

Hazardous Substances (HSUB)

Amended to comply with National Planning Standards September 2022

Issues

[Hazardous substances](#) are used in many industries and activities in the District. Activities involving [hazardous substances](#) have positive [effects](#) by providing products and services, but also create risks to those who use them and the surrounding [environment](#). The risks arise from the possible accidental [release](#), fire or explosion of these [hazardous substances](#).

Inadequate [storage](#) and location of [hazardous substances](#) are the main areas of concern. Where hazardous facilities are located next to coastal waters, waterways, above aquifers, or close to [environmentally](#) sensitive areas such as [indigenous wetlands](#) or [residential areas](#), the issue of unintentional [release](#) of [hazardous substances](#) is of special concern. Possible adverse [effects](#) of [hazardous substances](#) upon the environment include:

- Contamination of [water](#), soil and air.
- Short and long-term damage to ecosystems.
- Accumulation of persistent substances in the bodies of humans and animals, resulting in damage to their health and well-being, including spiritual values held by [tangata whenua](#).

This chapter manages the use, development or protection of [land](#) so as to prevent adverse effects from facilities using, storing, transporting or disposing of [hazardous substances](#). Management of the [hazardous substances](#) in a wider sense is the function of the [Hazardous Substances and New Organisms Act 1996](#).

Objectives

HSUB-O1– Adverse Effects	Protection of the environment from the adverse effects and risks, from activities involving the use, storage , manufacture, transport and disposal of hazardous substances .
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Policies

HSUB-P1– Location	To ensure that hazardous substances are stored and used in locations where any adverse effects on human health, the surrounding natural and physical resources, and ecosystems, and surrounding land use activities are avoided, remedied or mitigated.
HSUB-P2– Design of Facilities	To ensure that activities involving the use or storage of hazardous substances are designed, constructed and managed to avoid the risk of fire and explosion, and to protect human and environmental health.
HSUB-P3– Transportation	To ensure that the transportation of hazardous substances is undertaken in a manner that reduces the risk of accidental leaks and spills.
HSUB-P4– Disposal	To dispose of hazardous substances waste at specialised facilities to avoid inappropriate release into the environment .

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Rules

HSUB -R1	The Use, Storage or On-Site Movement of Hazardous Substances	
All Zones	Activity Status: Permitted Where: 1. The use, storage or on-site movement of hazardous substances complies with the conditions for permitted activities in Appendix 8 of the District Plan.	Activity Status when compliance not achieved: Discretionary
HSUB -R2	The Movement of Hazardous Substances Between Sites	
All Zones	Activity Status: Permitted Where: 1. The movement is conducted by means of an underground pipeline.	Activity Status when compliance not achieved: Discretionary

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Introduction

This Appendix gives [effect](#) to the objectives, policies and rules.

A8.2 Hazardous Substances - Rules

Permitted activities

A8.3 Hazardous Facilities

A [hazardous facility](#) is a **permitted** activity if:

a) The activity is one of the following exemptions:

- i. Retail sale of petrol (up to 100,000 litres [storage](#) in underground tanks), diesel (up to 50,000 litres [storage](#) in underground tanks) and LPG (up to 2 tonnes) in the Business, Port and Airport Zones, and the [storage](#) (and dispensing) of aviation fuel in the Airport Zone, in approved tanks of up to 100,000 litres (total) provided that the Code of Practice for '*Design, Installation and Operation of Underground Petroleum System*' published by the Department of Labour, OSH (or similar), or AS/NZ 1596:1997 [storage](#) and Handling of LPG (or a more recent edition) or other approved Code of Practice for fuel installation systems, are adhered to;
- ii. [Road](#) construction and improvements with related [storage](#), all within [road](#) reserves;
- iii. Milk [storage](#), provided that measures are taken and/or facilities installed so as to ensure that any spillage is prevented from entering a watercourse or [waterbody](#), or from seeping into groundwater;
- iv. Any accepted [discharge](#) by a network utility operator of trade waste into sewerage and waste treatment facility;
- v. [storage](#) and use of hazardous consumer products for private domestic use contained within original packaging;
- vi. Retail outlets for the sale of [hazardous substances](#) in domestic quantities;
- vii. Fuel in motor vehicles, boats and small engines such as weed trimmers, lawn mowers, chainsaws etc;
- viii. Oil, petrol and gas pipelines;
- ix. Any use or [storage](#) of radioactive materials with an activity level below that specified as an exempt activity in the Radiation Protection Regulations 1982;
- x. Application of agri-chemicals in a [farming](#), forestry or horticulture situation, provided that NZS 8409:1999 Code of Practice for the Management of Agrichemicals (or a more recent edition) and any applicable regional policies and rules are adhered to;
- xi. The use and [storage](#) of [hazardous substances](#) associated with [Temporary Military Training Activities](#) where this complies with New Zealand Defence Force orders contained within Ammunition and Explosives Regulations Volume One for the [storage](#) of ammunition and explosives and New Zealand P2, Safety in Training;

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- xii. The use and storage of fuel, of up to 1,000 litres of petrol and 5,000 litres of diesel, for use on-site for farming, forestry or horticultural operations, provided that these facilities are at least 30m away from other storage facilities for hazardous substances, and that suitable measures are provided to prevent any spills to water courses or water bodies, or to ground or groundwater.

Or

- b) The total Quantity Ratio for any Effect Group does not exceed the level stated below for the Environment in which the activity is to establish:

Residential Zones, Future Urban Zone, Rural Lifestyle Zone and Settlement Residential Sub-Zone.....0.025

Rural Production Zone0.5

City Centre Zone, Mixed Use Zone, Local Centre Zone, Waterfront Zone, Neighbourhood Centre Zone and Settlement Centre Sub-Zone.....0.15

Hospital Zone, Light Industrial Zone, Shopping Centre Zone and Commercial Zone0.4

Strategic Rural Industries Zone, Settlement Industry Sub-Zone, Heavy Industrial Zone and Port Zone1.5

Airport Zone1.0

Open Space and Recreation-Zones0.1

- c) Storage Containers: Storage containers for hazardous substances and waste containing hazardous substances are:

- i. Constructed or lined with a material that is resistant to corrosion or embrittlement by the hazardous substance;
- ii. Fitted with an appropriate release mechanism to prevent increases or decreases of pressure, or of an approved design for the substance being stored;
- iii. Designed in a manner that prevents exposure to ignition sources;
- iv. Designed in a manner that prevents unintentional release of the hazardous substance or waste.

- d) Spill Containment: The hazardous substance is exempt under the Hazardous Substances and New Organisms Act 1996 and its Regulations, or the site is serviced by a spill containment system that is:

- i. Constructed from impervious material resistant to the hazardous substances used, stored, manufactured, mixed, packaged, loaded, unloaded or otherwise handled on the site;
- ii. Able to contain the maximum volume of the largest tank used, or where drums or other containers are used, able to contain half the maximum volume of substances stored;
- iii. Able to prevent any spill or other unintentional release of hazardous substances, and any stormwater or fire water that has become contaminated, from entering the stormwater drainage system;

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- iv. Able to prevent any spill or other unintentional release of hazardous substances, and any stormwater or fire water that has become contaminated, from discharging into, or onto land or water (including groundwater and potable water supplies), unless permitted by a resource consent.
- e) Site Design: The hazardous substances is exempt under the Hazardous Substances and New Organisms Act 1996 and its Regulations, or any part of a site where hazardous substances are used or stored is to be designed, constructed and managed in a manner that prevents:
 - i. Any effects of the intended use from occurring outside of the intended area;
 - ii. The entry or discharge of the hazardous substance into the stormwater drainage or a municipal wastewater system, unless accepted by the network utility operator, and the ultimate discharge of the substance from the utility complies with any relevant discharge permit or plan provisions for discharges;
 - iii. The entry or discharge of the hazardous substance into the stormwater drainage or a municipal wastewater system, in the event of a spill or other unintentional release;
 - iv. The contamination of any land or water (including groundwater and potable water supplies) in the event of a spill or other unintentional release of hazardous substances.
- f) Stormwater Design: The hazardous substance is exempt under the Hazardous Substances and New Organisms Act 1996 and its Regulation, or a site where hazardous substances are used or stored shall be designed, constructed and managed in a manner that any stormwater originating on or collected on the site:
 - i. Does not transport any hazardous substances that are contaminants to any land or water, unless permitted by any resource consent;
 - ii. Does not enter or discharge into the stormwater drainage or a municipal wastewater system, unless accepted by the network utility operator, and the ultimate discharge of the substance from the utility complies with any relevant discharge permit of plan provisions for discharges.
- g) Underground Storage Tanks for the Storage of Hazardous Substances: Adherence to the Code of Practice for 'Design, Installation and Operation of Underground Petroleum Systems' (Department of Labour - Occupational Safety and Health), or another approved by the Environmental Risk Management Authority will be accepted as one method of complying with this condition. These underground storage tanks will be of double containment design, unless the site geology and soil structure make this design unnecessary. Where a site for the storage of hazardous substances is within 100.0m of a water body or coastal water, all pipes will be of double containment design.
- h) Signage: Any hazardous facility is signposted to indicate the nature of the substances stored or used. Adherence to the Code of Practice for 'Warning Signs for Premises Storing Hazardous Substances' of the New Zealand Chemical Industry Council or any other Code of Practice approved by the New Zealand Fire Service will be accepted as one method of complying with this condition.
- i) Waste Management: Any process waste or waste containing hazardous substances shall be managed to prevent:
 - i. The waste entering or discharging into the stormwater drainage system or into the wastewater system, unless permitted by the wastewater utility operator;

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- ii. The waste discharging into, or onto land and/or water (including groundwater and potable water supplies), unless permitted by a resource consent.

Any facility generating waste containing hazardous substances shall dispose of these wastes to appropriately permitted facilities, or be serviced by a reputable waste disposal contractor.

- j) Records: All sites which use or store hazardous substances shall at all times maintain a record of all types and quantities of hazardous substances and wastes produced or stored. This record will also note the method of waste disposal.
- k) Emergency and Contingency Plans: All sites which produce, use, store or dispose of hazardous substances shall prepare an emergency and contingency plan which sets out how any spillage or leaks will be contained, cleaned up and disposed of. The plan must identify the elements required to respond to an emergency and define responsibilities and specific tasks in an emergency.

Discretionary activities

A hazardous facility that contravenes a condition for a permitted activity is a **discretionary** activity.

Note: The provisions of the Regional Water and Soil Plan for Northland also apply to discharges from hazardous facilities.

A8.4 Reasons for Rules / Explanations

Use, storage or on-site movement of hazardous substances must comply with the relevant effects ratio, unless it comes within the exemptions in paragraph a) of Rule A8.3 Hazardous Facilities. These exemptions are included to cover common situations where hazardous substances are held in limited quantities, or in conditions where further management of risk is unnecessary. The effects ratios are derived from the Hazardous Facilities Screening Procedure, which has been adopted by many other districts throughout the country. The process by which this procedure was developed involved accepted risk management theory and scientific evidence. The use of effects ratios reflects the philosophy of the Resource Management Act 1991, whereby the method assesses the potential adverse effects of the use, or storage of hazardous substances, in a site-specific context. The various effect ratio levels for each environment reflect the levels of effects beyond which a resource consent application is required. The Hazardous Facilities Screening Procedure methodology is explained in section A8.6 below.

A8.5 Information to be Supplied with Resource Consent Applications

The following information is required to be submitted with an application for a discretionary activity involving the use, or storage of hazardous substances.

Qualitative or Quantitative Risk Assessment

1. The risk assessment must be a quantitative risk assessment, if the effects ratio is more than twice the maximum effects ratio for a permitted activity stated in Rule A8.3(b). A qualitative risk assessment applies in all other cases.
2. The risk assessment should consider:
 - a) Identification of potential hazards, failure modes and exposure pathways;
 - b) The separation distance to neighbouring activities, with emphasis on people-sensitive activities such as childcare facilities, schools, rest homes, hospitals, shopping centres and residential areas;

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- c) The location of the facility in relation to the nearest aquifer recharge area, river, coast or other sensitive environment;
- d) The nature of the subsoil and the site geology;
- e) The distance to, and effect on, environmentally sensitive areas such as wildlife habitats or water catchments;
- f) Assessment of the probability and potential consequences of an accident leading to a release of a hazardous substance or loss of control;
- g) Identification of cumulative or synergistic effects;
- h) Fire safety and fire water management;
- i) Adherence to health and safety or environmental management systems;
- j) Spill contingency and emergency planning, monitoring and maintenance procedures;
- k) Site drainage and off-site infrastructure, including stormwater drainage system, sewer type and capacity;
- l) The transport of hazardous substances;
- m) The disposal of wastes containing hazardous substance.

Risk Mitigation and Management

1. The adoption of specific spill contingency plans, emergency procedures, stormwater management and treatment, treatment and disposal procedures for wastes containing hazardous substances, fire safety, monitoring and maintenance procedures, and site management systems. Site management systems include: safety policy; formal descriptions of organisational structure and responsibilities; operating, emergency and monitoring procedures; and performance auditing.

Miscellaneous

1. Alternative locations or methods for undertaking the activity, where it is likely that an activity may result in significant adverse effects on the environment.
2. Adverse effects on the safety of the operation of the adjoining road network from vehicles transporting hazardous substances in residential areas. Conditions may be imposed that require access along specified routes.

A8.6 Overview of the Hazardous Facilities Screening Procedure

The Hazardous Facility Screening Procedure was prepared on behalf of 36 local authorities in New Zealand. The project was initiated by Environment Waikato and the Auckland Regional Council and was assisted by the Auckland City Council and various consultants who provided the technical support. The technical background to the procedure is outlined in the document Land Use Planning for Hazardous Facilities - a Resource for Local Authorities and Hazardous Facility Operators (1999) and this can be viewed at the Council.

The Hazardous Facility Screening Procedure focuses on assessing three groups of potential adverse effects (effects groups):

- Effects caused by fire or explosion;
- Effects on human health;
- Environmental effects.

Possible adverse environmental effects of hazardous substances can be predicted by the hazard of the substance and the anticipated consequences of its release to the environment. Adverse effects include:

- Contamination of water, soil and air;

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- Short and long-term damage to ecosystems;
- Accumulation of persistent substances in the bodies of humans and animals, resulting in chronic or long-term damage to their health;
- Acute damage to human health through exposure to substances affecting skin, mucus membranes, respiratory and digestive systems;
- Damage to the environment, human health and property through fire and explosion events.

It is important to distinguish between the **hazard** of a substance and the **risk** it poses:

- **Hazard** is principally defined by the intrinsic properties of the substance, such as its flammability or toxicity;
- The **risk** presented by a substance is defined by the probability of its release, combined with the potential of that release.

The Hazardous Facility Screening Procedure focuses on the potential effects of a hazardous substances release, and thus brings the essential dimension of risk into Council evaluations of hazardous facilities proposals. It works by assessing the quantities and hazard posed by substances on a proposed site in relation to each Council's own assessment of different levels of acceptable risk in different localities. This is stated as the 'Quantity Ratio' for each environment identified in this plan.

Generally, each substance to be used or stored on the site should be assessed for its effects in each of the three Effect Groups. For each substance and in each Effect Group, the Hazardous Facility Screening Procedure has assigned the following:

- a) A Base Quantity (B) which is mainly dependent on the substance's intrinsic hazardous properties. The Base Quantity is the amount of substance that has been assessed as generating no significant off-site effects in an industrial area, before site and substance-specific considerations have been taken into account. It is expressed as the weight or volume (for compressed gases), of classes of substances.
- b) Adjustment Factors (FF, FH, FE) which have been developed specifically for use with the Hazardous Facility Screening Procedure. These adjust the Base Quantity of substances on the site, to reflect the risk posed by factors which increase or decrease the likelihood and consequences of release, such as the physical state of the substance, the type of storage and activity, site separation distance, and the environmental sensitivity of the location.

Users of the Hazardous Facility Screening Procedure then calculate the following:

- a) An Adjusted Quantity, by multiplying the Base Quantities by the Adjustment Factors. This generates an Adjusted Quantity for each substance in each of the Effect Groups, so as to more realistically reflect the potential effects of the substances on the site.
- b) The Quantity Ratio for each substance in each Effects Group, by dividing the proposed quantity of the substance to be used or stored with the Adjusted Quantity. Where multiple substances are used or stored, the Quantity Ratios for each of the Effect Groups are added up, to indicate the cumulative potential effects of the proposed facility.

The Total Quantity Ratio (i.e. the sum of all Effects Ratios of individual substances within an Effects Group) is used to determine whether or not the activity needs a resource consent. Rule A8.3(b) indicates the Total Quantity Ratio values at which an activity or facility is permitted or discretionary in different Zones.

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If the [Hazardous Facility](#) Screening Procedure indicates that a proposed facility is discretionary, a more detailed assessment of the risks will be needed. This risk assessment should take account of:

- The probability and [effects](#) of potential hazardous substances accidents;
- The proposed measures to mitigate and manage the risk; and
- Location and characteristics of the proposed [site](#).

The granting of a resource consent would then be considered in terms of whether the off-site risks presented by a hazardous facility are adequately contained and managed. The Hazardous Facility Screening Procedure does not determine the outcome of the resource consent application.

A conceptual overview of the Hazardous Facility Screening Procedure is shown in Figure A8.1.

A8.7 Where the Hazardous Facility Screening Procedure fits into the Range of Controls on Hazardous Facilities

The Hazardous Facility Screening Procedure is simply a tool for determining whether or not an activity needs a resource consent. Therefore it forms only one component of a management strategy containing other essential and complementary elements.

The tools available to regulatory bodies for controlling [hazardous substances](#) are as follows:

- a) Locational controls, such as zoning, which determines where activities may locate;
- b) Management and design controls, such as performance standards or rules, that control how activities are undertaken;
- c) [Land](#) use controls imposed by way of a [land](#) use consent, when the hazardous facilities screening procedure and Rule A8.3(b) screen out facilities which require more specific controls.

A8.9 Rating Hazardous Substances for the Hazardous Facility Screening Procedure

To be able to assess [hazardous substances](#) under the HFSP, they must be rated first. The rating criteria, which are broadly based on the HSNO classification criteria, are specified in Table 8.3. For the purpose of the HFSP, each substance receives a hazard rating based on three [Effect](#) Types:

- Fire/Explosion [Effects](#): concerned with damage to property, the built [environment](#) and safety of people;
- Human Health [Effects](#): concerned with the well-being, health and safety of people;
- Environmental [Effects](#): concerned with damage to ecosystems and [natural resources](#).

Each [Effect](#) Type is divided into three hazard levels:

- High;
- Medium;
- Low.

The rating of a [hazardous substance](#) for the HFSP requires each substance to be assessed in terms of each of the hazard categories listed in Table 8.3. The Council holds information to assist with the process of rating [hazardous substances](#) for the Hazardous Facility Screening Procedure.

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Where information for the rating of a hazardous substance for the HFSP is not, or is only partially available, a precautionary default rating of 'Medium' for the Fire/Explosion and Human Health Effect Types, and 'High' for the Environmental Effect Type must be applied.

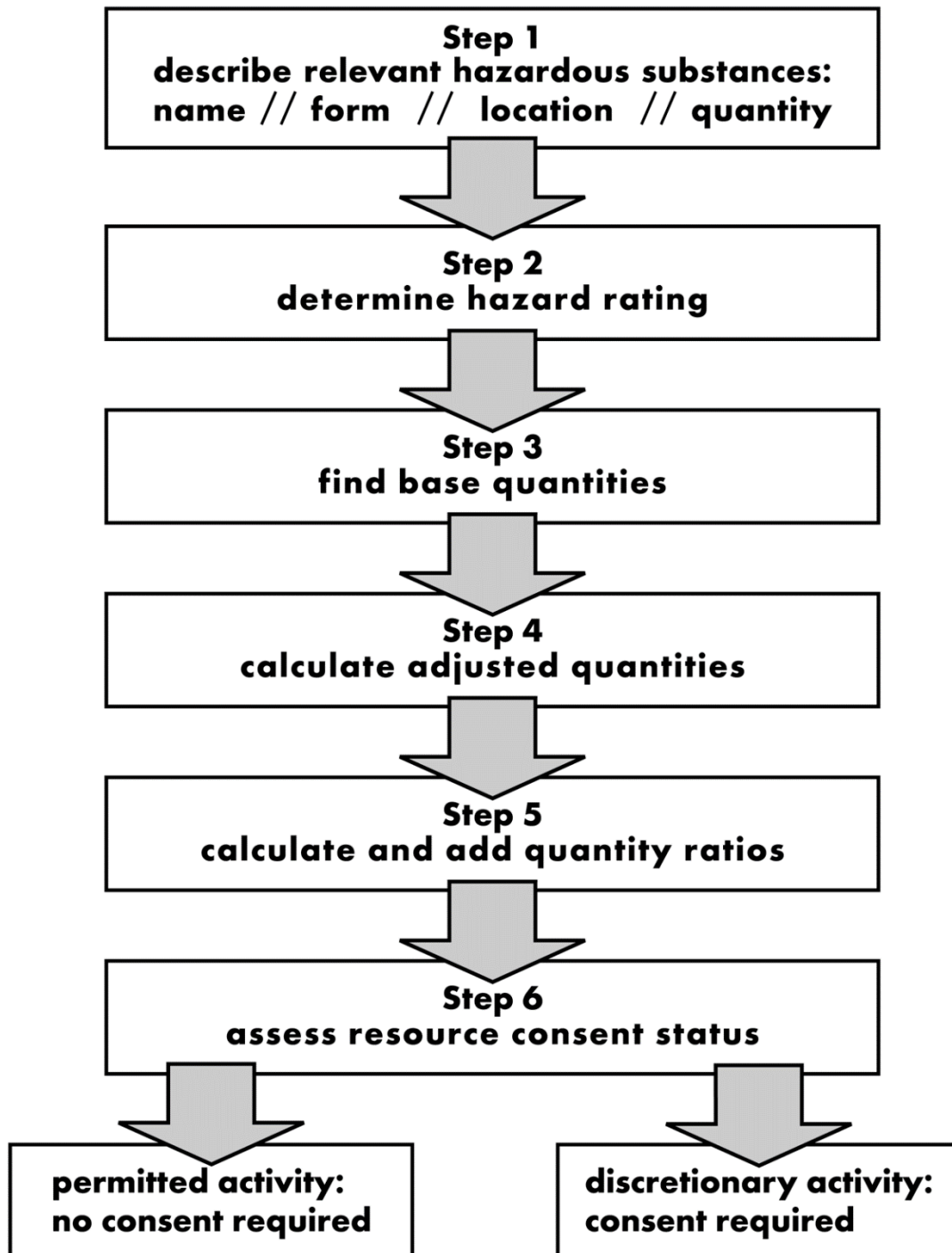
A8.10 Hazardous Facility Screening Procedure - Step-by-Step Guide

This section is a step-by-step guide on how to use the Hazardous Facility Screening Procedure (HFSP), following the steps shown in Figure 8.1. The Council will make available suitable guidance and working materials on the use and application of the Hazardous Facility Screening Procedure so that people using or storing hazardous substances can make their own calculations.

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Figure 8.1: Overview of the Step-by-Step Guide to the HFSP



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Use, Storage and On Site Movements of Hazardous Substances – Procedures					
STEPS	HFSP CALCULATIONS				EXPLANATION
<p>1. Describe the <u>hazardous facility</u></p> <p>Prior to using the HFSP, it is necessary to compile a full description of the <u>hazardous facility</u> in question. This includes the creation of an inventory of <u>hazardous substances</u> held on the <u>site</u>, including:</p> <ul style="list-style-type: none"> Names of the <u>hazardous substances</u>; Quantities of the <u>hazardous substances</u>; The physical form of the substances at 20°C and 101.3 kPa; The location of use or <u>storage</u> on the <u>site</u>, including separation distances from the <u>site</u> boundary and neighbouring <u>hazardous facilities</u> (on-site and off-site). <p>The description should also include site-specific details, including neighbouring <u>land</u> uses and the surrounding <u>environment</u>, with a focus on sensitive <u>land</u> uses and receptors (e.g. retirement accommodation, aquifers or <u>indigenous wetlands</u>).</p>	<p>Substance Name</p> <p>Substance 1</p> <p>Substance 2</p> <p>...</p> <p>Substance 10</p>	<p>Substance Form</p> <p>(liquid, solid, gas)</p>	<p>Location of substances on <u>site</u></p>	<p>Proposed Quantity (P)</p> <p>(tonnes or m³)</p>	<p>The HFSP uses standard units of tonnes (t) (for solids, liquids and liquefied gases) and cubic metres (m³) (for compressed gases). In some cases, it may therefore be necessary to convert substance quantities to these units. In the case of liquids, specific gravity (or density) must be taken into consideration when converting litres or m³ to tonnes (i.e.,</p> $\frac{\text{volume of liquid (litres)} \times \text{specific gravity}}{1000} = \text{tonnes}.$ <p>Adjustments to quantities are also necessary where a substance is diluted with <u>water</u> or mixed with another substance. In this instance, only the percentage quantity of the <u>hazardous substance</u>, or product in the dilution or mixture is assessed for the purposes of HFSP calculations (unless a mixture is more hazardous than its components, in which case data on the mixture needs to be used).</p> <p>An exception to this is products or brands that already constitute dilutions or mixtures of <u>hazardous substances</u> and which have been classified in terms of their hazardous properties as the 'whole' dilution or mixture for life cycle management purposes. Examples of this are corrosives, oxidising substances and pesticides, which are often sold commercially as standard solutions or strengths. In these cases, quantity adjustments are only applied when these commercially supplied concentrations are further diluted or mixed.</p>
	<p>Petrol</p>	<p>Liquid</p>	<p><30.0m</p>	<p>50 t</p>	

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Use, Storage and On Site Movements of Hazardous Substances – Procedures						
STEPS	HFSP CALCULATIONS			EXPLANATION		
<p>2. Determine Hazard Rating</p> <p>For the purposes of the HFSP, the <u>effects</u> of substances are categorised into three <u>Effect</u> Types:</p> <ul style="list-style-type: none"> • Fire/Explosion <u>Effect</u> Type: addressing damage to the built <u>environment</u> and safety of people; • Human Health <u>Effect</u> Type: addressing adverse <u>effects</u> on the well-being, health and safety of people; • Environmental <u>Effect</u> Type: addressing adverse <u>effects</u> on ecosystems and <u>natural resources</u>. <p>Each <u>Effect</u> Type is divided into three Hazard Rating Levels:</p> <p>◆ High ◆ Medium ◆ Low</p> <p>The rating levels are based predominantly on the <u>HSNO</u> classification system.</p>	<p>Substance Name</p> <p>Substance 1</p> <p>Substance 2</p> <p>Substance 10</p>	Hazard Rating				
		Fire/Explosion	Human Health	<u>Environment</u>		
		High (H)	High (H)	High (H)		
		or	or	or		
		Medium (M)	Medium (M)	Medium (M)		
Or	Or	Or				
Low (L)	Low (L)	Low (L)				
		EXAMPLE				

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Use, Storage and On Site Movements of Hazardous Substances – Procedures																			
STEPS	HFSP CALCULATIONS			EXPLANATION															
<p>3. Find Base Quantities</p> <p>The Base Quantity (B) is pre-calibrated. It is the amount of a substance that has been assessed as generating no significant off-site effects in a heavy industrial area before site- and substance-specific considerations have been taken into account (refer Step 4). Base Quantities for different hazardous properties, and hazard ratings in each Effect Type, are listed in Table 8.1.</p>	<p>Substance Name</p> <p>Substance 1</p> <p>Substance 2</p> <p>.....</p> <p>Substance 10</p>	<p>Base Quantities (B)</p> <table border="1"> <thead> <tr> <th>Fire/Explosion</th> <th>Human Health</th> <th>Environment</th> </tr> </thead> <tbody> <tr> <td>B₁</td> <td>B₁</td> <td>B₁</td> </tr> <tr> <td>B₂</td> <td>B₂</td> <td>B₂</td> </tr> <tr> <td>.....</td> <td>.....</td> <td>.....</td> </tr> <tr> <td>B₁₀</td> <td>B₁₀</td> <td>B₁₀</td> </tr> </tbody> </table>			Fire/Explosion	Human Health	Environment	B ₁	B ₁	B ₁	B ₂	B ₂	B ₂	B ₁₀	B ₁₀	B ₁₀
	Fire/Explosion	Human Health	Environment																
B ₁	B ₁	B ₁																	
B ₂	B ₂	B ₂																	
.....																	
B ₁₀	B ₁₀	B ₁₀																	
<p>Petrol</p>	<p>EXAMPLE</p> <table border="1"> <tbody> <tr> <td>10 t</td> <td>-</td> <td>1 t</td> </tr> </tbody> </table>			10 t	-	1 t													
10 t	-	1 t																	
<p>4. Calculate Adjusted Quantity (A)</p> <p>The pre-calibrated Adjustment Factors (FF, HF, EF) are multiplied with the Base</p>	<p>Substance Name</p>	<p>Adjusted Quantities (A)</p> <table border="1"> <thead> <tr> <th>Environment</th> </tr> </thead> <tbody> <tr> <td></td> </tr> </tbody> </table>			Environment														
Environment																			
<p>For example, in the Fire/Explosion Effect Type [Sub-category Flammables], non-significant off-site effects in a heavy industrial area are represented by a Base Quantity of:</p> <ul style="list-style-type: none"> 100 tonnes of a HSNO Category D flammable liquid which has a low hazard level for the Fire/Explosion Effect Type. 30 tonnes of a HSNO Category C flammable liquid, which has a medium hazard level for the Fire/Explosion Effect Type. 																			
<p>Different Adjustment Factors are applied for each Effect Type. For example, for the Fire/Explosion Effect Type, the</p>																			

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Use, Storage and On Site Movements of Hazardous Substances – Procedures					
STEPS	HFSP CALCULATIONS				EXPLANATION
<p>Quantities (B) to account for substance properties and site-specific environmental circumstances. This multiplication yields the Adjusted Quantity (A).</p> <p>Adjustment Factors differ for each of the Effect Types, and take into account the following considerations:</p> <ul style="list-style-type: none"> The physical state of the substance; The type of storage; The type of activity or use; Separation distances to the site boundary; The environmental sensitivity of the site location. <p>The Adjustment Factors are listed in Table 4.</p>	Substance 1 Substance 2 Substance 10	Fire/ Explosion A ₁ A ₂ A ₁₀	Human Health A ₁ A ₂ A ₁₀	A ₁ A ₂ A ₁₀	<p>temperature is relevant, while for the Human Health Effect Type, proximity to a potable water resource is important.</p> <p>In some instances, more than one Adjustment Factor within each Effect Type must be applied, which then need to be multiplied with each other to yield the total Adjustment Factor for the Effect Type. When the Adjustment Factors for each Effect Type have been calculated, they in turn are multiplied with the Base Quantity to yield the Adjusted Quantity).</p> <p>In the example given, the following parameters have been assumed:</p> <ul style="list-style-type: none"> <30m to site boundary; Not adjacent to water body; Underground storage.
<p>5. Calculate and add Quantity Ratios (FQ, HQ, EQ)</p> <p>This step requires the calculation of the Quantity Ratio for each hazardous substance in question. The Quantity Ratio</p>	Substance Name Substance 1	Quantity Ratios (FQ, HQ, EQ)			<p>By using the dimensionless ratio of the Proposed Quantity of a hazardous substance over the Adjusted Quantity, it is possible to aggregate the effects presented by multiple substances held on the same</p>
		Fire/ Explosion FQ ₁	Human Health HQ ₁	<u>Environment</u> EQ ₁	
	Petrol	100 t (10 tonnes x 10)	-	3 t (1 tonne x 3)	

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Use, Storage and On Site Movements of Hazardous Substances – Procedures											
STEPS	HFSP CALCULATIONS				EXPLANATION						
<p>is a dimensionless number. It is obtained by dividing the quantity of a substance that is proposed to be used or stored on a <u>site</u>, i.e. the Proposed Quantity (P) by the Adjusted Quantity (A).</p> <p>If several <u>hazardous substances</u> are used or stored on a <u>site</u>, the Quantity Ratios calculated for each of these substances are added up for each <u>Effect</u> Type.</p> <p>Note that FQ/HQ/EQ_{Total} stands for the total sum of Quantity Ratio values from all assessed <u>hazardous substances</u>, within each <u>Effect</u> Type.</p>	Substance 2	FQ ₂	HQ ₂	EQ ₂	<p><u>site</u>. Hence, it becomes possible to assess the cumulative potential <u>effects</u> which may be created by several substances present on the same <u>site</u>.</p>						
							
	Substance 10	FQ ₁₀	HQ ₁₀	EQ ₁₀							
		FQ_{Total}	HQ_{Total}	EQ_{Total}							
	Petrol	0.50	-	16.67							
	(50 tonnes / 100 tonnes)		(50 tonnes / 3 tonnes)								
<p>6. Assess resource consent status of <u>hazardous facility</u></p> <p>When assessing the resource consent status of a particular <u>hazardous facility</u>, the added Quantity Ratios for each <u>Effect</u> Type are compared with relevant Consent Status Indices in the Resource Consent Matrix in</p>	<p>Substance Name</p> <p>Substance 1</p> <p>Substance 2</p> <p>.....</p>	<p>Does Quantity Ratio exceed Consent Status Index?</p> <table border="1"> <tr> <td>Fire/Explosion</td> <td>Human Health</td> <td><u>Environment</u></td> </tr> <tr> <td>YES/NO</td> <td>YES/NO</td> <td>YES/NO</td> </tr> </table>			Fire/Explosion	Human Health	<u>Environment</u>	YES/NO	YES/NO	YES/NO	<p>When examining total Quantity Ratios against applicable Consent Status Indices, one or several substances may trigger a resource consent. This highlights the fact that when assessing <u>hazardous facilities</u>, it is often sufficient to assess just a few <u>hazardous substances</u> to start off with, mainly those that are either highly</p>
Fire/Explosion	Human Health	<u>Environment</u>									
YES/NO	YES/NO	YES/NO									

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Use, Storage and On Site Movements of Hazardous Substances – Procedures				
STEPS	HFSP CALCULATIONS			EXPLANATION
the District Plan. If they are exceeded, a resource consent is required.	Substance 10			hazardous or are used/stored in high quantities.

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Table 8.1: Base Quantities (B) for all Effect Types and Hazard Ratings

HSNO Category	UN Class Equivalent	Hazard Level	Unit	Base Quantity (B)		
				Fire/ Explosion	Human Health	Environment
Explosiveness						
1.1	Class 1.1	High	t	0.1	-	-
1.2	Class 1.2	Medium	t	1	-	-
1.3	Class 1.3	Low	t	3	-	-
Flammable gases						
2.1 A+B (LPG)	Class 2.1	Medium	t	30	-	-
2.1 A+B (excluding LPG)	Class 2.1	High	m ³	10,000*	-	-
Flammable liquids						
3 A and 3 B	Class 3PGI and 3PGII	High	t	10	-	-
3 C	Class 3PGIII	Medium	t	30	-	-
3 D		Low	t	100	-	-
Flammable solids						
4.1 (all categories)	Class 4.1	Medium	t	10	-	-
4.2 (all categories)	Class 4.2	High	t	1	-	-
4.3 (all categories)	Class 4.3	High	t	1	-	-
Oxidising gases, liquids and solids						
5.1 (all categories)	Class 5.1	Medium	t (m ³)	10 (10,000*)	-	-
5.2 (all categories)	Class 5.2	High	t	1	-	-
Toxic gases, liquids and solids						
6.1 A and 6.1 B	Class 6.1 PGI and PGII	High	t	-	0.5	-
6.1 A and 6.1 B	Class 2.3 PGI and PGII	High	m ³	-	30*	-

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HSNO Category	UN Class Equivalent	Hazard Level	Unit	Base Quantity (B)		
				Fire/ Explosion	Human Health	Environment
6.1 C	Class 6.1 PGIII	Medium	t	-	10	-
6.1 C	Class 2.3 PGIII	Medium	m ³	-	50*	-
6.7-6.9 (chronic toxicity categories)	OECD	Medium	t	-	10	-
6.1 D		Low	t	-	30	-
6.1 D		Low	m ³	-	500*	-
Corrosive gases, liquids and solids						
(8A) 6.3-6.4 (corrosives, all categories)	Class 8	Medium	t (m ³)	-	10	-
Ecotoxic gases, liquids and solids						
9.1-9.4A	(OECD 1)	High	t (m ³)	-	-	1 (30*)
9.1-9.4B	(OECD 2)	Medium	t (m ³)	-	-	30 (50*)
9.1-9.4C	(OECD 3)	Low	t (m ³)	-	-	100 (500*)

* Quantity Threshold in m³ at 101.3 kPA and 20 0C for permanent or compressed gases.

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Table 8.2: Adjustment Factors

Adjustment Factors for All Effect Types		
Fire/ Explosion	Human Health	Environment
FF1: substance form	FH1: substance form	FE1: substance form
Solid = 1 Liquid, powder = 1 Gas (101.3 kPA and 20°C) = 0.1	Solid = 3 Liquid, powder = 1 Gas (101.3 kPA and 20°C)= 0.1	Solid = 3 Liquid, powder = 1 Gas (101.3 kPA and 20°C)= 0.1
FF2: separation distance from site boundary (sub-facility)	FH2: separation distance from site boundary (sub-facility) (gases only)	FE2: environmental sensitivity
< 30 m = 1 > 30 m (>60 m) ¹ = 3	< 30 m = 1 > 30 m (>60 m) ² = 3	Normal = 1 Adjacent to water resource ² = 0.3
FF3: type of activity	FH3: type of activity	FE3: type of activity
Use = 0.3 Above-ground storage = 1 Underground storage ³ = 10	Use = 0.3 Above-ground storage = 1 Underground storage ³ = 10	Use = 0.3 Above-ground storage = 1 Underground storage ³ = 3
Final Fire/Explosion Adjustment Factor FF = FF1 x FF2 x FF3	Final Human Health Adjustment Factor FH = FH1 x FH2 x FH3	Final Environment Adjustment Factor FE = FE1 x FE2 x FE3

¹ If the facility is assessed as a sub-facility, the distance to the neighbouring sub-facility must be more than 60 metres (ie, 2 x 30 metres) to qualify for an Adjustment Factor of 3 (a [hazardous sub-facility](#) is a [hazardous facility](#) that is separated by more than 30 metres from any other hazardous facility on the same site).

² [Water](#) resources include aquifers and [water](#) supplies, [streams](#), springs, lakes, [indigenous wetlands](#), estuaries and the sea, but do not include entry points to the stormwater drainage network. 'Adjacent' must be defined in respective district plans and will depend on the type of [water](#) resource potentially affected (adjacent is variably defined as between 30 and 100 metres).

³ Applicable to Class 3 substances (flammable liquids) only.

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Table 8.3: HFSP Rating Criteria For Hazardous Substances

Steps HFSP Rating Criteria For Hazardous Substances

The full description of [HSNO](#) Classes, Sub-classes and Categories is contained in the [HSNO](#) Regulations.

Hazard	HSNO Class & Category	(UN Division)	Description	Effect Type	Hazard Rating
Explosives	1.1	1.1	Articles and substances having a mass explosion hazard.	Fire/Explosion	High
	1.2	1.2	Articles and substances having a projection hazard, but not a mass explosion hazard.	Fire/Explosion	Medium
	1.3	1.3	Articles and substances having a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard. This division comprises articles and substances that: <ul style="list-style-type: none"> • give rise to considerable radiant heat, or • burn one after another, producing minor blast and/or projection effects. 	Fire/Explosion	Low
	1.4, 1.5, 1.6	1.4, 1.5, 1.6	Not applicable.		
Flammable Gases	2.1A, 2.1B	2.1	Flammable gases: <ul style="list-style-type: none"> i) gases which at 20oC and a standard pressure of 101.3 kPa: <ul style="list-style-type: none"> • are ignitable when in a mixture of 13% or less by volume with air, or • have a flammable range with air of at least 12% regardless of the lower flammability limit; or, 	Fire/Explosion	High

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			<p>ii) gases or gas mixtures, other than those of (i) above, that at 20°C and a standard pressure of 101.3 kPa have a flammable range in mixture in air.</p> <p>Flammable aerosols, being a pressurised mixture of containing gas, compressed, liquified, or dissolved under pressure, with or without a liquid, paste or powder; comprising at least 45% by mass of flammable ingredients, under a pressure greater than 100 kPa, which can be released in a finely divided spray.</p>		
		LPG	LPG	Fire/Explosion	Medium
		2.2	Not applicable.		
Explosives	1.1	1.1	Articles and substances having a mass explosion hazard.	Fire/Explosion	High
	1.2	1.2	Articles and substances having a projection hazard, but not a mass explosion hazard.	Fire/Explosion	Medium
	1.3	1.3	Articles and substances having a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard. This division comprises articles and substances that: <ul style="list-style-type: none"> • give rise to considerable radiant heat, or • burn one after another, producing minor blast and/or projection effects. 	Fire/Explosion	Low
	1.4, 1.5, 1.6	1.4, 1.5, 1.6	Not applicable.		
Flammable Gases	2.1A, 2.1B	2.1	<p>Flammable gases:</p> <p>(i) gases which at 20°C and a standard pressure of 101.3 kPa:</p> <ul style="list-style-type: none"> • are ignitable when in a mixture of 13% or less by volume with air, or 	Fire/Explosion	High

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			<ul style="list-style-type: none"> have a flammable range with air of at least 12% regardless of the lower flammability limit; or, (ii) gases or gas mixtures, other than those of (i) above, that at 20°C and a standard pressure of 101.3 kPa have a flammable range in mixture in air. Flammable aerosols, being a pressurised mixture of containing gas, compressed, liquified, or dissolved under pressure, with or without a liquid, paste or powder; comprising at least 45 % by mass of flammable ingredients, under a pressure greater than 100 kPa, which can be released in a finely divided spray.		
		LPG	LPG	Fire/Explosion	Medium
		2.2	Not applicable.		
Flammable Liquids			Flammable liquids comprising liquids, mixtures of liquids, or liquids containing solids in suspension which give off a flammable vapour at specific temperatures.		
	3A	3 PGI	Flash point: < 23°C Initial boiling point: < 35°C	Fire/Explosion	High
	3B	3 PGII	Flash point: < 23°C Initial boiling point: > 35°C	Fire/Explosion	High
	3C	3 PGIII	(a) Flash point: 23°C; 60°C (b) Flash point: > 60°C, but liquid is manufactured, stored, transported or used (except deliberate burning) at a temperature at or above its flash point.	Fire/Explosion	Medium
	3D	Combustible Liquids	Flash point: > 60°C but 93°C	Fire/Explosion	Low
Flammable Solids	4.1 All Categories	4.1	<ul style="list-style-type: none"> Flammable solids that are readily combustible or may cause fire easily through an ignition source or friction. 	Fire/Explosion	Medium

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			<ul style="list-style-type: none"> Self-reacting substances that are thermally unstable and are liable to undergo a strongly exothermic decomposition even without the participation of oxygen (and related substances). Desensitised explosives: substances which are wetted with water or alcohol or diluted with other substances to suppress their explosive properties. 		
	4.2 All Categories	4.2	<p>Substances liable to spontaneous combustion:</p> <p>Pyrophoric substances: liquid or solid substances which, even in small quantities, ignite within 5 minutes of coming in contact with air;</p> <p>Self-heating substances: solid substances which generate heat when in contact with with air without additional energy supply.</p>	Fire/Explosion	High
	4.3 All Categories	4.3	Substances which, in contact with water, become spontaneously flammable, or emit flammable gases.	Fire/Explosion	High
Oxidising Capacity	5.1 All categories	5.1	Oxidising substances: substances which in themselves are not necessarily combustible, but may cause or contribute to the combustion of other materials by yielding oxygen.	Fire/Explosion	Medium
	5.2 All categories	5.2	<p>Organic peroxides: organic substances that are thermally unstable and may undergo exothermic, self-accelerating decomposition. They may:</p> <ul style="list-style-type: none"> Be liable to explosive decomposition; Burn rapidly; Be sensitive to impact or friction; React dangerously with other substances; Cause damage to the eyes. 	Fire/Explosion	High
Toxicity		6.1	Substances which are liable to cause death or injury or to harm human health if swallowed, inhaled, or contacted by the skin.		

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	6.1A	6.1 PGI	Oral toxicity LD ₅₀ (mg/kg): 5 Dermal toxicity LD ₅₀ (mg/kg): 50 Inhalation toxicity dust/mist LC ₅₀ (mg/l): 0.05	Human Health	High
	6.1B	6.1 PGII	Oral toxicity LD ₅₀ (mg/kg): >5 - 50 Dermal toxicity LD ₅₀ (mg/kg): >50 - 200 Inhalation toxicity dust/mist LC ₅₀ (mg/l): >0.05 - 0.5	Human Health	High
	6.1C	6.1 PGIII	Oral toxicity LD ₅₀ (mg/kg): >50 - 300 Dermal toxicity LD ₅₀ (mg/kg): >200 – 1,000 Inhalation toxicity dust/mist LC ₅₀ (mg/l): >0.5 – 1	Human Health	Medium
	6.1 D		Oral toxicity LD ₅₀ (mg/kg): >300 – 2,000 Dermal toxicity LD ₅₀ (mg/kg): >1000 – 2,000 Inhalation toxicity dust/mist LC ₅₀ (mg/l): >1 - 5	Human Health	Low
		2.3	Toxic gases: gases which are known to be toxic or corrosive to humans and pose a hazard to health. This division is divided into the following categories:		
	6.1A		a) Inhalation toxicity gases LC ₅₀ : < 100 ppm, vapours LC ₅₀ : < 0.5 mg/l	Human Health	High
Toxicity <i>(continued)</i>	6.1B		b) Inhalation toxicity gases LC ₅₀ : >100 ppm - 500 ppm, vapours LC ₅₀ : >0.5 mg/l – 2 mg/l	Human Health	High
	6.1C		c) Inhalation toxicity gases LC ₅₀ : >500 ppm - 2,500 ppm, vapours LC ₅₀ : >2 mg/l – 10 mg/l	Human Health	Medium
	6.1D		d) Inhalation toxicity gases LC ₅₀ : >2,500 ppm – 5,00 ppm, vapours LC ₅₀ : >10 mg/l – 20 mg/l	Human Health	Low
	(8) 6.4 All categories	8	Eye Irritation/Corrosiveness: Chemical Property: 2 > pH > 11.5. Effect: Draize Grade 1 for either corneal opacity or iritis or Grade 2 for either conjunctival redness or chemosis	Human Health	Medium

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(8) 6.3 All categories	8	Skin Irritation/Corrosiveness: Chemical Property: 2 > pH > 11.5. Effect: Draize Grade 1.5 for erythema or oedema	Human Health	Medium
6.4	(OECD 1 & 2)	Respiratory or contact sensitiser.	Human Health	Medium
6.7A, 6.7B	(OECD 1 & 2)	Carcinogenicity: Suspected or presumed carcinogen.	Human Health	Medium
6.9A, 6.9B	(OECD 1 & 2)	Known, presumed or suspected human target organ toxicity.	Human Health	Medium
6.6A, 6.6B	(OECD 1 & 2)	<ul style="list-style-type: none"> Substances known or regarded as mutagenic; OR Substances which cause concern for man owing to the possibility that they may induce heritable mutations in the germ cells of human. 	Human Health	Medium
6.8A, 6.8B	(OECD 1 & 2)	<ul style="list-style-type: none"> Known, or presumed Human Reproductive or Developmental Toxicant; OR Suspected Human Reproductive or Developmental Toxicant. 	Human Health	Medium
6.8C	(OECD)	Effects on or via lactation: Data showing: i) A likelihood that the substance would be present in potentially toxic levels in human breast milk; AND/OR ii) Clearly defined adverse effect in the offspring of animals due to transfer in the milk; OR clearly defined adverse effect on the quality of the milk in animals; AND/OR iii) Human evidence indicating a hazard to babies during the lactation period.	Human Health	Medium
	6.2	Not applicable.		
Ecotoxicity		Ecotoxic substances: any substance exhibiting a toxic effect on ecosystems. This division is divided into three categories.		

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9.1A 9.2A 9.3A 9.4A	(OECD1)	a) Very toxic to the aquatic environment; Very toxic to the terrestrial environment; Very toxic to terrestrial vertebrates; Very toxic to beneficial invertebrates.	Environment	High
9.1B 9.2B 9.3B 9.4B	(OECD2)	b) Toxic to the aquatic environment; Toxic to the terrestrial environment; Toxic to terrestrial vertebrates; Toxic to beneficial invertebrates.	Environment	Medium
9.1C 9.2C 9.3C 9.4C	(OECD3)	c) Harmful to the aquatic environment; Harmful to the terrestrial environment; Harmful to terrestrial vertebrates; Harmful to beneficial invertebrates.	Environment	Low