO classification
Aquatic toxicity (Acute)	Category 1	9.1A
	Category 2	9.1B
	Category 3	9.1D
Aquatic toxicity (Chronic)	Category 1	9.1A
	Category 2	9.1B
	Category 3	9.1C
	Category 4	9.1D
Ecotoxic to soil environment		9.2A – 9.2D
Ecotoxic to terrestrial vertebrates		9.3A – 9.3C
Ecotoxic to terrestrial invertebrates		9.4A – 9.4C
Hazardous to the ozone layer	Category 1	^h

Notes:

^a Not currently covered under HSNO classification scheme.

^b HSNO criteria taken from UN Model Regulations 11th Edition.

^c Covered under local transport law adoption of UN Model Regulations.

^d HSNO criteria taken from UN Model Regulations 11th Edition.

^e HSNO does not separate reversible eye effects into two sub-categories.

^f HSNO does not specifically address the GHS category of transient target organ effects. Narcotic effects would normally be classified under 6.9B and respiratory irritation would be classified under 6.1E.

^g Aspiration hazard is currently captured under HSNO as an acute toxic hazard where there is evidence in humans of significant acute toxic effects as a result of acute exposure to the substance, where the substance has not already been assigned to a more hazardous category.

^h Covered under the Ozone Layer Protection Act.

Appendix 6: List of data sources

The following databases provide useful sources of chemical information and hazard data that should be used if you are classifying a substance from its composition.

General information	
EPA Chemical Classification Information Database http://www.epa.govt.nz/search-databases/Pages/HSNO-CCID.aspx	
TOXNET http://toxnet.nlm.nih.gov/	<ul style="list-style-type: none"> ➤ The United States National Library of Medicine's (NLM) Toxicology Data Network; access to several databases. ➤ ChemIDplus Chemical synonyms, structures and more. ➤ HSDB – Hazardous Substances Databank. ➤ CCRIS – Chemical Carcinogenesis Research Information System. ➤ IRIS – Integrated Risk Information System. ➤ DART/ETIC – Development and Reproductive Toxicology, and Environmental Teratology Information Center. ➤ GENETOX Genetic Toxicology (mutagenicity). ➤ TOXLINE Toxicology bibliographic information.
US EPA Pesticide Chemical Search http://iaspub.epa.gov/apex/pesticides/f?p=chemicalsearch:1	
European Chemicals Agency – Registered Substances http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances	EU: Information on registered substances: for example their hazardous properties, their classification and labelling and how to use the substances safely.
C&L Inventory database http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database	EU: Classification and labelling information on notified and registered substances received from manufacturers and importers.
Hazardous Substances Information System (HSIS) http://hsis.safeworkaustralia.gov.au/	Australian: Information on substances that have been classified in accordance with the Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2004)] 3rd Edition
Patty's Industrial Hygiene and Toxicology http://www.mrw.interscience.wiley.com/pattys/index.html	Gives general information on chemicals. Subscription required.

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National Toxicology Programme (NTP) http://ntp-server.niehs.nih.gov/	Consists of relevant toxicology activities of the National Institutes of Health's National Institute of Environmental Health Sciences (NIH/NIEHS), the Centers for Disease Control and Prevention's National Institute for Occupational Safety and Health (CDC/NIOSH), and the Food and Drug Administration's National Center for Toxicological Research (FDA/NCTR).
ChemFinder http://chemfinder.cambridgesoft.com/	General information on chemicals. Individual access is complimentary on a limited basis.
GHS http://www.unece.org/trans/danger/publi/ghs/ghs_rev02/02files_e.html	Access to the Globally Harmonised System for the Classification and Labelling of Chemicals.
UN Recommendations on the Transportation of Dangerous Goods – Model Regulations http://www.unece.org/trans/danger/publi/unrec/rev17/17files_e.html	Access to the 17th revised edition provides information on the UN packing groups.

Toxicity

IPCS INCHEM http://www.inchem.org/	Access to the International Programme for Chemical Safety documents on pesticides and veterinary medicines (JECFA and JMPR), International Agency for Research on Cancer (IARC) summaries.
European Union On-line http://ec.europa.eu/food/plant/protection/evaluation/new_subst_rep_en.htm	European Union new active substance evaluations.
European Union On-line http://ec.europa.eu/food/index_en.htm	Access to the European Union existing active substance evaluations.
EudraPORTAL	Access to the European Agency for the Evaluation of Medicinal Products (EMA) – veterinary and human medicines.
International Agency for Research on Cancer (IARC) http://www.iarc.fr/	Monographs on the evaluation of carcinogenic risk to humans, and other resources.
NICNAS http://www.nicnas.gov.au/Publications.asp	Australian NICNAS chemical assessment reports.

Ecotoxicity

USEPA ECOTOX http://cfpub.epa.gov/ecotox/	Access to the USEPA's ECOTOX database.
National Chemicals Inspectorate, Sweden http://apps.kemi.se/nclass/default.asp	Access to the N-class database for ecotoxic classifications.

Appendix 7: Chemical Classification and Information Database (CCID)

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The CCID is a database of chemicals classified by the EPA in accordance with the HSNO regulations. These chemicals have been classified using the best data available to the EPA at the time of classification.

The purpose of this database is to provide information on the classification of chemicals that will aid industry in the classification of formulated products. Information found within this database will also be useful for the preparation of labels and safety data sheets. The information may also be of assistance to industry in formulating less hazardous products by providing the classification information on potential alternative components.

The database provides:

1. **Chemical identification information.** Such as:

- CAS number;
- name and synonyms;
- UN number and UN class (where applicable);
- HSNO approval number (where the chemical is HSNO approved);
- selected physical property information.

2. **Hazard classifications.** Classifications are provided for both the physical hazards (explosiveness, flammability, oxidising capacity, metal corrosiveness) and biological hazards (toxicity, biological corrosiveness and ecotoxicity) of a chemical.

The HSNO hazard classifications, specified in the Hazardous Substances (Classification) Regulations 2001, are represented by numbers (identifying the class and subclass of hazard), a letter (ranking the hazard) and an associated hazard phrase. For example, 3.1C Flammable liquids: Medium hazard.

The HSNO hazard classification system is substantially equivalent to the United Nations Globally Harmonized System for Classification of Chemicals (GHS). A table correlating the HSNO classification categories with those of the GHS system can be found in appendix 5 or on the EPA website at the following: <http://www.epa.govt.nz/Publications/hsnogen-ghs-nz-hazard.pdf>.

Differences that currently exist between the two systems are noted.

3. **Classification data.** The data upon which each hazard classification is based. This generally includes a reference to the source of the data.

Searching

To search the database, enter either the:

1. CAS Number

or

2. Synonym/Name

of a chemical into the search engine.

Example search

Step 1: Enter name or CAS number in search.

HSNO Chemical Classification and Information Database (CCID)

The CCID is a database of chemicals we have classified in accordance with the Hazardous Substances and New Organisms (HSNO) regulations.

The information on the classification of chemicals will help with classifying formulated products. It may also be useful for preparing labels and safety data sheets.

For more information about the CCID:

- What is the CCID?

For wildcard searches, please add "%" after the substance name.

Search the CCID

CAS Number

Search ?

Step 2: A list of records matching your search will be given where records are available. Double click on the record of interest.

Search the CCID

CAS Number

7647-01-0

Search ?

CAS Number	Synonym / Name
7647-01-0	Hydrochloric acid, >25% aqueous solution
7647-01-0	Hydrochloric acid, 0.5-2% aqueous solution
7647-01-0	Hydrochloric acid, >10-25% aqueous solution
7647-01-0	Hydrochloric acid, >2-10% aqueous solution
7647-01-0	Hydrogen chloride

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Step 3: Information on the HSNO classifications of the substance will be displayed. The classification data provided will be the study used to assign the classification to the substance.

Hydrochloric acid, 0.5-2% aqueous solution

Cas Number: 7647-01-0
 Synonyms: Chlorohydric acid, Hydrochloric acid, Muriatic acid
 Molecular Weight: 36.46
 Relative Density: 1.10
 Water Solubility (mg/l): miscible
 Approval Number: HSR001564
 UN Class: 8; PGII,III
 UN Number:

Classification

6.1E	(oral)	Acutely toxic
6.3A		Irritating to the skin
6.4A		Irritating to the eye

Classification Data

6.1E (oral)	SPECIES: Rat ENDPOINT: LD50 VALUE: 700 mg/kg bw REFERENCE SOURCE: DOW Deutschland Inc., Werk Stade Stade 5 (110) Monsanto (1976) unpublished report YO-76-0404 of Monsanto [judid 200 REMARK: sol %31.50 LD50 sol 700.00 % 100.00 LD50 100% 220.50 LD50(comp) 220.5 % 2 LD50(mix) 11025
6.3A	REMARK: Corrosive cutoff at 2% NOHSC.
6.4A	REMARK: Corrosive cutoff at 2% NOHSC.

Appendix 8: Worked example for classifying a product from component data

Toxic properties

6.1: Oral			
Name	Max %	6.1 – Oral	LD ₅₀ mg/kg bw
<i>Mixture classification</i>		6.1D	400
Component A	80	No	5,050
Component B	1.5		
Component C	12.5	6.1C	100
Component D	0.9		
Component E	5.1	6.1B	40

The LD₅₀ for the mixture is calculated from the formula: $T_{\text{mix}} = 100 / (C_C/T_C + C_E/T_E)$ where C_E is the concentration of Component E and T_E is the LD₅₀ of Component E.

$$T_{\text{mix}} = 100 / ((12.5/100) + (5.1/40))$$

$$T_{\text{mix}} = 400 \text{ mg/kg bw}$$

Component A is not included in this calculation because the LD₅₀ is greater than 5,000 mg/kg bw and is therefore deemed to be non-hazardous. It is reported as 'No' in the table.

If a component has an LD₅₀ outside of the range indicated in table 3, section 5.3 Acute toxicity, then it is considered to be non-hazardous and is not included in the mixture calculations.

The calculated toxicity value is in the range > 300 to ≤ 2,000 mg/kg bw, therefore the **mixture is classified as a 6.1D oral** (refer to table 3, section 5.3, for the LD₅₀ cut-off values).

If applicable, dermal and inhalation toxicity will need to be classified as well, and the most conservative classification is then applied to the mixture. That is, the most severe classification triggered will be applied.

6.1: Dermal			
Name	Max %	6.1 – Dermal	LD ₅₀ mg/kg bw
<i>Mixture classification</i>		6.1E	3,000
Component A	80		> 5,000
Component B	1.5		
Component C	12.5	6.1C	500
Component D	0.9		
Component E	5.1	6.1D	600

LD₅₀ for the mixture is calculated using the formula: $T_{\text{mix}} = 100 (C_C/T_C + C_E/T_E)$.

$$T_{\text{mix}} = 100 / ((12.5/500) + (5.1/600))$$

$$T_{\text{mix}} = 3000 \text{ mg/kg bw}$$

The calculated toxicity value is in the range > 2,000 up to (and including) 5,000 mg/kg bw so the **classification is 6.1E dermal** (refer to table 3, section 5.3 Acute toxicity, for the LD₅₀ cut-off values).

6.1: Overall classification

The oral classification is 6.1D, and the mixture is assigned this classification because it is the most severe classification triggered. The dermal classification should still be recorded so as to generate the full set of necessary label elements.

6.3: Skin irritation/8.2: Skin corrosive

Name	Max %	6.3/8.2
Mixture classification		6.3A
Component A	80	
Component B	1.5	8.2B
Component C	12.5	
Component D	0.9	6.3A
Component E	5.1	

The skin irritation/corrosive classification is calculated according to table 6, section 5.3 Skin irritation/corrosivity.

The concentration of the 8.2B corrosive Component B is 1.5 percent. This is less than the 5 percent minimum threshold so does not trigger corrosivity for the mixture. However, because the concentration of the 8.2B component is 1.5 percent, this is in the range ≥ 1 to < 5 percent, it triggers a 6.3A irritation classification.

6.4A: Eye irritation/8.3A: Eye corrosive

Name	Max %	6.4/8.3
Mixture classification		6.4A
Component A	80	
Component B	1.5	6.4A
Component C	12.5	
Component D	0.9	8.3A
Component E	5.1	

The eye irritation/corrosive classification is calculated according to table 8, section 5.3 Eye irritation/corrosivity.

The concentration of the 8.3A corrosive Component D is 0.9 percent. This is less than the 3 percent minimum threshold so does not trigger corrosivity for the mixture. However, the component may still trigger an irritancy classification.

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Eye irritancy calculation:

= 10 x concentration of eye corrosives 8.3A + concentration of 6.4A

= 10 x 0.9% + 1.5%

= 10.5%.

This is greater than the 10 percent minimum so the mixture is classified as a 6.4A eye irritant.

6.5A: Respiratory sensitiser/6.5B: Contact sensitiser

Name	Max %	6.5
Mixture classification		6.5B
Component A	80	
Component B	1.5	6.5B
Component C	12.5	
Component D	0.9	6.5A
Component E	5.1	

Any component that is a 6.5A or 6.5B, which is at greater than 0.1 percent (as set out in table 10, section 5.3 Sensitisation), results in that classification applying to the mixture.

Component B is a 6.5B and is present at 1.5 percent. This is greater than the 0.1 percent cut-off value, therefore the mixture is classified as 6.5B. Component D is a 6.5A and is present at 0.9 percent. This is greater than the 0.1 percent cut-off value, therefore the mixture is also classified as 6.5A.

6.6: Mutagenicity

Name	Max %	6.6
Mixture classification		6.6B
Component A	80	
Component B	1.5	
Component C	12.5	6.6B
Component D	0.9	
Component E	5.1	

The mutagenicity hazard thresholds are in table 11, section 5.3 Mutagenicity.

Component C is a 6.6B and is present at 12.5 percent. This is greater than the cut-off level of 1 percent, therefore the mixture is classified as 6.6B.

Because this component is a CMR, the NZIoC will need to be checked to see if this chemical is present. If it is not present, you cannot assign the mixture to the group standard, and you will need to contact the EPA to get a separate approval.

6.8: Reproductive/developmental toxicant

Name	Max %	6.8
Mixture classification		6.8B and 6.8C
Component A	80	
Component B	1.5	
Component C	12.5	
Component D	0.9	6.8C
Component E	5.1	6.8B

The reproductive/developmental toxicant thresholds are in table 13, section 5.3 Reproductive and development effects.

Component E is a 6.8B and is present at 5 percent, which is greater than the cut-off level of 0.1 percent, therefore the mixture is classified as 6.8B.

Component D is a 6.8C and is present at 0.9 percent, which is greater than the cut-off value of 0.1 percent, therefore the mixture is also classified as 6.8C.

Note there is a difference between the classifications 6.8B and 6.8C, see section 5.3 Reproductive and developmental effects for further details.

Also note that both of these components are CMRs and will need to be checked to see if they are present on the NZIoC. If they are not present, you cannot assign the mixture to the group standard, you will need to contact the EPA to get separate approvals.

6.9: Target organ

Name	Max %	6.9
Mixture classification		6.9B
Component A	80	
Component B	1.5	6.9A
Component C	12.5	
Component D	0.9	
Component E	5.1	

The target organ toxicant thresholds are in table 14, section 5.3 Specific target organ toxicity.

Component B is a 6.9A and is present at 1.5 percent. This is less than the 10 percent minimum to trigger a 6.9A classification, therefore the mixture is not classified as 6.9A. However, the concentration is in the range of 1–10 percent, which triggers a 6.9B classification, therefore the mixture is classified as 6.9B.

Ecotoxic properties

9.1: Aquatic toxicity

Note: For the assignment of a 9.1 classification a LC_{50} concentration of > 1 and ≤ 100 mg/L may result in a classification of 9.1B, 9.1C or 9.1D. The assignment of a classification to the mixture is therefore determined by calculating the weighted sum of non-rapidly degradable or bioaccumulative components (separately). For clarification, see examples below.

Aquatic classifications for mixtures: Example 1

Name	Max %	9.1	LC_{50} mg/L	Rapid degradation	Bioaccumulation
Component A	80	No		No	No
Component B	1.5	9.1A	0.05	Yes	ND
Component C	12.4	9.1B	8	No	No
Component D	1	No		Yes	No
Component E	5.1	9.1C	50	Yes	No

Step 1: Consider all components classified as 9.1A

From this example, Component B has a 9.1A classification with a LC_{50} of 0.05 mg/L. Because the LC_{50} is in the range > 0.01 and ≤ 0.1 a multiplying factor of 10 applies.

M x concentration of component that is 9.1A

$$10 \times 1.5 = 15\%$$

Because this value is less than 25 percent, the mixture is not classified as 9.1A.

Step 2a: Consider all components classified as 9.1A and 9.1B

$$\Sigma(M \times 10 \times 9.1A) + 9.1B$$

$$(10 \times 1.5 \times 10) + 12.4 = 162.4\%$$

This value is greater than 25 percent, indicating a 9.1B classification.

Step 2b: Consider components that are not rapidly degradable or are bioaccumulative

If the weighted sum of components that are not rapidly degradable or are bioaccumulative* is < 25 percent then the mixture is assigned the classification at the step below.

***Note the weighted sum of components that are not rapidly degradable is to be considered separately to the sum of components that are bioaccumulative.**

In this example:

Rapid degradation

Component B is rapidly degradable and therefore not included in the calculation. Component C is not rapidly degradable.

Amount of Component C in the mixture is 12.4 percent. This value is less than 25 percent.

Bioaccumulation

There is no data as to the bioaccumulation of Component B – as a result it defaults to being considered as bioaccumulative.

Component C is not bioaccumulative and therefore not included in the calculation.

Component B has a 9.1A classification with an LC_{50} of 0.05 mg/L, therefore a multiplying factor of 10 applies.

A further multiplication factor of 10 applies to Component B because of the transition from Step 1 to Step 2 calculations.

$M \times \text{concentration of Component B} \times 10$

$$10 \times 1.5 \times 10 = 150\%$$

This value is greater than 25 percent. It can therefore be said that this mixture contains ecotoxic components that are bioaccumulative.

Conclusion

There was no data as to the bioaccumulation of Component B therefore it was assumed that the component is bioaccumulative. Following the *mixture calculation for classification* and the *calculation using the weighted sum of components that are bioaccumulative* the mixture is classified as **9.1B**.

Aquatic classifications for mixtures: Example 2

Name	Max %	9.1	LC_{50} mg/L	Rapid degradation	Bioaccumulation
Component A	80	No		Yes	No
Component B	10.5	9.1B	2	Yes	ND
Component C	3.4	9.1B	8	No	No
Component D	1	No		Yes	No
Component E	5.1	9.1C	50	Yes	Yes

Step 1: Consider all components classified as 9.1A

None of the components are classified as 9.1A.

Step 2a: Consider all components classified as 9.1A and 9.1B

From this example, Component B and Component C both have a 9.1B classification.

Sum of components that are 9.1B

$$10.5 + 3.4 = 13.9\%$$

This value is less than 25 percent, therefore the mixture is not classified as 9.1B.

Step 2b: Consider components that are not rapidly degradable or are bioaccumulative

These calculations are not necessary in the above instance because the mixture has yet to be assigned a hazard classification.

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Step 3a: Consider all components classified as 9.1A, 9.1B and 9.1C

$$\Sigma(M \times 100 \times 9.1A) + (10 \times 9.1B) + 9.1C$$

$$(10 \times 13.9) + 5.1 = 145\%$$

This value is greater than 25 percent, indicating a 9.1C classification.

Step 3b: Consider components that are not rapidly degradable or are bioaccumulative

In this example:

Rapid degradation

Component B is rapidly degradable and therefore not included in the calculation. Component C is not rapidly degradable.

A multiplication factor of 10 applies to Component C because of the transition from Step 2 to Step 3 calculations.

$$3.4 \times 10$$

This value is greater than 25 percent. It can therefore be said that this mixture contains toxic components that are not rapidly degradable.

Bioaccumulation

Need not be considered because the above result.

Conclusion

Following the *mixture calculation for classification* and the *calculation using the weighted sum of components that are not rapidly degradable* the mixture is classified as **9.1C**.

Aquatic classifications for mixtures: Example 3

Name	Max %	9.1	LC ₅₀ mg/L	Rapid degradation	Bioaccumulation
Component A	63.00			Yes	No
Component B	17.00	9.1A	1	Yes	No
Component C	0.3	9.1B	8	No	No
Component D	13.6	9.1D		No	No
Component E	5.1	9.1C	50	No	No

Step 1: Consider all components classified as 9.1A

Component B has a 9.1A classification and the default multiplying factor of 1 applies.

M x concentration of component that is 9.1A

$$1 \times 17 = 17\%$$

This value is less than 25 percent, therefore the mixture is not classified as 9.1A.

Step 2a: Consider all components classified as 9.1A and 9.1B

$$\Sigma(M \times 10 \times 9.1A) + 9.1B$$

$$(1 \times 17 \times 10) + 0.3 = 170.3\%$$

This value is greater than 25 percent, indicating a 9.1B classification.

Step 2b: Consider components that are not rapidly degradable or are bioaccumulative***Rapid degradation***

Component B is rapidly degradable and therefore not included in the calculation. Component C is not rapidly degradable.

Amount of Component C in the mixture is 0.3 percent. This value is less than 25 percent.

Bioaccumulation

Components B and C are not bioaccumulative.

Step 3a: Consider all components classified as 9.1A, 9.1B and 9.1C

$$\Sigma(M \times 100 \times 9.1A) + (10 \times 9.1B) + 9.1C$$

$$(1 \times 17 \times 100) + (0.3 \times 10) + 5.1 = 1708.1\%$$

This value is greater than 25 percent, indicating a 9.1C classification.

Step 2b: Consider components that are not rapidly degradable or are bioaccumulative***Rapid degradation***

Component B is rapidly degradable and therefore not included in the calculation. Component C is not rapidly degradable. Component E is not rapidly degradable.

$$0.3 \times 10 + 5.1 = 8.1\%$$

This value is less than 25 percent.

Bioaccumulation

Components B, C and E are not bioaccumulative.

The classification therefore shifts from 9.1C to 9.1D because the weighted sum of not rapidly degradable components or bioaccumulative components is < 25 percent.

Conclusion

The mixture is classified as **9.1D**.

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9.2: Soil toxicity

Name	Max %	9.2	EC ₅₀ mg/kg soil
<i>Mixture classification</i>		9.2B	
Component A	80		
Component B	1.5	9.2C	50 AND DT ₅₀ soil > 30days
Component C	12.5	9.2A	No data
Component D	1		
Component E	5.1	9.2B	10

The soil ecotoxicity cut-off values are in table 16, section 5.4 Soil toxicity.

In this example, the LC₅₀ values are outside the ranges to trigger multiplication factors. For Component C, although it is known to be 9.2A, there is no data for the LC₅₀ so it is assumed that the M-factor will be = 1.

The calculation is:

$$9.2A \times M (M=1)$$

$$= 12.5 \times 1$$

$$= 12.5\%$$

This is less than the 25 percent minimum value, therefore this mixture is not classified as 9.2A.

The next calculation becomes:

$$\Sigma(M \times 10 \times 9.2A) + 9.2B$$

$$= 10 \times 12.5 + 5.1$$

$$= 130.1\%$$

This is greater than the 25 percent minimum value, therefore the **mixture is classified as 9.2B.**

9.3: Terrestrial vertebrate toxicity

Name	Max %	9.3	LD ₅₀ mg/kg bw	Species
<i>Mixture classification</i>		9.3B		
Component A	80			
Component B	1.5			
Component C	12.5	9.3B	100	Mammal
Component D	1			
Component E	5.1	9.3A	40	Mammal

The summation approach is used to derive a terrestrial hazard classification. A mixture of mammalian and avian data can be used for calculating the classification.

The calculation is:

$$9.3A \times M (M = 1)$$

$$= 5.1 \times 1$$

$$= 5.1\%$$

This value is less than the minimum 25 percent value, therefore the mixture is not classified as 9.3A. However, it may still be a lesser classification, such as 9.3B or 9.3C.

The next calculation becomes:

$$\Sigma(M \times 10 \times 9.3A) + 9.3B$$

$$= (1 \times 5.1 \times 10) + 12.5$$

$$= 63.5\%$$

This is greater than the 25 percent minimum value, therefore the **mixture is classified as 9.3B**

9.4: Terrestrial invertebrate toxicity

Name	Max %	9.4	µg/invertebrate
<i>Mixture classification</i>			
Component A	80		
Component B	1.5		
Component C	12.5		
Component D	0.9	9.4B	4.2
Component E	5.1		

The terrestrial invertebrate cut-off values are in table 20, section 5.4 Terrestrial invertebrate toxicity.

In this example there are no components with 9.4A classification, therefore, there are no multiplying factors to apply.

For a 9.4B classification, the calculation is: $9.4B = 0.9\%$.

This is below the minimum 25 percent value, therefore no 9.4B classification is triggered.

For a 9.4C classification the calculation is: $9.4B \times 10 = (0.9 \times 10) = 9$.

This is below the minimum 25 percent value, therefore no 9.4C classification is triggered.

For this mixture, 0.9 percent of a 9.4B classification does not trigger any 9.4 classification, therefore the mixture is not classified as 9.4.

Appendix 9: Examples of HSNO compliant safety data sheets

If you are selling or supplying a hazardous substance above certain quantities¹⁰ to a place of work you must provide a SDS to the recipient if it is the first time that you have supplied the product to that place of work.

You must also provide the SDS if asked to do so by the person in charge of the workplace.

Information required on a safety data sheet must be provided under the following 16 general headings in the order listed below, and must include the information referred to under those headings:

Section 1. Identification of the substance and supplier—

- i. product name; and
- ii. recommended uses; and
- iii. name of the supplier, New Zealand contact details including an emergency contact;

Section 2. Hazards identification—

- i. a description of the hazards of the substance, which may include its HSNO hazard classification; and
- ii. hazard information, including signal words, hazard statement(s) and precautionary statement(s);

Section 3. Composition/information on ingredients—

- i. in the case of single component substances, their chemical identity, including common names and synonyms, CAS number and any impurities that are themselves hazardous; or
- ii. in the case of substances that are mixtures, the chemical identity of each hazardous ingredient, their CAS number and their concentration ranges;

Section 4. First aid measures—

- i. first aid instructions according to each relevant route of exposure; and
- ii. whether medical attention is required, and its urgency; and
- iii. information on the most important symptoms and effects, acute and delayed, from exposure;

Section 5. Fire fighting measures

- i. information on the appropriate type of extinguishers or fire-fighting agents, including extinguishers that may not be appropriate for a particular situation; and
- ii. any advice on hazards that may arise from combustion products; and
- iii. precautions for fire fighters and protective clothing requirements;

Section 6. Accidental release measures—

- i. advice on protective clothing requirements and emergency procedures; and
- ii. any environmental precautions from accidental spills and release; and
- iii. advice on how to contain and clean up a spill or release;

Section 7. Handling and storage—

- i. precautions for safe handling; and
- ii. conditions for safe storage, including any incompatibilities;

¹⁰ These trigger quantities are found in either Schedule 2 of the Hazardous Substances (Identification) Regulations 2001 or in the appropriate group standard.

Section 8. Exposure controls/personal protection—

- i. exposure limits set for the substance or any of its components, or in their absence, relevant overseas exposure limits; and
- ii. engineering controls; and
- iii. individual protection measures, including personal protective equipment;

Section 9. Physical and chemical properties—

- i. a description of relevant physical and chemical properties for the substance, including units of measurement and reference conditions where appropriate; and
- ii. where necessary for interpretation of data reported, the method of determination;

Section 10. Stability and reactivity—

- i. an indication of the chemical stability of the substance under normal and anticipated storage and handling conditions; and
- ii. a list of conditions to avoid to prevent a hazardous situation; and
- iii. information on incompatible substances or materials;

Section 11. Toxicological information—

- i. a full description of the toxicological (health) effects, including the symptoms or signs of injury or ill health associated with each likely route of exposure; and
- ii. the dose, concentration or conditions of exposure likely to cause injury or ill health; and
- iii. a summary of the data used to identify the health effects;

Section 12. Ecological information—

- i. ecotoxicity; and
- ii. persistence and degradability; and
- iii. mobility;

Section 13. Disposal considerations—

- i. disposal methods, including disposal of packaging; and
- ii. special precautions to be taken during disposal; and
- iii. any method of disposal that should not be used;

Section 14. Transport information—

- i. If relevant,
- ii. the UN number; and
- iii. the proper shipping name; and
- iv. the UN Dangerous Goods class and subsidiary risk; and
- v. the UN Packing Group;


Section 15. Regulatory information—

- i. HSNO approval number and/or title of the Group Standard; and
- ii. information on the conditions of the Group Standard, and any other regulatory requirements;

Section 16. Other information—

- i. date of preparation or revision of the safety data sheet; and
- ii. a key/legend to abbreviations and acronyms used.

Example of a HSNO compliant SDS for a herbicide assigned to an individual substance approval:

SAFETY DATA SHEET		
		Emergency Phone: 0800 243 622 + 64 3 353 0199 Dow AgroSciences (NZ) Ltd. 89 Paritutu Road, New Plymouth
VERSATILL™		Effective Date: 22 June 2010 Product Code: 42291
1. PRODUCT AND COMPANY IDENTIFICATION:		
PRODUCT: Versatill™		
RECOMMENDED USE: Herbicide		
COMPANY IDENTIFICATION: Dow AgroSciences (NZ) Ltd. Registration Number: 169964 89 Paritutu Road, New Plymouth		
Customer Service Toll Free Number: 0800 803 939 (Mon-Fri, 8am–4.30 pm)		
Emergency Telephone Numbers: NZ: 0800 CHEMCALL (0800 243 622) Australia: 1-800 127 406 Global: + 64 3 353 0199 (24 hours) (EMERGENCIES ONLY)		
Transport Emergency Only Dial 111		
This SDS may not provide exhaustive guidance for all the HSNO controls assigned to this substance. The ERMA website www.ermanz.govt.nz should be consulted for a full list of triggered controls and cited regulations		
2. HAZARDOUS IDENTIFICATION:		
EMERGENCY OVERVIEW ERMA New Zealand Approval Code: HSR000761 HSNO Hazard Classification: 9.1B, 9.2A, 9.3C. Toxic to aquatic life with long lasting effects. Very toxic to the soil environment Harmful to the soil environment Avoid release to the environment		
3. COMPOSITION/INFORMATION ON INGREDIENTS:		
Ingredient	CAS #	Content
Clopyralid		
Triisopropanolamine Salt	1702-17-6 (acid)	~51%
Balance Ingredients not contributing to the hazards		~49%
4. FIRST AID:		
Consult the National Poisons Information Centre (0800 POISON (0800 764 766) or a doctor in every case of suspected chemical poisoning. Never give fluids or induce vomiting if a patient is unconscious or convulsing regardless of cause of injury. If breathing difficulties occur seek medical attention immediately.		
EYES: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.		
SKIN: Wash skin thoroughly with plenty of water.		
INGESTION: No emergency medical treatment necessary.		
INHALATION: Move person to fresh air; if effects occur, consult a physician.		
NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.		
5. FIRE FIGHTING MEASURES:		
FLASH POINT: None		
FLAMMABLE LIMITS LFL: Not applicable UFL: Not applicable		
EXTINGUISHING MEDIA: Water fog, foam, alcohol foam, CO ₂ , dry chemical.		
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1		

SAFETY DATA SHEET



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FIRE & EXPLOSION HAZARDS: Noxious fumes under fire conditions. Contain water from fire fighting to prevent entry to surface and ground water.

FIRE-FIGHTING EQUIPMENT: Wear positive-pressure self-contained breathing apparatus and full-protective clothing.

HAZCHEM: 2X

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS/LEAKS: Do not touch or walk through spilled material. Wear a face shield or goggles, overalls buttoned to neck and wrist, chemical resistant gloves and footwear. Stop leak when safe to do so. Dam area and prevent entry into waterways, and drains. **Small spills/leaks:** Absorb with material such as sand, soil or sawdust. Collect spilled product and place in sealable container for disposal. Spill residues may be cleaned using water and detergent. Contain and absorb wash water for disposal. Absorb and collect washings and place in the same sealable container for disposal. **Large spills/leaks:** Dam the area of and report them to Dow AgroSciences Emergency Services at 0800 CHEMCALL (0800 243 622).

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

HANDLING: Keep out of reach of children. Harmful if swallowed. Causes skin irritation. Avoid contact with skin and clothing. After work, remove protective clothing and equipment, wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Clean up spilled material immediately, and wash clothes, equipment and work area after use.

STORAGE: Store in tightly closed original container in a cool, dry well-ventilated area out of direct sunlight when not in use. This product can be stored in an unheated building. Do not store with food, feedstuffs, fertilizers and seeds. See product label for further handling/storage precautions relative to the end use of this product.

This substance is subject to a requirement for an emergency management plan, secondary containment

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and signage, whenever it is held in quantities of 1000 liters or more, either alone or in aggregate with other hazardous substances. See Hazardous substances (Emergency Management) Regulations 25 to 42.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINE(S):

Clopyralid acid: Dow AgroSciences Industrial Hygiene Guide is 10 mg/M³ (skin). – See section 16

No EEL, TEL or WES has been set by ERMA

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use a New Zealand Standard approved air-purifying respirator for organic vapors.

SKIN PROTECTION: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur.

EYE PROTECTION: Use safety glasses.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE: Green liquid

ODOR: None

pH: 6-8 Undiluted

RELATIVE DENSITY: Not determined

BOILING POINT: 100 – 105°C

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VAPOR PRESSURE: 1.2×10^{-5} mmHg @ 25°C
(clopyralid acid)
SPECIFIC GRAVITY: 1.17 @ 20°C
SOLUBILITY IN WATER: Miscible

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Stable under normal storage conditions. Not flammable.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Acid, base, oxidizing material.

HAZARDOUS DECOMPOSITION PRODUCTS:
Noxious fumes under fire conditions - hydrogen chloride and others.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYE: May cause slight temporary eye irritation. Mist may cause eye irritation. Corneal injury is unlikely.

SKIN: Brief contact is essentially non-irritating to skin. Prolonged contact is unlikely to result in absorption of harmful amounts. Skin contact may cause allergic skin reaction in a small proportion of individuals. The LD₅₀ for skin absorption in rabbits is >2000 mg/kg.

INGESTION: Very low toxicity if swallowed. The oral LD₅₀ for rats is >5000 mg/kg. Harmful effects not anticipated from swallowing small amounts.

INHALATION: No adverse effects are anticipated from single exposure to vapor. Mist may cause irritation of upper respiratory tract (nose and throat). The inhalation LC₅₀ for rats is >2.6 mg/L for 4 hours.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: In animals, effects have been reported on the following organs: kidney and liver. Observations in animals include: lethargy.

CANCER INFORMATION: Did not cause cancer in laboratory animals.

TERATOLOGY (BIRTH DEFECTS): Has caused birth defects in test animals, but only at greatly exaggerated doses that were severely toxic to the mothers. No birth defects were observed in animals given doses several times greater than those expected during normal exposure.

REPRODUCTIVE EFFECTS: In animal studies, the active ingredient did not interfere with reproduction.

MUTAGENICITY: For the active ingredient in-vitro and animal genetic toxicity studies were negative.

12. ECOLOGICAL INFORMATION:**ENVIRONMENTAL FATE:**

Based largely or completely on information for clopyralid acid.

MOVEMENT & PARTITIONING:

Clopyralid is weakly sorbed (Mean K_{oc} ~5 mL/g) indicating potential for mobility

DEGRADATION & PERSISTENCE:

Clopyralid is hydrolytically stable and photochemical degradation is slow (half-life 19.5 days). Clopyralid is not readily biodegradable under the conditions of the EU Ready Biodegradability test EEC method C5, OECD No. 301B). Clopyralid rapidly degrades to CO₂ in the soil (field half-life 2- 24 days). Degradation is retarded under cold conditions or very dry soils. Clopyralid slowly degrades in water/sediment systems (half-life 143 – 182 days).

ECOTOXICOLOGY:

Based largely or completely on information for clopyralid acid.

Material is toxic to aquatic organisms on an acute basis (LC₅₀ or EC₅₀ is 6.9 mg/L in most sensitive species - algae). ERMA has classified this substance as 9.1B.

Material is slightly toxic to birds on an acute basis (LD₅₀ is 1465 mg/kg. Material is practically non-toxic to birds on a dietary basis (LC₅₀ is >5000 mg/kg. ERMA has classified this substance as 9.3C.

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This material is highly toxic to many plants by root and leaf uptake. ERMA has classified this substance as 9.2A.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION:

PUBLIC PASSENGER VEHICLE TRANSPORT: No restriction.

DANGEROUS GOODS CLASSIFICATION: None required

15. REGULATORY INFORMATION:

ACVMG APPROVAL NUMBER: P003311
ERMA New Zealand Approval Code: HSR000761

16. OTHER INFORMATION:

Glossary

A2: NZ OSH carcinogenicity classification.

Suspected Human Carcinogen The A2 carcinogen rating is used primarily when there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals with relevance to humans.

ACGIH: American Conference of Governmental Industrial Hygienists.

BAC: Butyl acetate. Evaporation rate is an important factor in evaluating health and fire hazard of the named chemical—a fast evaporation rate generally indicates a

high health, fire, and/or explosion risk. Slow = <0.8 x BAC; medium = 0.8-3 x BAC; Fast = >3 x BAC

BCF: Bioconcentration Factor - a measure for the characterization of the accumulation of a chemical in an organism. It is defined as the concentration of a chemical in an organism (plants, microorganisms, animals) divided by the concentration in a reference compartment (e.g. food, surrounding water).

Dow AgroSciences Industrial Hygiene Guideline: An internal company standard based on an 8 hour TWA.

EC₅₀: median effective concentration. Statistically derived concentration of a substance in an environmental medium expected to produce a certain effect in 50% of test organisms in a given population under a defined set of conditions.

EEL: Environmental exposure standard set by ERMA

Explosive Limits: The range of concentrations (% by volume in air) of a flammable gas or vapour that can result in an explosion for ignition in a confined space.

EPA: Environmental Protection Authority of New Zealand

ERMA: The Environmental Risk Management Authority of New Zealand now the EPA.

K_{oc}: the organic carbon partition coefficient (mL soil water /g organic carbon).

K_{ow}: See P_{ow}

LC₅₀: Lethal Concentration 50%. A concentration of chemical in air or water that will kill 50% of the test organisms.

LD₅₀: Lethal Dose-50%. The doses of a chemical that will kill 50% of the test animals receiving it.

NIOSH: American national Institute of Occupational Safety and Health, a federal agency which conducts research on occupational safety and health questions and recommends new standards.

OSH: Occupational Safety and Health Service of The Department of Labour, New Zealand.

OSHA: American Occupational Safety and Health Administration.

PEL: Permissible Exposure Level, a maximum allowable exposure level by law.

pH: Measure of how acidic or alkaline a material is using a 1 - 14 scale. pH 1 is strongly acidic and pH 14 strongly alkaline.

Polymerisation: a chemical reaction in which small molecules (monomers) combine to form much larger molecules (polymers). A hazardous polymerisation

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reaction is one that occurs at a fast rate and releases large amounts of energy.

P_{ow}: The octanol-water partition coefficient is the ratio of the concentration of a chemical in octanol and in water at equilibrium and at a specified temperature. Octanol is an organic solvent that is used as a surrogate for natural organic matter. This parameter is used in many environmental studies to help determine the fate of chemicals in the environment.

Skin: A 'skin' notation following the exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact. It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

STEL: Short-Term Exposure Limit. A term used to indicate the maximum average concentration allowed for a continuous 15 minute exposure period.

TEL: Tolerable Exposure Limit set by ERMA

TVL: Threshold Limit Value, an exposure limit set by a competent authority

TWA: Time Weighted Average. The average concentration of a chemical in air over the total exposure time - usually an 8-hour workday.

WES: Work place exposure standard set by ERMA or OSH.

References

AS/NZS 1715-1994 Selection Use and Maintenance of Respiratory Protective Devices.

ASNZS 1716 - 1994 Respiratory protective devices.

A guide to Respiratory Protection (published by the Occupational Safety and Health Service with support of NZ Safety Ltd 1999)

Guidelines for Personal Protection for Agrichemical Users NZ Safety Limited.

Environmental Risk Management Authority Decision for ERMA Approval Code (Refer to Section 15).

Land Transport Rule 45001/1: Dangerous Goods 2005 and its amendments.

International Maritime Dangerous Goods Code (IMDG) Maritime Rule 24A Carriage of Cargoes-Dangerous Goods

International Air Transport Association (IATA)

Dangerous Goods Regulation

VERSION CONTROL

Replaces version dated: 20 June 2006

Sections amended: 14, 16

Formulation Number: IWD-4316




**FOR FURTHER PRODUCT INFORMATION CALL
DOW AGROSCIENCES CUSTOMER SERVICE
REPRESENTATIVES TOLL FREE 0800 803 939
DURING BUSINESS HOURS.**

Dow AgroSciences (NZ) Ltd. urges each customer or recipient of this SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific SDSs, we are not and cannot be responsible for SDSs obtained from any source other than ourselves. If you have obtained an SDS from another source or if you are not sure that the SDS you have is current, please contact us for the most current version.

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Example of a HSNO compliant SDS for a cleaning product assigned to a group standard approval:

 Datachem		Cleaning Chemical, Corrosive Safety Data Sheet	
1. Identification of Substance & Company			
Product			
Product name	Cleaning Chemical, Corrosive		
HSNO approval	HSR002526, Cleaning Products (Corrosive) Group Standard 2006		
Approval description	Cleaning Products (Corrosive) Group Standard 2006		
UN number	1824		
Proper Shipping Name	SODIUM HYDROXIDE SOLUTION		
DG class	8		
Packaging group	III		
Hazchem code	2R		
Uses	Cleaning Chemical		
Company Details			
Company	Datachem LTD		
Address	9 Raewyn Place Pakuranga Auckland 2010		
Telephone	09 940 3080		
Fax number	09 576 7766		
Website	www.datachem.co.nz		
Emergency Telephone Number: 0800 POISON (0800 764 766)			
2. Hazard Identification			
Approval and			
This product has been approved under the Hazardous Substances and New Organisms Act (HSNO, Approval HSR002526, Cleaning Products (Corrosive) Group Standard 2006), and is classified as follows:			
Classes	Hazard Statements		
6.1D (oral)	Harmful if swallowed		
8.2C	Causes severe skin burns and eye damage.		
8.3A	Causes serious eye damage.		
8.1A	May be corrosive to metals.		
SYMBOLS			
DANGER			
 			
Other Classifications			
There are no other Classifications that are known to apply.			
Precautionary Statements			
Precautionary	Keep out of reach of children. Read label before use. Do not breathe vapours/spray. Wash hands thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Keep only in original container. Absorb spillage to prevent material damage. Store in corrosive resistant container with a resistant inner liner. Further precautionary statements can be found in Section 4 – First Aid.		
Page 1 of 6 May 2013		Product Name: Cleaning Chemical, Corrosive	



Cleaning Chemical, Corrosive Safety Data Sheet

3. Composition / Information on Ingredients

Component	CAS/ Identification	Class for ingredient(s)	Concentration
Surfactants	proprietary	6.1D (oral), 6.3B, 6.4A, 9.3C	>60%
Sodium hydroxide	1310-73-2	6.1E (oral), 8.1A, 8.2C, 8.3A for 2-5% solution	2-5%
Ingredients not contributing to HSNO classes	Proprietary	NA	<5%
Water	7732-18-5	non hazardous	balance

This is a commercial product whose exact ratio of components may vary. Trace quantities of impurities are also likely.

4. First Aid

General Information

If medical advice is needed, have product container or label at hand. You should call the National Poisons Centre if you feel that you may have been harmed, burned or irritated by this product. The number is 0800 764 766 (0800 POISON) (24 hr emergency service).

Recommended first aid facilities

Ready access to running water is required. Accessible eyewash is required.

Exposure

Swallowed	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Call a POISON CENTER or doctor if you feel unwell.
Eye contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Apply continuous irrigation with water for at least 15 minutes holding eyelids apart. Immediately call a POISON CENTER or doctor.
Skin contact	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or doctor/physician.
Inhaled	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

Advice to Doctor

Treat symptomatically

5. Firefighting Measures

Fire and explosion hazards:	There are no specific risks for fire/explosion for this chemical. It is non-flammable.
Suitable extinguishing substances:	Carbon dioxide, extinguishing powder, foam, fog sprays.
Unsuitable extinguishing substances:	Unknown.
Products of combustion:	Carbon dioxide, and if combustion is incomplete, carbon monoxide and smoke. Water: May form toxic mixtures and corrosive fumes in air and may accumulate in sumps, pits and other low-lying spaces, forming potentially explosive mixtures.
Protective equipment:	Self-contained breathing apparatus. Safety boots, non-flammable overalls, gloves, hat and eye protection.
Hazchem code:	2R

6. Accidental Release Measures

Containment	If greater than 1000L is stored, secondary containment and emergency plans to manage any potential spills must be in place.
Emergency procedures	In the event of spillage alert the fire brigade to location and give brief description of hazard. Stop the source of the leak, if safe to do so. Wear protective equipment to prevent skin, eye and respiratory exposure. Clear area of any unprotected personnel. Contain using sand, earth or vermiculite. Prevent by whatever means possible any spillage from entering drains, sewers, or water courses. (If this occurs contact your regional council immediately).



Cleaning Chemical, Corrosive Safety Data Sheet

Clean-up method	Use absorbent (soil, sand or other inert material). Rags are not recommended for the clean-up of spills, as they may create fire or environmental hazard. Collect and seal in properly labelled containers or drums for disposal. If contamination of crops, sewers or waterways has occurred advise local emergency services.
Disposal	Mop up and collect recoverable material into labelled containers for recycling or salvage. Recycle containers wherever possible. This material may be suitable for approved landfill. Dispose of only in accord with all regulations.
Precautions	Wear protective equipment to prevent skin and eye contamination and the inhalation of vapours. Work up wind or increase ventilation.

7. Storage & Handling

Storage	Avoid storage of harmful substances with food. Store out of reach of children. Containers should be kept closed in order to minimise contamination. Keep from extreme heat and open flames. Avoid contact with incompatible substances as listed in Section 10.
Handling	Keep exposure to a minimum, and minimise the quantities kept in work areas. See section 8 with regard to personal protective equipment requirements. Avoid skin and eye contact and inhalation of vapour, mist or aerosols.

8. Exposure Controls / Personal Protective Equipment

Workplace Exposure Standards





A workplace exposure standard (WES) has not been established by the NZ Ministry for Business, Innovation and Employment for this product. There is a general limit of 10mg/m³ for dusts and mists when limits have not otherwise been established.

NZ Workplace Exposure Stds (2013)	Ingredient	WES-TWA	WES-STEL
	sodium hydroxide	Ceiling 2 mg/m ³	no data

Engineering Controls

In industrial situations, it is expected that employee exposure to hazardous substances will be controlled to a level as far below the WES as practicable by applying the hierarchy of control required by the Health and Safety in Employment Act 1992 (HSE). Exposure can be reduced by process modification, use of local exhaust ventilation, capturing substances at the source, or other methods. If you believe air borne concentrations of mists, dusts or vapours are high, you are advised to modify processes or increase ventilation.

Personal Protective Equipment

Eyes		Protect eyes with goggles, safety glasses or full face mask. Avoid wearing contact lenses.
Skin	  	Avoid repeated or prolonged skin contact. Wear overalls, rubber boots and impervious gloves. Nitrile or Neoprene gloves are recommended. Replace frequently. Gloves should be checked for tears or holes before use. Remove protective clothing and wash exposed areas with soap and water prior to eating, drinking or smoking.
Respiratory		A respirator when airborne concentrations approach the WES (section 8). Use a respirator with a particulate filter (for dusts/mists). If using a respirator, ensure that the cartridges are correct for the potential air contamination and are in good working order.

WES Additional Information
Not applicable



Cleaning Chemical, Corrosive Safety Data Sheet

9. Physical & Chemical Properties

Appearance	Liquid preparation, colourless
Odour	Slight
pH	~11
Vapour pressure	Water vapour pressure
Viscosity	no data
Boiling point	~100°C
Volatile materials	No data
Freezing / melting point	~0°C
Solubility	Soluble in water
Specific gravity / density	No data
Flash point	Non flammable
Danger of explosion	NA
Auto-ignition temperature	NA
Upper & lower flammable limits	NA
Corrosiveness	Solution is considered to be a metal corrosive and corrosive to skin and eyes.

10. Stability & Reactivity

Stability	Stable
Conditions to be avoided	Containers should be kept closed in order to avoid contamination. Keep from extreme heat and open flames.
Incompatible groups	Strong acids, strong oxidising agents.
Substance Specific Incompatibility	None known
Hazardous decomposition products	Oxides of carbon.
Hazardous reactions	None known

11. Toxicological Information

Summary

IF SWALLOWED: the liquid is corrosive to the gastrointestinal tract and harmful if swallowed.

IF IN EYES: contact may cause severe damage to eyes with loss of sight.

IF ON SKIN: contact may cause severe burns to the skin.

IF INHALED: inhalation of concentrated vapours/mists of this product may be corrosive to the upper respiratory tract. Inhalation may result in damage to the lung.

Supporting Data

Acute	Oral	The estimated LD ₅₀ (oral, rat) for the mixture is between 2000 and 5,000 mg/kg. Sodium Hydroxide (NaOH): Schedule 4 poison. There is limited toxicity data available for NaOH due to the immediate corrosive effect on the digestive tract. One study (not validated) reported an LD ₅₀ for NaOH of 325mg/kg (reference: ECHA REACH registered substance official record: EC215-185-5).
	Dermal	Using LD ₅₀ 's for ingredients, the calculated LD ₅₀ (dermal, rat) for the mixture is >5000 mg/kg. Data considered includes: sodium hydroxide 1349 mg/kg.
	Inhaled	No toxicological information for inhalation. Inhalation of vapours/mists are irritating to the respiratory tract.
	Eye	The mixture is considered to be corrosive to the eye. The pH of the solution is ~11. EPA has classified solutions containing 2-5% sodium hydroxide as corrosive to the eye.
	Skin	The mixture is considered to be corrosive to the skin. The pH of the solution is ~11. EPA has classified solutions containing 2-5% sodium hydroxide as corrosive to the skin.
Chronic	Sensitisation	No ingredient present at concentrations > 0.1% is considered a sensitizer.
	Mutagenicity	No ingredient present at concentrations > 0.1% is considered a mutagen.
	Carcinogenicity	No ingredient present at concentrations > 0.1% is considered a carcinogen.
	Reproductive / Developmental	No ingredient present at concentrations > 0.1% is considered a reproductive or developmental toxicant or have any effects on or via lactation.
	Systemic	No ingredient present at concentrations > 1% is considered a target organ toxicant.
	Aggravation of existing conditions	None known.



Cleaning Chemical, Corrosive Safety Data Sheet

12. Ecological Data

Summary

This product is not considered to be ecotoxic under HSNO. However discharge to the aquatic environment may affect the pH of the water and hence may affect aquatic organisms. Do not discharge concentrate to sewer or waterways.

Supporting Data

Aquatic	Using EC ₅₀ 's for ingredients, the calculated EC ₅₀ for the mixture is > 100 mg/L. Data considered includes: sodium hydroxide 2-5% 45.4 mg/l (96hr, fish), 40.38 mg/l (48hr, water flea).
Bioaccumulation	No data
Degradability	No data
Soil	No evidence of soil toxicity.
Terrestrial vertebrate	This mixture does not trigger HSNO classification. However ingestion by terrestrial vertebrates will cause burns to the digestive tract. See acute toxicity in section 11.
Terrestrial invertebrate	No evidence of toxicity towards terrestrial invertebrates.
Biocidal	no data
Environmental effect levels	No EELs are available for this mixture or ingredients

13. Disposal Considerations

Restrictions	There are no product-specific restrictions, however, local council and resource consent conditions may apply, including requirements of trade waste consents.
Disposal method	Disposal of this product must comply with the requirements of the Resource Management Act for which approval should be sought from the Regional Authority. The substance must be treated and therefore rendered non-hazardous before discharge to the environment.
Contaminated packaging	Rinse containers with water before disposal. Preferably re-cycle container, otherwise send to landfill or similar.

14. Transport Information

Transport according to NZS 5433 (Transport of Hazardous Substances on Land). Considered a hazardous substance for transport.

UN number:	1824	Proper shipping name:	SODIUM HYDROXIDE SOLUTION
Class(es)	8	Packing group:	III
Precautions:	Corrosive	Hazchem code:	2R

15. Regulatory Information

This product is an approved substance under the Hazardous Substances and New Organisms Act (HSNO). Approval code: HSR002526, Cleaning Products (Corrosive) Group Standard 2006.

Specific Workplace Controls (as per HSNO approval referenced to Controls Matrix)


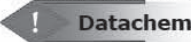
Key workplace requirements are:

MSDS	To be available within 10 minutes in workplaces storing any quantity.
Labelling	No removal of labels and/or decanting of product into other containers can occur.
Emergency plan	Required if > 1000L is stored.
Approved handler	Not required.
Tracking	Not required.
Bunding & secondary containment	Required if > 1000L is stored.
Signage	Required if > 1000L is stored in any one location.
Location test certificate	Not required.
Flammable zone	Not required.
Fire extinguisher	Not required.

Note: The above workplace requirements apply if only this particular substance is present. The complete set of controls for a location will depend on the classification and total quantities of other substances present in that location.

Other Legislation

In New Zealand, the use of this product may come under the Resource Management Act and Regulations, the Health, Safety in Employment Act and Regulations, local Council Rules and Regional Council Plans.

 Cleaning Chemical, Corrosive Safety Data Sheet	
16. Other Information	
Abbreviations	
Approval Code	Approval HSR002526, Cleaning Products (Corrosive) Group Standard 2006 Controls, EPA. www.epa.govt.nz
CAS Number	Unique Chemical Abstracts Service Registry Number
Ceiling	Ceiling limit: The maximum airborne concentration of a biological or chemical agent to which a worker may be exposed at any time.
Controls Matrix	List of default controls linking regulation numbers to Matrix code (e.g. T1, I16).
EC₅₀	Ecotoxic Concentration 50% – concentration in water which is fatal to 50% of a test population (e.g. daphnia, fish species)
ERMA	Environmental Risk Management Authority (now EPA)
EPA	Environmental Protection Agency (previously known as ERMA)
HAZCHEM Code	Emergency action code of numbers and letters that provide information to emergency services, especially fire fighters
HSNO	Hazardous Substances and New Organisms (Act and Regulations)
IARC	International Agency for Research on Cancer
LEL	Lower Explosive Limit
LD₅₀	Lethal Dose 50% – dose which is fatal to 50% of a test population (usually rats).
LC₅₀	Lethal Concentration 50% – concentration in air which is fatal to 50% of a test population (usually rats)
MBIE	Ministry for Business, Innovation and Employment (New Zealand)
MSDS/SDS	Material Safety Data Sheet or Safety Data Sheet
STEL	Short Term Exposure Limit - The maximum airborne concentration of a chemical or biological agent to which a worker may be exposed in any 15 minute period, provided the TWA is not exceeded
TWA	Time Weighted Average – generally referred to as WES averaged over typical work day (usually 8 hours)
UEL	Upper Explosive Limit
UN Number	United Nations Number
WES	Workplace Exposure Standard - The airborne concentration of a biological or chemical agent to which a worker may be exposed.
References	
Data	Unless otherwise stated comes from the EPA HSNO chemical classification information database (CCID) http://www.epa.govt.nz/hs/compliance/chemicals.html , for specific chemicals.
EPA Transfer Gazettes	Classifications and controls assigned for specific ingredients (consolidated gazette, 2004)
Controls Matrix	Part of the EPA New Zealand User Guide to the HSNO Control Regulations
WES 2013	The NZ Workplace Exposure Standards Effective from 2011, published by MBIE and available on their web site – www.dol.govt.nz .
Other References:	Suppliers MSDS
Review	
Date	Reason for review
May 2013	Not applicable – new MSDS
Disclaimer	
<p>This MSDS was prepared by Datachem LTD and is based on our current state of knowledge, including information obtained from suppliers. The MSDS is given in good faith and constitutes a guideline (not a guarantee of safety). The level of risk each substance poses is relevant to its properties (as summarised in the MSDS) AND HOW THE SUBSTANCE IS USED. While guidelines are given for personal protective equipment, such precautions must be relevant to the use. The likely HSNO classifications for this MSDS have been estimated based on general information from the supplier (e.g., hazard, toxicological). This MSDS is copyright Datachem and must not be copied, edited or used for other than intended purpose. To contact the MSDS author, email info@datachem.co.nz or phone: +64 9 940 30 80.</p>	
	
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The EPA thanks Birgit Rahm from Datachem LTD for the use of this safety data sheet.

Appendix 10: HSNO classifications and their hazard statements

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Physical hazards	
HSNO classification	Hazard description
1.1	Substances and articles that have a mass explosion hazard
1.2	Substances and articles that have a projection hazard but not a mass explosion hazard
1.3	Substances and articles that have a fire hazard and either a minor blast hazard or a minor projection hazard, or both, but not a mass explosion hazard
1.4	Substances and articles that present no significant explosive hazard
1.5	Very insensitive substances that have a mass explosion hazard
1.6	Extremely insensitive articles that do not have a mass explosion hazard
2.1.1A	Flammable gas- high hazard
2.1.1B	Flammable gas - medium hazard
2.1.2A	Flammable aerosol
3.1A	Flammable liquid - very high hazard
3.1B	Flammable liquid - high hazard
3.1C	Flammable liquid - medium hazard
3.1D	Flammable liquid - low hazard
4.1.1A	Readily combustible solids and solids that may cause fire through friction: medium hazard
4.1.1B	Readily combustible solids and solids that may cause fire through friction: low hazard
4.1.2A	Self-reactive substances: type A
4.1.2B	Self-reactive substances: type B
4.1.2C	Self-reactive substances: type C
4.1.2D	Self-reactive substances: type D
4.1.2E	Self-reactive substances: type E
4.1.2F	Self-reactive substances: type F
4.1.2G	Self-reactive substances: type G
4.1.3A	Solid desensitised explosives: high hazard
4.1.3B	Solid desensitised explosives: medium hazard
4.1.3C	Solid desensitised explosives: low hazard
4.2A	Spontaneously combustible substances: pyrophoric substances: high hazard
4.2B	Spontaneously combustible substances: self-heating substances: medium hazard
4.2C	Spontaneously combustible substances: self-heating substances: low hazard
4.3A	Solids that emit flammable gas when in contact with water: high hazard
4.3B	Solids that emit flammable gas when in contact with water: medium hazard
4.3C	Solids that emit flammable gas when in contact with water: low hazard
5.1.1A	Oxidising substances that are liquids or solids: high hazard
5.1.1B	Oxidising substances that are liquids or solids: medium hazard

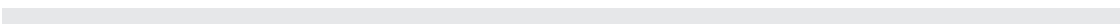
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HSNO classification	Hazard description
5.1.1C	Oxidising substances that are liquids or solids: low hazard
5.1.2A	Oxidising substances that are gases
5.2A	Organic peroxides: type A
5.2B	Organic peroxides: type B
5.2C	Organic peroxides: type C
5.2D	Organic peroxides: type D
5.2E	Organic peroxides: type E
5.2F	Organic peroxides: type F
5.2G	Organic peroxides: type G

Toxicity hazards

HSNO classification	Hazard description
6.1A	Substances that are acutely toxic - Fatal
6.1B	Substances that are acutely toxic - Fatal
6.1C	Substances that are acutely toxic- Toxic
6.1D	Substances that are acutely toxic - Harmful
6.1E	Substances that are acutely toxic –May be harmful, Aspiration hazard
6.3A	Substances that are irritating to the skin
6.3B	Substances that are mildly irritating to the skin
6.4A	Substances that are irritating to the eye
6.5A	Substances that are respiratory sensitisers
6.5B	Substances that are contact sensitisers
6.6A	Substances that are known or presumed human mutagens
6.6B	Substances that are suspected human mutagens
6.7A	Substances that are known or presumed human carcinogens
6.7B	Substances that are suspected human carcinogens
6.8A	Substances that are known or presumed human reproductive or developmental toxicants
6.8B	Substances that are suspected human reproductive or developmental toxicants
6.8C	Substances that produce toxic human reproductive or developmental effects on or via lactation
6.9A	Substances that are toxic to human target organs or systems
6.9B	Substances that are harmful to human target organs or systems
8.1A	Substances that are corrosive to metals
8.2A	Substances that are corrosive to dermal tissue UN PGI
8.2B	Substances that are corrosive to dermal tissue UN PGII
8.2C	Substances that are corrosive to dermal tissue UN PGIII
8.3A	Substances that are corrosive to ocular tissue

Environmental hazards	
HSNO classification	Hazard description
9.1A	Substances that are very ecotoxic in the aquatic environment
9.1B	Substances that are ecotoxic in the aquatic environment
9.1C	Substances that are harmful in the aquatic environment
9.1D	Substances that are slightly harmful to the aquatic environment or are otherwise designed for biocidal action
9.2A	Substances that are very ecotoxic in the soil environment
9.2B	Substances that are ecotoxic in the soil environment
9.2C	Substances that are harmful in the soil environment
9.2D	Substances that are slightly harmful in the soil environment
9.3A	Substances that are very ecotoxic to terrestrial vertebrates
9.3B	Substances that are ecotoxic to terrestrial vertebrates
9.3C	Substances that are harmful to terrestrial vertebrates
9.4A	Substances that are very ecotoxic to terrestrial invertebrates
9.4B	Substances that are ecotoxic to terrestrial invertebrates
9.4C	Substances that are harmful to terrestrial invertebrates



5 < LC₅₀ ≤
mg ≥ 5%
2 μ x 100
M x LD₅₀
T_{mix} = 30mg
HSNO

Active ingredients used for the manufacture of agricultural compounds
Additives, process chemicals and raw materials
Aerosols
Agricultural compounds
Anti-fouling paints
Animal nutritional and animal care products
Class 4 substances
Cleaning products
Compressed gas mixtures
Construction products
Corrosion inhibitors
Cosmetic products
Denatured ethanol
Dental products
Embalming products
Fertilisers
Fire fighting chemicals
Food additives and fragrance materials
Fuel additives
Fumigants
Graphic materials
Laboratory chemicals and reagent kits
Leather and textile products
Lubricants
Metal industry products
Oxidising substances (class 5.1.1) and organic peroxides (class 5.2)
Pesticides
Pharmaceutical active ingredients
Pheromone containing products
Photographic chemicals
Polymers
Refining catalysts
Single component chemicals
Solvents
Surface coatings and colourants
Tattoo inks
Timber treatments
Veterinary medicines
Vertebrate Toxic Agents
Water treatment chemicals

Assigning a Product to a HSNO Approval

May 2013 / Revised June 2014



Environmental
Protection Authority
Te Mana Rauhi Taiao