

**Appendix A:
HFSP Rating Criteria for
Hazardous Substances**

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The full description of HSNO classes, sub-classes and categories as well as explanations of terms used is contained in the HSNO Regulations. Further details on their use may also be found in the ERMA 'Users Guide to the HSNO Thresholds and Classifications of Hazardous Substances'.

It is important to note that:

- HSNO classes and categories do not always correspond perfectly with the UN Classification. The list provided in this Appendix should therefore only be used for HFSP purposes.
- A number of HSNO classes or sub-classes do not have an HFSP hazard rating in the land use planning context as the potential for off-site effect of these substances is low.

Hazard	HSNO Class and Category	(UN Division)	Description	Effect type	Hazard rating
Explosive substances	1.1	1.1	Substances and articles that have a mass explosion hazard.	Fire/explosion	High
	1.2	1.2	Substances and articles that have a projection hazard but not a mass explosion hazard.	Fire/explosion	Medium
	1.3	1.3	Substances and articles that have a fire hazard and either a minor blast hazard or a minor projection hazard or both.	Fire/explosion	Low
	1.5	1.5	Very insensitive substances that have a mass explosion hazard.	Fire/explosion	Low
Flammable gases	2.1.1A High hazard	2.1	a) Ignitable when in a mixture of 13% or less by volume with air; or b) Has a flammable range with air of at least 12%, regardless of the lower flammability limit.	Fire/explosion	High
	2.1.2A Flammable aerosols	2.1 LPG	An aerosol comprising 45% or more by mass of flammable ingredients.	Fire/explosion Fire/explosion	High Medium
Flammable liquids	3.1.A Very high hazard	3 PGI	A flash point of less than 23°C and an initial boiling point of less than or equal to 35°C.	Fire/explosion	High
	3.1.B High hazard	3 PGII	A flash point of less than 23°C and an initial boiling point of greater than 35°C.	Fire/explosion	High
	3.1.C Medium hazard	3 PGIII	A flash point of greater than or equal to 23°C but less than or equal to 60°C.	Fire/explosion	Medium
	3.1.D Low hazard	Combustible liquids	A flash point of greater than 60°C but less than or equal to 93°C.	Fire/explosion	Low

Hazard	HSNO Class and Category	(UN Division)	Description	Effect type	Hazard rating
Liquid desensitised explosives	3.2A 3.2B 3.2C	3 PGI 3 PGII 3 PG III	a) A substance that: (i) is listed as a liquid desensitised explosive and is assigned Packing Group I, II or III in the UN Model Regulations; or b) A liquid desensitised explosive that: (i) is formed from an explosive of Class I by adding a desensitising agent to form a liquid that no longer meets the threshold for Class I; and (ii) is not listed in the UN Model Regulations and is not assigned a Packing Group.	Fire/ explosion	High
Flammable solids – readily combustible solids and solids that may cause fire through friction	4.1.1A Medium hazard	4.1(a) PG II	A substance that burns rapidly or the reaction spreads rapidly or may cause fire through low friction in the relevant tests of the UN Manual of Tests and Criteria.	Fire/ explosion	Medium
	4.1.1B Low hazard	4.1(a) PG III	A substance that has lower ratings than 4.1.1A in the relevant tests of the UN Manual of Tests and Criteria.	Fire/ explosion	Low
Self-reactive substances	4.1.2A 4.1.2B	4.1(b) Type A Type B	A thermally unstable substance that propagates a detonation or rapid deflagration or violent effect or thermal explosion in the relevant tests of the UN Manual of Tests and Criteria.	Fire/ explosion	High
	4.1.2C 4.1.2D	4.1(b) Type C Type D	A substance with lower ratings than the above two categories in the relevant tests.	Fire/ explosion	Medium
	4.1.2E 4.1.2F 4.1.2G	4.1(b) Type E Type F	A substance with even lower ratings than the above two categories in the relevant tests.	Fire/ explosion	Low
Solid desensitised explosives	4.1.3A 4.1.3B 4.1.3C	4.1(c) PG I PG II PG III	a) A substance with one of the specified UN serial numbers listed in the UN Model Regulations; or b) A solid desensitised explosive that is formed from an explosive of Class I by adding a desensitising agent to form a solid substance that no longer meets the threshold for Class I.	Fire/ explosion	High
Spontaneously combustible substances	4.2A Spontaneously combustible and pyrophoric substances High hazard	4.2 PG I	a) A solid substance that does not meet the criteria for subclass 4.1.2, but ignites within 5 minutes on contact with air under the relevant test conditions in the UN Manual of Tests and Criteria; or b) A substance that does not meet the criteria for subclass 4.1.2, but is a liquid which ignites or chars the filter paper under the relevant test conditions.	Fire/ explosion	High
	4.2B Spontaneously combustible and self-heating substances Medium hazard	4.2 PG II	A substance that does not meet the criteria for subclass 4.1.2 but meets specified criteria under the relevant test conditions.	Fire/ explosion	High
	4.2C Spontaneously combustible and self-heating substances Low hazard	4.2 PG III	A substance that does not meet the criteria for subclass 4.1.2, which, depending on quantity, meets specified criteria under the relevant test conditions.	Fire/ explosion	Medium

Hazard	HSNO Class and Category	(UN Division)	Description	Effect type	Hazard rating
Solids that emit flammable gas when in contact with water	4.3A High hazard	4.3 PG I	a) A substance that emits a gas that ignites when a small quantity of the substance is brought into contact with water; or b) A substance that reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is > 10 litres/kg over any 1 minute.	Fire/ explosion	High
	4.3B Medium hazard	4.3 PG II	A substance that reacts readily with water at ambient temperatures such that the maximum rate of evolution is > 20 litres/ kg per hour.	Fire/ explosion	High
	4.3C Low hazard	4.3 PG III	A substance that reacts slowly with water at ambient temperatures so that the maximum rate of evolution of flammable gas is > 1 litre /kg per hour.	Fire/ explosion	Medium
Oxidising substances – liquids or solids	5.1.1A High hazard	5.1 PG I	a) A substance listed as 5.1 in the UN Model Regulations and assigned Packing Group I; or b) A solid that when mixed with dry cellulose either spontaneously ignites or exhibits a mean burning time less than that of a specified reference material; or c) A liquid that when mixed with dry cellulose forms a mixture that either spontaneously ignites or exhibits a mean pressure rise time less than that of a specified reference material.	Fire/ explosion	High
	5.1.1B Medium hazard	5.1 PG II	a) A substance listed as 5.1 in the UN Model Regulations and assigned Packing Group II; or b) A solid that does not meet the criteria of 5.1.1A and that when mixed with dry cellulose forms a mixture that exhibits a mean burning time equal to or less than a specified reference material; or c) A liquid that does not meet the criteria of 5.1.1A and that when mixed with dry cellulose forms a mixture that exhibits a mean pressure rise time less than or equal to that of a specified reference material.	Fire/ explosion	High
	5.1.1C Low hazard	5.1 PG III	a) A substance listed as 5.1 in the UN Model Regulations and assigned Packing Group III; or b) A solid that does not meet the criteria of 5.1.1A or B and that when mixed with dry cellulose forms a mixture that exhibits a mean burning time equal to or less than that of a specific reference material; or c) A liquid that does not meet the criteria of 5.1.1A or B and that when mixed with dry cellulose forms a mixture that exhibits a mean pressure rise time less than or equal to that of a specified reference material.	Fire/ explosion	Medium

Hazard	HSNO Class and Category	(UN Division)	Description	Effect type	Hazard rating
Gases	5.1.2A	2.2	a) A gas that is listed as 5.1 in the UN model Regulations; or b) A gas that causes or contributes to combustion of other material at a faster rate than air.	Fire/explosion	High
Organic peroxides	5.2A 5.2B	5.2 Type A Type B	A substance that propagates a detonation or rapid deflagration or violent effect or thermal explosion in the relevant tests of the UN Manual of Tests and Criteria.	Fire/explosion	High
	5.2C 5.2D	5.2 Type C Type D	A substance with lower ratings than 5.2A or B in the relevant tests.	Fire/explosion	Medium
	5.2E 5.2F 5.2G	5.2 Type E Type F Type G	A substance with even lower ratings than 5.2A or B in the relevant tests.	Fire/explosion	Low
Toxic substances	6.1A	6.1 PGI 2.3 (gases)	Oral toxicity: LD ₅₀ of less than or equal to 5 mg/kg Dermal toxicity: LD ₅₀ of less than or equal to 50 mg/kg Inhalation toxicity (gas): LC ₅₀ of less than or equal to 100 ppm Inhalation toxicity (vapour): LC ₅₀ of less than or equal to 0.5 mg/l Inhalation toxicity (dust/mist): LC ₅₀ of less than or equal to 0.05 mg/l	Human health	High
	6.1B	6.1 PGII 2.3 (gases)	Oral toxicity: LD ₅₀ of greater than 5 mg/kg but less than or equal to 50 mg/kg Dermal toxicity: LD ₅₀ of greater than 50 mg/kg but less than or equal to 200 mg/kg Inhalation toxicity (gas): LC ₅₀ of greater than 100 ppm but less than or equal to 500 ppm Inhalation toxicity (vapour) LC ₅₀ of greater than 0.5 mg/l but less than or equal to 2.0 mg/l Inhalation toxicity (dust/mist) LC ₅₀ of greater than 0.05 mg/l but less than or equal to 0.5 mg/l	Human health	High
	6.1C	6.1 PGIII	Oral toxicity: LD ₅₀ of greater than 50 mg/kg but less than or equal to 300 mg/kg Dermal toxicity: LD ₅₀ of greater than 200 mg/kg but less than or equal to 1000 mg/kg Inhalation toxicity (gas): LC ₅₀ of greater than 500 ppm but less than or equal to 2500 ppm Inhalation toxicity (vapour) LC ₅₀ of greater than 2.0 mg/l but less than or equal to 10.0 mg/l Inhalation toxicity (dust/mist) LC ₅₀ of greater than 0.5 mg/l but less than or equal to 1.0 mg/l	Human health	Medium

Hazard	HSNO Class and Category	(UN Division)	Description	Effect type	Hazard rating
	6.1D	Toxic Substances Regulations: Standard Poison	Oral toxicity: LD ₅₀ of greater than 300 mg/kg but less than or equal to 2000 mg/kg Dermal toxicity: LD ₅₀ of greater than 1000 mg/kg but less than or equal to 2000 mg/kg Inhalation toxicity (gas): LC ₅₀ of greater than 2500 ppm but less than or equal to 5000 ppm Inhalation toxicity (vapour) LC ₅₀ of greater than 10 mg/l but less than or equal to 20 mg/l Inhalation toxicity (dust/mist) LC ₅₀ of greater than 1.0 mg/l but less than or equal to 5.0 mg/l	Human health	Low
Corrosive substances	8.2A	8 PG I	Data indicate irreversible destruction of dermal tissue following brief exposure	Human health	High
	8.2B	8 PG II	Data indicate irreversible destruction at dermal tissue following moderate exposure	Human health	Medium
	8.2C	8 PG III	Data indicate irreversible destruction at dermal tissue following lengthy exposure (up to four hours)	Human health	Low
Ecotoxic substances	9.1A Substances that are very ecotoxic in the aquatic environment	GHS	Acute aquatic toxicity value ⁸ of less than or equal to 1 mg/l	Environment	High
	9.1B Substances that are ecotoxic in the aquatic environment	GHS	Chronic aquatic toxicity ⁹ of less than or equal to 1 mg/l and a) acute aquatic toxicity value of greater than 1 mg/l but less than 10 mg/l; and b) not rapidly degradable or is bioaccumulative, or is not rapidly degradable and is bioaccumulative.	Environment	Medium
	9.1C Substances that are harmful in the aquatic environment	GHS	Chronic aquatic toxicity of less than or equal to 1 mg/l and: a) acute aquatic toxicity value of greater than 10 mg/l but less than 100 mg/l; and b) not rapidly degradable or is bioaccumulative or, is not rapidly degradable and is bioaccumulative.	Environment	Low

⁸ 'Acute aquatic toxicity value' means the lowest value expressed in units of milligrams of a substance per litre of water from:
(a) fish LC₅₀ data after a 96-hour exposure period; or
(b) crustacean EC₅₀ data after a 48-hour exposure period; or
(c) algal, or other aquatic plant EC₅₀ data after a 72-hour exposure period.

⁹ 'Chronic aquatic toxicity' means the lowest value expressed in units of milligrams of a substances per litre of water from chronic fish, crustacean, algal, or other aquatic plant NOEC (no observed effect concentration) data.

Hazard	HSNO Class and Category	(UN Division)	Description	Effect type	Hazard rating
	9.1D Substances that are slightly harmful in the aquatic environment or are otherwise designed for biocidal action	GHS	<ul style="list-style-type: none"> a) Acute aquatic toxicity value of greater than 1 mg/l but less than 100 mg/l, but does not meet classification criteria for 9.1A, 9.1B or 9.1C; or b) Chronic aquatic toxicity value is less than or equal to 1 mg/l but does not meet classification criteria for 9.1B or 9.1C; or c) Not rapidly degradable and is bioaccumulative but does not meet classification criteria for 9.1A, 9.1B or 9.1C. 	Environment	Low