



Draft Document:

Management Guide: Categorizing, Control Banding and Toxicological Scoring of Hazardous Substances



Categorizing, Control Banding, and Toxicological Scoring of Hazardous Substances

Management Guide

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1 Introduction

Hazardous Substances comprise one of the most important matters requiring risk control at the University. They are widely distributed throughout the university campus.

The legal obligation of the University is to ensure a healthy and safe working environment. A formal process of health risk assessment, risk control, training and education and other measures that aim to reduce the risks of exposure are necessary in order to comply with all relevant legislative acts, in this case those that cover Hazardous Substances.

Exposure of employees to substances hazardous to health should be prevented or, where this is not reasonably practicable, adequately controlled.

Various different systems (*University of York (UK)* hazard categorisation system; the Synergee Occupational Health Toxicological Scoring System (*Dr Greg Kew*); and COSHH essentials Risk Phrase control banding, *HSE UK*; The Classification and Labelling of Dangerous Substances and Preparations for Sale and Handling: *South African Bureau of Standards*) have been adapted resulting in the University of Cape Town system of Categorizing, Control Banding and Toxicological Scoring

2 Acronyms and Definitions

Hazardous Substances Risk Assessment is a complex process, and is regrettably burdened with many technical terms, which have to be learned by the Risk Assessors. A lot of these terms will appear on the Material Safety Data Sheets (Refer to Reference Guide – The Material Safety Data Sheet). Some of these include the following:

Term	Explanation
Time intervals o Acute o Sub-Acute o Chronic	These refer to time intervals; – the time over which the condition evolves, or the duration of the condition. <u>Acute</u> events are those that take place after (or over) a short time interval (seconds – hours). For example: burns following exposure to concentrated acids. <u>Sub-acute</u> events are those that take place after (or over) a medium time interval (days – weeks). For example: contact dermatitis following exposure to solvents. <u>Chronic</u> events are those that take place after (or over) a long time interval (months – years). For example: asthma following isocyanates
Chemical Identity Numbers o CAS Number o UN Number	There is an international registration system for each and every chemical. Unfortunately not every single chemical is registered through this registration system, but this is as close to an “ID number” for chemicals that one can get. A powerful advantage of the CAS number is that it can be used as a search parameter, when hunting for toxicological information on databases. Searching databases by chemical names is hamstrung by the fact that all chemicals have synonyms (different names); hence the search may fail to find the chemical simply because it is listed under a different synonym. For example: The CAS number for hydrochloric acid is 7647-01-0. The UN numbering system is similar, but the numbers are different.
Synonym	Chemicals may have a number of different names, or synonyms. This is because chemicals are often named according to their chemical atomic structure. Unfortunately, the atomic structure can be named in various ways, producing different names (synonyms) for the

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Term	Explanation
	<p>identical chemical substance.</p> <p>For example: hydrochloric acid has a synonym, hydrogen chloride</p>
HCS	<p>Hazardous Chemical Substance. This is any chemical substance (solid, liquid, gas, vapour, dust, powder, etc.) that has the potential to cause harm. Often when one sees a reference to an “HCS”, this may mean a chemical that is listed in the tables published in the Regulations for Hazardous Chemical Substances of the Occupational Health and Safety Act.</p>
Mucus membranes	<p>This term refers to the epithelial lining of certain internal body surfaces, such as the nose, mouth, throat, lungs, eyes, etc. This is the body surface most vulnerable to chemical exposure.</p>
Irritant (IRR)	<p>This term refers to a direct toxic effect, or “burn”. Corrosive is a synonym for irritant. The more corrosive the irritant, the greater the intensity of the irritation and the greater the damage on contact. The exposed body surfaces are most affected by irritants, such as the skin and mucus membranes of the eyes and upper respiratory tract.</p> <p>For example: Acids and alkalis are irritants. The more concentrated they are, the more corrosive.</p>
Sensitiser (SEN)	<p>This term refers to substances that have the potential to cause exposed people to become sensitised (allergic) to the substance. This is significant, as even minimal exposures can trigger a reaction in sensitised individuals (no “safe” low dose). Outcomes include eczematous skin reactions and asthma.</p> <p>For example: isocyanates</p>
Carcinogen (CAR)	<p>This term refers to substances that have the potential to cause cancer in exposed people.</p> <p>For example: asbestos fibres.</p> <p>Various agencies exist around the world, which analyse and categorise chemicals by their degrees of carcinogenicity. These include:</p> <p>IARC (International Agency for Research on Cancer) (World Health Organisation)</p> <ul style="list-style-type: none"> ○ 1: Known human carcinogen ○ 2A: Probably carcinogenic – degree of evidence almost sufficient to be classified as carcinogenic. ○ 2B: Possibly carcinogenic – no human data, but experimental evidence of carcinogenicity. ○ 3: Suspected carcinogen, but not classifiable. ○ 4: Probably not carcinogenic to humans. <p>NTP (National Toxicology Programme, of U.S. Public Health Service)</p> <ul style="list-style-type: none"> ○ K: Known human carcinogen ○ N: Not known to be a human carcinogen. ○ A: Associated (Suspected) human carcinogen.



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Term	Explanation													
	<p>OSHA (Occupational Safety and Health Administration, USA)</p> <ul style="list-style-type: none"> ○ Y: Yes - known human carcinogen ○ N: No – not a human carcinogen. <p>NIOSH (National Institute for Occupational Health & Safety, USA)</p> <ul style="list-style-type: none"> ○ “Listed” carcinogens, without differentiation between “possible” or “probable” carcinogens. <p>ACGIH (American Conference for Governmental Hygienists)</p> <ul style="list-style-type: none"> ○ A1: Known Human Carcinogen ○ A2: Suspected Human Carcinogen ○ A3: Confirmed animal carcinogen, with unknown relevance to Humans ○ A4: Not classifiable as a human carcinogen (there is a concern, but inadequate evidence) ○ A5: Not suspected to be a human carcinogen 													
<p>Toxic to Reproduction (TR)</p>	<p>Substances that affect reproduction; including adverse effects on male and female sexual function and, as well as on the developing unborn child. This group includes the teratogens</p> <p>For example: ethanol, phenytoin.</p>													
<p>Mutagen (MUT)</p>	<p>This term refers to substances that have the potential to induce changes (usually damaging) to the genetic material of the sex organs, leading to an increased likelihood of passing on defective chromosomes to future generations.</p> <p>For example: radionuclides (³²P, ¹⁴C, ³⁵S, ⁴⁵Ca)</p>													
<p>Organ effects (ORG)</p>	<p>This term refers to substances that have the potential to interfere with normal metabolic pathways leading to organ system (bone marrow, liver, kidney, nervous system, etc) malfunction and disease.</p> <p>These are listed in the Chemical Toxicology Profile as follows:</p> <table border="1" data-bbox="443 1518 1331 1579"> <tr> <td>CNS</td> <td>PNS</td> <td>HEP</td> <td>HAE M</td> <td>REP</td> <td>REN</td> <td>GIT</td> <td>END O</td> <td>CVS</td> <td>RESPE</td> <td>YES</td> <td>EAR S</td> <td>OTH</td> </tr> </table> <p>CNS – Central Nervous System PNS – Nerves of the body HEP – Liver HAEM – Bone marrow and blood forming organs REP – Reproductive organs REN – Kidneys GIT – Gastro-intestinal Tract ENDO – Endocrine system (the hormones) CVS – The heart and blood vessels</p>	CNS	PNS	HEP	HAE M	REP	REN	GIT	END O	CVS	RESPE	YES	EAR S	OTH
CNS	PNS	HEP	HAE M	REP	REN	GIT	END O	CVS	RESPE	YES	EAR S	OTH		



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Term	Explanation
	<p>RES – The lungs and airways</p> <p>EYES – The eyes and the tracts that take the visual messages to the brain.</p> <p>EARS – The ears and the cranial nerves that go to the organs of hearing and balance.</p> <p>OTH – Anything that doesn't fit with the other headings</p>
OEL	This stands for "Occupational Exposure Limit". It is a statutory limit for the maximum allowable level of airborne (safe) exposure to a chemical substance. These allowable maximum limits are published in the Regulations for Hazardous Chemical Substances of the Occupational Health and Safety Act. Similar allowable limits are published for many countries all over the world. These include ACGIH ("TLVs" (Threshold Limit Values), OSHA, NIOSH, HSE.
Organisations commonly cited (referred to).	<p>WHO World Health Organisation (Geneva)</p> <p>ILO International Labour Office (Organisation) (Geneva)</p> <p>ACGIH American Conference for Governmental Hygienists (USA)</p> <p>OSHA Occupational Safety and Health Administration (USA)</p> <p>NIOSH National Institute for Occupational Safety and Health (USA)</p> <p>HSE Health and Safety Executive (British)</p> <p>NCOH National Centre for Occupational Health (RSA)</p>
Physical properties of Chemicals	<p>Reactivity: the propensity to react on contact with other chemicals.</p> <p>Flammability: the propensity to burn (burst into flame)</p> <p>Explosion: the propensity to explode</p> <p>These physical properties are often recorded as an index (out of 1-4) in MSDS documents. Hence "reactivity index" and "flammability index".</p>
Indices of toxicity	<p>Various agencies around the world analyse and categorise chemicals by their potential to cause harm. These are recorded as a "toxicity index", just as for the indices of reactivity and flammability. These agencies include:</p> <p>NFPA: National Fire Protection Agency (score of 1-4, from mild to very severe)</p> <p>WHIMS: World Health Information Management System (score of 1-4, from mild to very severe)</p> <p>Another method for recording toxicity is by the "Lethal Dose" score:</p> <p>LD₅₀ The dose required to cause death to 50% of exposed experimental animals.</p>
Scores (indices) of toxicity	<p>Acute Toxicity: This refers to the harmfulness of the chemical, out of a score of 1 to 4, with a time reference of "acute".</p> <p>Chronic Toxicity: This refers to the harmfulness of the chemical, out of a score of 1 to 4, with a time reference of "chronic".</p> <p>These scores are allocated according to the tables in the appendix.</p>



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3 Objectives of this Policy

This management guide has three major objectives.

To introduce a standard category system to ensure consistency throughout the University (see Management Guide – *The Control of Hazardous Substances*).

To introduce methods to assign a toxicity index value (see Policy Document – *Hazardous Substances Programme*, and Management Guide – *Hazardous Substances Risk Assessment Process*).

To work in conjunction with the University of Cape Town Policies on *Hazardous Substances*; the *Hazardous Substances Programme*; and *Hazardous Waste*; and the Management Guides – *The Control of Hazardous Substances*; *Hazardous Substances Risk Assessment Process*; *Hazardous Waste*; *Carcinogens, Mutagens, and Substances Toxic to Reproduction*; and *Safe Storage of Chemicals*.

4 Scope and Standards

This Policy will apply to ALL Faculties; Departments; Centres; Units as well as to ALL members of the University of Cape Town.

The UCT Hazardous Chemical Substances Policy has been prepared according to the standards set in SA Law. However, best practice is the aim. The policy is to be used as a minimum guide to Faculties and Departments.

This Policy will be reviewed annually from the date of implementation or when deemed necessary.

5 Assigning a Hazard Category

On ordering, purchasing, receipt and transferring into the University all hazardous substances must be assigned a hazard category. This hazard category will inform all that come into contact with the substance of the hazards and the level of hazard associated with it. Adequate risk assessments can be then carried out. On receipt, the chemicals must be labelled with the date of receipt, the expiry date (if applicable) and the hazard category. In science-based Departments this hazard category will be assigned by:

- The person placing the order for supply
- Chief or Senior Stores Technician
- Departmental Safety Officer/Advisor
- Laboratory Superintendent/Departmental Administrator

Please refer to your departmental safety handbooks to find how your specific departments have allocated this role

For smaller or non-science-based Departments this will be done by trained members of staff or the Safety, Health and Environment Department.

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6 Categories of Hazard

To ascertain the hazard category of a substance, there are two pieces of information required; these are the substances **Danger Category** (see section 6.1) and the **Hazard Severity Level** (see section 6.2). The category of danger indicates the **type** of harm; it does not inform as to the **seriousness** of the harm if a person is exposed to the substance. Hazard Severity Level is an indication of the seriousness of the harm that can be caused if a person is exposed to a hazardous substance.

6.1 Danger category

The Classification and Labelling of Dangerous Substances and Preparations for Sale and Handling Code of Practice, South African Bureau of Standards, 1999 (commonly known as SABS 0265:1999) indicate three categories of danger:

- a. Physicochemical properties e.g. explosive, oxidizing, flammable
- b. Health effects e.g. corrosive, harmful, irritant, toxic, carcinogenic.
- c. Environmental e.g. dangerous for the environment.

The danger category will usually be indicated on the substance container, by a symbol, words, or risk phrase. The person assessing the hazard may deem that the information on the label is clear and understandable; if this is indeed the case then no further action would be necessary.

Should the label be unclear or if decanting or mixing has taken place then further indication of the category of danger will be required. In Appendix 1 each category of danger has been assigned a letter in the table. This letter can then be shown on the container.

According to SABS 0265:1999, when more than one danger category is assigned to a substance or preparation, the following categories take precedence

- a) Toxic category (T) letter takes precedence over Corrosive (C), Harmful (X) and Irritant (I) letters
- b) Corrosive letter (C) takes precedence over the Harmful (X) and Irritant (I) letters
- c) Explosive letter (E) takes precedence over the Flammable (F) and Oxidising (O) letters
- d) Harmful (X) letter takes precedence over the Irritant (I) letter

6.2 Hazard Severity Level / Toxicity Score

There are two methods for the evaluation of toxicity:

- Indirect measurement by estimation of potential outcome (qualitative)
- Direct measurement of "lethal dose" (LD₅₀) (quantitative).

The indirect measures are suitable for providing scores for all the "chronic toxicity" parameters, such as sensitisation, toxicity to reproduction, mutagenesis, carcinogenesis, etc.

The direct measure (LD₅₀) is only suitable for scoring "acute toxicity".



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These elements are each examined for the agent under evaluation. The suggested scores (weightings) for each of the elements are as listed in Appendices 4 and 5. Note that these are guidelines only - the user is required to apply the best-suited category.

Note: "OEB" stands for "Occupational Exposure Band", which is a concentration bandwidth within which the OEL falls. This is one of the most fundamental measures of toxicity.

The level of severity is ranges from 1 (negligible severity), to 5 (very high severity). There are a number of ways one can ascertain the Hazard Severity Level/Toxicity Score. The first is to check the label or MSDS; if the substance has been assigned a Risk Phrase Number then Appendix 2 can be used to determine the Hazard Severity Level.

If there is no risk phrase number assigned to the substance then the MSDS needs to checked for other information, Appendices 4 and 5 are the reference tables to be used in this instance. If the MSDS is not of help then refer to *Reference Guide - Chemical database* or consult Safety, Health and Environment in the Risk Services Department for help.

The **highest score** from the tables is carried forward as the Hazard Severity Level Toxicity Score.

All hazardous substances must be assigned a level of severity and this must be indicated on all containers. This level of severity or toxicity score is also used in the Hazardous Substance Risk Assessment to allocate a score to be used alongside an **Exposure (Probability)** score for every chemical, to every person (or occupational group) exposed, which is central to the process of Health Risk Assessment (see Management Guide – *Hazardous Substance Health Risk Assessment*).

7 Labelling the Substance

Once a hazard category has been given, represented by a letter (indicating the hazard categorization) and a number (indicating the level of severity), or a number only where the container is adequately labelled, this must be indicated on the substance container (and any decanting containers from a bulk source).

To provide a visual indication of the level of severity, a coloured label system has been devised and to avoid confusion the colour coding in Appendix 3 should be followed.

Any category indication required must be indicated (or attached to) the container prior to distribution/use by the end user(s)

8 Labelling and signage for doors, designated areas, gas cylinders, and hazardous waste (see Appendix 7)

South Africa has adopted a classification system similar to that used by the United Nations and other countries. This system helps the handler/user identify the **nature** of the hazards and to respond accordingly. All aspects of this system of identification and classification of dangerous substances and goods are dealt with in detail in SABS 0228. The different categories are used in the fields of transport and *Hazmat* and also appear on MSDS.

The university classification system assigns a hazard category to a substance and goes a step further than the other system. A letter is assigned for the Danger category (Physicochemical, Health effect, or environmental effect) and a number (1-5) used to assign a Hazard Severity Level / Toxicity Score. The category of danger indicates the **type** of



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harm; it does not inform as to the **seriousness** of the harm if a person is exposed to the substance. Hazard Severity Level is an indication of the seriousness of the harm that can be caused if a person is exposed to a hazardous substance.

The university system works in conjunction with the other system. Hazardous waste from the University will be classified using this system to inform the hazardous waste service provider and the fire authorities of the contents of the containers stored on and to be taken off university property. The University will also use the pictograms for all labels and door signage and designated work areas.

9 Appendices

9.1 Appendix 1: Danger Category

Appendix 1: Danger Category		
Hazard Type ★	Letter	Hazard (Danger Symbol)
Physicochemical Property	E	Explosive (E)
	O	Oxidising (O)
	F	Flammable (R10, F, F+)
Health Effect	T	Toxic (T, T+)
	X	Harmful (Xn)
	I	Irritant (Xi)
	S	Sensitiser
	C	Corrosive (C)
	Z	Carcinogenic Mutagenic Toxic to Reproduction
Danger to the Environment	N	Environmental Harm



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9.2 Appendix 2: Toxicological Scoring Using EU Risk Numbers as a guide

Appendix 2: Toxicological Scoring Using EU Risk Numbers as a guide					
Hazard Severity Level ★	1 (Negligible)	2 (Low)	3 (Med)	4 (High)	5 (Very High)
Indication of Risk	Substances which are considered to carry a low level of severity including those without any indication of danger	Substances which carry a low level of severity, reversible health effects. These include: Flammable (R10) Highly Flammable (F - R7, R8, R11, 15, 30) Irritant (Xi - R36, R37, R38, R43)	Substances that carry a medium level of severity. Severe health effects after repeated or prolonged exposure. Serious damage to skin, eyes or mucus membranes after single or repeated exposure. These include: Explosive (E - R1, R2, R3, R4, R5, R6, R9, R16, R18, R19, R44) Oxidising (O) Extremely Flammable (F+ - R12, R13, R14, 17) Respiratory sensitisers, Harmful substances: (Xn) - R20, R21, R22, R33, R37, R38, R41, R48, R65, R66, R67, R68, Harmful (Category 3 Carcinogens / Mutagens/ Substances Toxic to Reproduction and sensitisers R40, R42, R43)	Substances that carry a high level of severity. Ability to cause very serious physical effects or health impairment by repeated or prolonged exposure. Irreversible change or impairment from single or repeated exposure. Toxic chemicals, corrosive chemicals These include: Corrosive (C) - R34) Category 2 Carcinogens, Mutagens and Substances Toxic to Reproduction – R23, R24, R25, R45, R46, R47, R48, R49, R60, R61) Toxic (T) R29, R31, Substances that may impair fertility, or possibly may harm the unborn child, R62; R63; R64	Ability to cause acute or chronic health effects at low levels of exposure or when statutory controls are in place. Severe irreversible effects after single exposure, injury of sufficient severity to threaten life by a single exposure. Very toxic chemicals, very corrosive chemicals These include: Corrosive (C - R35) Category 1 Carcinogens, Mutagens and Substances Toxic to Reproduction (R45, R46, R47, R48, R49, R60, R61) Very Toxic (T+ - R26, R27, R28, R32, R39)



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9.3 Appendix 3: Colour banding using Table 2, 4, and 5 as a guide

Appendix 3: Colour banding using Table 2, 4, and 5 as a guide					
Hazard Severity Level ★	1 (Negligible)	2 (Low)	3 (Med)	4 (High)	5 (Very High)
Colour					

9.4 Appendix 4: Scoring short-term (“acute”) Toxicity.

Appendix 4: Scoring short-term (“acute”) Toxicity.					
Hazard Severity Level ★	1 (Negligible)	2 (Low)	3 (Med)	4 (High)	5 (Very High)
HAZARD PROPERTY	OEB 1 (OEL ≥ 1000 µg/m ³)	OEB 2 (OEL ≥ 100 µg/m ³)	OEB 3 (OEL ≥ 10 µg/m ³)	OEB 4 (OEL ≥ 1 µg/m ³)	OEB 5 (OEL < 1 µg/m ³)
IRRITANT	<u>Transient</u> or no eye, skin & respiratory irritation.	<u>Mild</u> eye, skin & respiratory irritation.	<u>Moderate</u> eye, skin & respiratory burns.	<u>Serious</u> eye, skin & respiratory burns. Corrosive.	Life-threatening. Very Corrosive.
SENSITISER	Not a sensitiser.	Low incidence mild allergy. (Skin only)	Known, definite sensitiser. (Skin, eyes & upper respiratory tract only)	More severe allergy (Respiratory tract)	High incidence sensitiser. Potentially serious. (Respiratory & systemic organs).
ORGAN EFFECTS	Reversible mild or transient effects. (E.g. raised enzymes). Significant volume required (ingestion) LC ₅₀ > 2000mg/m ³ LD ₅₀ rat > 2000mg/kg	<u>Reversible</u> significant effects (e.g. blindness, anaemia) Ingestion (even low volume). LC ₅₀ 1000–2000mg/m ³ LD ₅₀ rat 200 - 2000mg/kg	<u>Irreversible</u> (even potentially) effects (e.g. neuropathy) Inhalation route. LC ₅₀ 250–1000mg/m ³ LD ₅₀ rat 50-200mg/kg	<u>Irreversible</u> (even potentially) severe effects (e.g. Asthma, hepatitis) Skin absorption. LC ₅₀ 25-250mg/m ³ LD ₅₀ rat 5 - 50mg/kg	Life-threatening. Impaired fertility. (E.g. aplastic anaemia, agranulocytosis). Skin absorption. LC ₅₀ <25mg/m ³ LD ₅₀ rat < 5mg/kg



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9.5 Appendix 5: Scoring long term (“chronic”) Toxicity

Appendix 5: Scoring long-term (“chronic”) Toxicity.					
Hazard Severity Level ★	1 (Negligible)	2 (Low)	3 (Med)	4 (High)	5 (Very High)
HAZARD PROPERTY	OEB 1 (OEL ≥ 1000 µg/m ³)	OEB 2 (OEL ≥ 100 µg/m ³)	OEB 3 (OEL ≥ 10 µg/m ³)	OEB 4 (OEL ≥ 1 µg/m ³)	OEB 5 (OEL < 1 µg/m ³)
MUTAGEN ¹			Category 3.	Category 2.	Category 1. and
TOXIC TO REPRODUCTION, TERATOGEN ²			Category 3	Category 2..	Category 1. and
CARCINOGEN	Not a carcinogen.	IARC Cat 3 Suspected. (Animal studies only)	IARC Cat 2B Suspected. (Laboratory only)	IARC Cat 2A Known. (Human studies)	IARC Cat 1 Known. (Case studies exist).

9.6 Appendix 6: Other criteria to be used.

Other criteria to be used in applying professional judgement in assigning compounds to a particular OEB:

- Structure-activity relationship(s), class effects, mechanism of action
- Relevance of endpoint to occupational exposure (e.g. dose response consideration for Reproductive / Developmental Toxicity)
- Pharmacokinetic / pharmacodynamic considerations (e.g. plasma half life (T_{1/2}))
- Warning properties
- Unusual hazards that have been identified (e.g. respiratory sensitisation, antigenicity)
- Reversibility of effects
- Repeat-dose toxicity by parenteral route(s), other species



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9.6.1 Criteria for Mutagenicity Categorisation

- Category 1: Substances for which there is positive evidence from human mutagenicity epidemiology studies (corresponding to EU phrase R46: May cause heritable genetic damage.).
- Category 2: Substances for which there are positive results from assays showing mutagenic effects or other cellular interactions relevant to mutagenicity in germ cells of mammals *in vivo* or mutagenic effects in somatic cells in mammals *in vivo* in combination with clear evidence that the substance or relevant metabolite reaches the germ cells (corresponding to EU phrase R46: May cause heritable genetic damage.).
- Category 3: Substances for which there are positive results from assays showing mutagenic effects or other cellular interactions relevant to mutagenicity in somatic cells of mammals *in vivo*, supported by positive results from *in vitro* mutagenicity assays (corresponding to EU phrase R40: Possible risk of irreversible effects).


9.6.2 Criteria for Reproductive / Developmental Categorisation


- Category 1: Substances known to impair fertility or cause developmental toxicity in humans (corresponding to EU phrase R60: May impair fertility or R61: May cause harm to the unborn child, respectively.).
- Category 2: Substances that should be regarded as if they impair fertility or cause developmental toxicity in humans on the basis of clear evidence of impaired fertility or developmental toxicity in animal studies in the absence of toxic effects, or evidence of same at around the same dose levels as other toxic effects but which is not a secondary, non-specific consequence of the other effect(s) (Corresponding to EU Phrase R60: May impair fertility or R61: May cause harm to the unborn child, respectively.).
- Category 3: Substances that cause concern for human fertility or developmental toxicity in humans on the basis of appropriate animal studies that provide sufficient evidence to cause a strong suspicion of impaired fertility or developmental toxicity in the absence of toxic effects, or evidence of same at around the same dose levels as other toxic effects but which is not a secondary, non-specific consequence of the other effect(s), but where the evidence is insufficient to place the substance in Category 2 (corresponding to EU phrase R62: Possible risk of impaired fertility, or R63: Possible risk of harm to the unborn child).

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9.7 Appendix 7: Labeling and signage for doors, designated areas, gas cylinders, and hazardous waste


CLASSIFICATION	CLASS	SUB CLASS	SUB CLASS CLASSIFICATION
Explosives	1	1.1	Explosive Substances
		1.2	Projection Hazardous Substances
		1.3	Fire Hazard & either a minor blast or projection hazard or both
		1.4	Substances which present no significant hazard
		1.5	Very insensitive substances which have a mass explosion hazard
		1.6	Extremely insensitive articles, do not have a mass explosion hazard
			


CLASSIFICATION	CLASS	SUB CLASS	SUB CLASS CLASSIFICATION
Gases	2	2.1	Flammable gases
		2.2	Non-flammable, non toxic gases
		2.3	Toxic gases
			

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CLASSIFICATION	CLASS	SUB CLASS	SUB CLASS CLASSIFICATION
Flammable liquids	3		
			

CLASSIFICATION	CLASS	SUB CLASS	SUB CLASS CLASSIFICATION
Flammable solids and other flammable substances	4	4.1 4.2 4.3	Flammable solids Spontaneously combustible material Dangerous when wet
			

CLASSIFICATION	CLASS	SUB CLASS	SUB CLASS CLASSIFICATION
Oxidizing	5	5.1 5.2	Oxidizers Organic peroxides
			

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CLASSIFICATION	CLASS	SUB CLASS	SUB CLASS CLASSIFICATION
Toxic and infectious substances	6	6.1 6.2	Toxic substances Infectious substances


CLASSIFICATION	CLASS	SUB CLASS	SUB CLASS CLASSIFICATION
Radioactive material	7		

CLASSIFICATION	CLASS	SUB CLASS	SUB CLASS CLASSIFICATION
Corrosives	8		



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CLASSIFICATION	CLASS	SUB CLASS	SUB CLASS CLASSIFICATION
Miscellaneous dangerous goods	9		
			

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