Part 2 (Classification)

Transport Canada is currently conducting a consultation on proposed amendments to the *Transportation of Dangerous Goods Regulations* (TDG Regulations). The TDG Regulations are updated on a regular basis to harmonize, to the greatest extent possible, with the United Nations Model Regulations on the Transport of Dangerous Goods (UN Recommendations). One of the main objectives of this amendment is to harmonize the classification requirements in the TDG Regulations with those in the 19th edition of the UN Recommendations. Currently, most of the provisions in the TDG Regulations regarding classification date back to the 11th edition from 1999.

This amendment proposes a series of changes throughout Part 2 (Classification) of the TDG Regulations. Some of these proposed changes are:

- Harmonize the classification scheme of the TDG Regulations with the UN Recommendations and the 49 CFR to allow the use of a shipping name listed in Schedule 1 without having to proceed to the tests or assessment of the criteria under Part 2 (Classification) ;
- The divisions within classes of dangerous goods would be named using the term “Division” instead of “Class” to harmonize with the UN Recommendations to better describe the dangerous goods for Classes 1, 2, 4, 5 and 6. For example, Class 1.1 would become Division 1.1.
- Many definitions would be aligned with the UN Recommendations and classification-related definitions would be moved from Part 1 (Coming into Force, Repeal, Interpretation, General Provisions and Special Cases) to Part 2 (Classification) of the TDG Regulations to add clarity in the respective sections (i.e. LC_{50}, gas, patient specimen).
- The term “subsidiary hazard” would be used instead of “subsidiary class”.
- While the UN Recommendations use the term “risk” TDG proposes to use the word “hazard” as the term “hazard” communicates the dangerous goods’ capability to do harm as opposed to “risk” which conveys a probability that a hazard will occur.
- Information currently located in the appendices would be integrated into the relevant sections (i.e. the Class 1-Compatibilities Group table would be moved to the Class 1 section).
- A series of consequential changes are occurring throughout the document to harmonize the TDG Regulations with the UN Recommendations.
- New special provisions, from the UN Recommendations, are being added to the TDG Regulations to harmonize better.
- New application and interpretation clauses would be added to provide guidance related to the classification principles (i.e. tear gas).

Introduction

This amendment would introduce general classification provisions and additional background information at the beginning of Part 2 (Classification) of the TDG Regulations to explain the underlying principles and provide clarity. The classification scheme would be modified to align more with the UN Recommendations but would also be organized in a way that would assist consignors in following the steps in the process to classify their dangerous goods.

One of the proposed changes is in the requirement to determine if a substance or article is dangerous goods which would align the TDG Regulations with the UN Recommendations and the 49 CFR. If a substance or article is listed by name in Schedule 1, the classification information that appears in Schedule 1 for that name would be allowed to be used without the need to conduct additional testing to verify the classification. This would save the consignor time and money.

Other changes being proposed include:

- Introducing definitions and interpretation clauses to improve clarity;
- New layout of the classification criteria that is more intuitive;
- Providing flowcharts and tables to assist with the classification of commonly transported dangerous goods; and
- Updating the precedence of classes table to reflect the table in the 19th edition of the UN Recommendations.

Proposed text
INTRODUCTION **2.1 Determining When A Substance, Mixture, Solution or Article Is Dangerous Goods** A substance, mixture, solution or article is dangerous goods when **(a)** it is listed by name in Schedule 1; or **(b)** it is not listed by name in Schedule 1 but meets the criteria in this Part for inclusion in at least one of the 9 classes of dangerous goods. **2.2 Responsibility for Classification** **(1)** Before allowing a carrier to take possession of the dangerous goods for transport, the consignor must determine the classification of the dangerous goods in accordance with this Part. **(2)** When importing dangerous goods into Canada, the consignor must ensure that they have the correct classification before they are transported in Canada. **(3)** A consignor may use the appropriate classification in the ICAO Technical Instructions, the IMDG Code or the UN Recommendations to transport dangerous goods within Canada by a road vehicle, a railway vehicle or a ship on a domestic voyage if these Regulations or the document from which the classification is taken does not forbid their transport. **(4)** A carrier who notices an error in classification, or has reasonable grounds to suspect an error in classification, while the dangerous goods are in transport must advise the consignor and stop transporting the dangerous goods until the consignor verifies or corrects the classification. The consignor must immediately verify or correct the classification and ensure that the carrier is provided with the verified or corrected classification. **2.3 Classes and Divisions** **(1)** A substance, mixture, solution or article that is dangerous goods must be assigned to one of the following classes, and if applicable, divisions, according to the hazard or the most predominant of the hazards they present during the course of transport. **(2)** A substance, mixture, solution or article that meets the criteria for inclusion in more than one class or division must be assigned a subsidiary hazard or hazards in accordance with section 2.9. Class 1: Explosives Division 1.1: Substances and articles which have a mass explosion hazard Division 1.2: Substances and articles which have a projection hazard but not a mass explosion hazard Division 1.3: Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard Division 1.4: Substances and articles which present no significant hazard Division 1.5: Very insensitive substances which have a mass explosion hazard Division 1.6: Extremely insensitive articles which do not have a mass explosion hazard Class 2: Gases Division 2.1: Flammable gases Division 2.2: Non-flammable, non-toxic gases Division 2.3: Toxic gases Class 3: Flammable liquids Class 4: Flammable solids; substances liable to spontaneous combustion; substances which, on contact with water, emit flammable gases Division 4.1: Flammable solids, self-reactive substances, solid desensitized explosives and polymerizing substances Division 4.2: Substances liable to spontaneous combustion Division 4.3: Substances which in contact with water emit flammable gases

Proposed text

Class 5: Oxidizing substances and organic peroxides

Division 5.1: Oxidizing substances

Division 5.2: Organic peroxides

Class 6: Toxic and infectious substances

Division 6.1: Toxic substances

Division 6.2: Infectious substances

Class 7: Radioactive material

Class 8: Corrosive substances

Class 9: Miscellaneous dangerous substances and articles, including environmentally hazardous substances.

2.4 Packing Groups

For packing purposes, substances other than those of Classes 1, 2 and 7, divisions 5.2 and 6.2 and other than self-reactive substances of Division 4.1 must be assigned to one of the following packing groups in accordance with this Part:

Packing group I: Substances presenting high danger;

Packing group II: Substances presenting medium danger; and

Packing group III: Substances presenting low danger.

Articles are not assigned to packing groups.

2.5 UN Numbers and Proper Shipping Names

(1) Dangerous goods must be assigned to a UN number and shipping name in accordance with this Part.

(2) The descriptive text written in lower case letters following a shipping name in column 2 of Schedule 1 must be used in determining the shipping name that most precisely describes the dangerous goods.

(3) Shipping names must be assigned to dangerous goods according to the following.

A substance, mixture, solution or article must be assigned to a:

(a) Single shipping name if it is a well-defined dangerous goods;

(b) Generic shipping name if it:

(i) belongs to a well-defined group of dangerous goods; and

(ii) is not listed by name as a single entry in column 2 of Schedule 1;

(c) Specific not otherwise specified (N.O.S.) shipping name if it:

(i) belongs to a group of dangerous goods with common properties; and

(ii) is not listed by name as either a single or generic entry in column 2 of Schedule 1;

(d) General N.O.S. shipping name if it:

(i) belongs to a group of dangerous goods that meet the criteria of one or more classes or divisions; and

(ii) is not listed by name as either a single, generic or specific N.O.S. entry in column 2 of Schedule 1.

(4) For each shipping name listed in Schedule 1, the UN number, the class or, if applicable, the division, and if applicable, the subsidiary hazard or hazards and packing group listed in columns 1, 3 and 4 of Schedule 1 that correspond to that shipping name must be used as the classification of the dangerous goods.

(5) If more than one packing group is listed in column 4 of Schedule 1 for the substance, mixture or solution it must be assigned to a packing group in accordance with the criteria and tests in this Part.

2.6 Classifying Substances, Mixtures, Solutions and Articles That Are Listed by Name in Schedule 1

(1) If the name of a substance, mixture, solution or article is shown as a shipping name in column 2 of Schedule 1, that name must be used as the shipping name.

(2) Despite subsection (1), a substance, mixture, solution or article that is listed by name in Column 2 of Schedule 1

Proposed text

must be classified in accordance with section 2.7, 2.8 or 2.9 of this Part, as applicable, if:

(a) it contains impurities or additives that affect its classification; or

(b) if it has been identified on the basis of the criteria and tests in this Part, that it meets classification criteria for a class or, if applicable, a division that is not identified in columns 3 and 4 of Schedule 1 that correspond to that shipping name.

2.7 Classifying a Mixture or Solution That Is Not Listed by Name in Schedule 1 and That Contains One Predominant Dangerous Good

(1) A mixture or solution that meets the classification criteria of these Regulations and is composed of a single predominant substance identified by name in Schedule 1 and one or more substances that do not meet the criteria of this Part or traces of one or more substances identified by name in Schedule 1, must be assigned the shipping name of the predominant substance named in Schedule 1 unless:

(a) the name and description of the substance named in Schedule 1 specifically indicate that they apply only to the pure substance;

(b) it has been identified on the basis of the criteria and tests in this Part, that it meets classification criteria for a class or, if applicable, a division that is not identified in columns 3 and 4 of Schedule 1 that correspond to that shipping name; or

(c) the hazard characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in Schedule 1.

(2) If the solution or mixture meets the criteria listed in paragraphs (1)(a), (b) or (c) it must be assigned the shipping name from column 2 of Schedule 1 that most precisely describes the dangerous goods and for which the corresponding data in columns 3 and 4 are the most consistent with the class, or division, and, if applicable, the subsidiary hazard(s) and the packing group in accordance with Section 2.8 or 2.9 of this Part.

2.8 Classifying Substances, Mixtures, Solutions and Articles That Are Not Listed by Name in Schedule 1 and That Are Included in Only One Class and One Packing Group

If, in accordance with the criteria and tests in this Part, a substance, mixture, solution or article that is not listed by name in column 2 of Schedule 1 is included in only one class or division and, if applicable, one packing group, it must be assigned the shipping name in column 2 of Schedule 1 that most precisely describes the dangerous goods and for which the corresponding data in columns 3 and 4 are the most consistent with the class or division and, if applicable, the packing group.

2.9 Classifying Substances, Mixtures, Solutions or Articles That Are Not Listed by Name in Schedule 1 and Are Included in More Than One Class or Packing Group

If, in accordance with the criteria and tests in this Part, a substance, mixture, solution or article that is not listed by name in in column 2 of Schedule 1 meets the criteria for inclusion in more than one class or packing group, the substance, mixture, solution or article is dangerous goods and its classification must be determined in the following manner:

(a) the classes in which the dangerous goods are included are ranked in order of precedence in accordance with section 2.11 to determine the class or division and the subsidiary hazard or hazards;

(b) the packing group is the one with the lowest roman numeral;

(c) the dangerous goods are assigned the shipping name from column 2 of Schedule 1 that most precisely describes the dangerous goods and for which the corresponding data in columns 3 and 4 are the most consistent with the class or division, and, if applicable, the subsidiary hazard(s) and the packing group.

2.10 Classifying mixtures and solutions not meeting the criteria for inclusion in any class

A mixture or solution containing one or more substances identified by name in Schedule 1 or classified under a N.O.S. entry and one or more substances is not subject to these regulations if the hazard characteristics of the mixture or solution are such that they do not meet the criteria (including human experience) for any class.

Proposed text

2.11 Precedence of Hazard Characteristics

(1) A substance, mixture or solution having more than one class or division that is not listed by name in column 2 of schedule 1 must be classified according to the precedence of hazard table. The precedence of hazard table indicates which of the hazards must be selected as the primary hazard. The class or division which appears at the intersection of the horizontal line and the vertical column is the primary hazard and the remaining class is the subsidiary hazard. The packing groups for each of the hazards associated with the substance, mixture or solution must be determined by reference to the appropriate criteria in this Part. The most stringent of the packing groups must be selected for the packing group of the substance, mixture or solution.

(2) Despite subsection (1), a substance, mixture, solution or article that is not listed by name in column 2 of schedule 1 and that meets the classification criteria for inclusion in one of the following classes or divisions, must be assigned to that class or division:

- **(a)** Substances and articles of Class 1;
- **(b)** Gases of Class 2;
- **(c)** Liquid desensitized explosives of Class 3;
- **(d)** Self-reactive substances and solid desensitized explosives of Division 4.1;
- **(e)** Pyrophoric substances of Division 4.2;
- **(f)** Substances of Division 5.2;
- **(g)** Substances of Division 6.1 with a packing group I inhalation toxicity:
- **(h)** Substances of Division 6.2;
- **(i)** Material of Class 7.

(3) Despite paragraph (2)(g), Class 8 (Corrosives) is the class assigned to a substance, mixture, solution or article when it meets the criteria for inclusion in:

- **(a)** Class 8 (Corrosives);
- **(b)** Packing Group I due to inhalation toxicity of dusts and mists;
- **(c)** Packing Group III due to toxicity through oral ingestion or dermal contact.

(4) Except for radioactive material in excepted packages, where the other hazardous properties take precedence, radioactive material that meets the criteria for inclusion in a class or division other than Class 7 (Radioactive material) must always be classified in Class 7 (Radioactive material) and the subsidiary hazard must be identified.

(5) For radioactive material in excepted packages, other than UN3507, URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, special provisions 72 and 74 of schedule 2 apply.

(6) A substance, mixture, solution or article that is not listed by name in column 2 of Schedule 1 and that meets the criteria for inclusion in more than one class and does not meet the criteria in subsections (1), (2), (3), (4) or (5) must be assigned the class which appears at the intersection of the horizontal line and vertical column according to the Precedence of Classes Table.

(7) The other classes or divisions for which a substance, mixture, solution or article meets the classification criteria must be assigned as the subsidiary hazard(s).

Proposed text

Table - Precedence of Hazards

Class or Division and Packing Group	4.2 All	4.3 All	5.1 I	5.1 II	5.1 III	6.1 I D	6.1 I O	6.1 II X	6.1 III X	8 I L	8 I S	8 II L	8 II S	8 III L	8 III S
3 I[a]		4.3				3	3	3	3	3	-	3	-	3	-
3 II[a]		4.3				3	3	3	3	8	-	3	-	3	-
3 III[a]		4.3				6.1	6.1	6.1	3[b]	8		8	-	3	-
4.1 II[a]	4.2	4.3	5.1	4.1	4.1	6.1	6.1	4.1	4.1	-	8	-	4.1	-	4.1
4.1 III[a]	4.2	4.3	5.1	4.1	4.1	6.1	6.1	6.1	4.1	-	8	-	8	-	4.1
4.2 II		4.3	5.1	4.2	4.2	6.1	6.1	4.2	4.2	8	8	4.2	4.2	4.2	4.2
4.2 III		4.3	5.1	5.1	4.2	6.1	6.1	6.1	4.2	8	8	8	8	4.2	4.2
4.3 I			5.1	4.3	4.3	6.1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
4.3 II			5.1	4.3	4.3	6.1	4.3	4.3	4.3	8	8	4.3	4.3	4.3	4.3
4.3 III			5.1	5.1	4.3	6.1	6.1	6.1	4.3	8	8	8	8	4.3	4.3
5.1 I						5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
5.1 II						6.1	5.1	5.1	5.1	8	8	5.1	5.1	5.1	5.1
5.1 III						6.1	6.1	6.1	5.1	8	8	8	8	5.1	5.1
6.1 I D										8	6.1	6.1	6.1	6.1	6.1
6.1 I O										8	6.1	6.1	6.1	6.1	6.1
6.1 II i										8	6.1	6.1	6.1	6.1	6.1
6.1 II D										8	6.1	8	6.1	6.1	6.1
6.1 II O										8	8	8	6.1	6.1	6.1
6.1 III X										8	8	8	8	8	8

[a] *Substances of Division 4.1, other than self-reactive substances and solid desensitized explosives, and substances of Class 3 other, than liquid desensitized explosives.*

[b] *Division 6.1 for pesticides.*

D = dermal *L = liquid*

O = oral *S = solid*

i = by inhalation

X = any route of exposure - D, O or i *- = denotes and impossible combination*

Proposed text
2.12 Marine Pollutants A substance is a marine pollutant if the letter "P" (marine pollutant) is set out in column 4 of Schedule 3 for the substance. **2.13 Proof of Classification** A consignor who allows a carrier to take possession of dangerous goods for transport or who imports dangerous goods into Canada must, during a five-year period that begins on the date that appears on the shipping document, make a proof of classification available to the Minister on reasonable notice given by the Minister. **(a)** For the purposes of this section, a proof of classification is **(i)** a test report; **(ii)** a lab report; or **(iii)** a document that explains how the dangerous goods were classified. **(b)** A proof of classification must include the following information: **(i)** the date on which the dangerous goods were classified; **(ii)** if applicable, the technical name of the dangerous goods; **(iii)** the classification of the dangerous goods; and **(iv)** if applicable, the classification method used under this Part or under Chapter 2 of the UN Recommendations, IMDG Code or ICAO Technical Instructions.

Class 1 Explosives

This amendment proposes to reference the *Explosives Regulations, 2013* for the classification of explosives and not the classification provisions in the UN Recommendations. Natural Resources Canada is the leading authority and expert for the classification of explosives in Canada. Some of the proposed changes are:

- The definition of “explosives” would be removed as it can be found in the *Explosives Regulations, 2013*.
- The packing groups for Class 1, Explosives would be removed to align with the UN Recommendations which state that articles are not assigned to packing groups.
- The compatibility groups table for Explosives (Section 2.16) would be aligned with the UN Recommendations to reflect international terminology (i.e. classification code).

Proposed text
Class 1 (Explosives) **2.14 General** (1) A substance defined as an “Explosive” in the *Explosives Regulations, 2013* is included in Class 1, Explosives. (2) Explosives must be classified in accordance with the *Explosives Regulations, 2013.* **2.15 Divisions** Class 1, Explosives, has six divisions: (a) Division 1.1 Substances and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire load virtually instantaneously); (b) Division 1.2 Substances and articles which have a projection hazard but not a mass explosion hazard; (c) Division 1.3 Substances and articles which have 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 substances and articles: (i) which give rise to considerable radiant heat; or (ii) which burn one after another, producing minor blast or projection effects or both;

Proposed text

(d) Division 1.4 Substances and articles which present no significant hazard

This division comprises substances and articles which present only a small hazard in the event of ignition or initiation during transport. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package

(e) Division 1.5 Very insensitive substances which have a mass explosion hazard

This division comprises substances which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport;

(f) Division 1.6 Extremely insensitive articles which do not have a mass explosion hazard

This division comprises articles which predominantly contain extremely insensitive substances and which demonstrate a negligible probability of accidental initiation or propagation

2.16 Compatibility Groups

Explosives are divided into 13 compatibility groups as described in the table below

Table Description of Compatibility Groups Class 1, Explosives

Description of substance or article to be classified	Compatibility Group	Classification Code
Primary explosive substance	A	1.1A
Article containing a primary explosive substance and not containing two or more effective protective features. Some articles, such as detonators for blasting, detonator assemblies for blasting and primers, cap-type, are included, even though they do not contain primary explosives	B	1.1B 1.2B 1.4B
Propellant explosive substance or other deflagrating explosive substance or article containing such explosive substance	C	1.1C 1.2C 1.3C 1.4C
Secondary detonating explosive substance or black powder or article containing a secondary detonating explosive substance, in each case without means of initiation and without a propelling charge, or article containing a primary explosive substance and containing two or more effective protective features	D	1.1D 1.2D 1.4D 1.5D
Article containing a secondary detonating explosive substance, without means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids)	E	1.1E 1.2E 1.4E
Article containing a secondary detonating explosive substance with its own means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids) or without a propelling charge	F	1.1F 1.2F 1.3F 1.4F
Pyrotechnic substance, or article containing a pyrotechnic substance, or article containing both an explosive substance and an illuminating, incendiary, tear- or smoke-producing substance (other than a water-activated article or one containing white phosphorus, phosphides a pyrophoric substance, a flammable liquid or gel, or hypergolic liquids)	G	1.1G 1.2G 1.3G 1.4G

Proposed text		
Article containing both an explosive substance and white phosphorus	H	1.2H 1.3H
Article containing both an explosive substance and a flammable liquid or ~~flammable~~ gel	J	1.1J 1.2J 1.3J
Article containing both an explosive substance and a toxic ~~substance~~ chemical agent	K	1.2K 1.3K
Explosive substance or article containing an explosive substance and presenting a special hazard (e.g. ~~that is~~ due to water-activation or ~~to the~~ presence of hypergolic liquids, phosphides or a pyrophoric substance) and needing isolation of each type	L	1.1L 1.2L 1.3L
Articles predominantly containing ~~only~~ extremely insensitive ~~detonating~~ substances	N	1.6N
Substance or article so packed or designed that any hazardous effects arising from accidental functioning are confined within the ~~means of containment~~ package unless the ~~means of containment~~ package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder or prohibit fire fighting or other emergency response efforts in the immediate vicinity of the ~~means of containment~~ package	S	1.4S

Class 2, Gases

The classification provisions for gases would be modified to provide clarity and harmonize with the 19th edition of the UN Recommendations. Some of the proposed changes are:

- Tellurium Hexafluoride would be removed from the list of substances included in Class 2, Gases (section 2.13) as it is already identified as a Class 2 gas in Schedule 1 of the TDG Regulations.
- A classification standard would be updated with a more recent version that is referenced in the UN Recommendations (i.e. ISO10156:2010). This amendment would also provide the option to use the American Society for Testing and Materials (ASTM) standard equivalent for enhanced harmonization with the United States.
- The definition of gas would be modified and aligned with the UN Recommendations.
- Classification provisions for Division 2.2 would be clarified and harmonized with the UN Recommendations.

Proposed text
Class 2 (Gases) **2.17 Definitions and General Provisions** (1) A gas is a substance which: (a) At 50°C has a vapour pressure greater than 300 kPa; or (b) Is completely gaseous at 20°C at a standard pressure of 101.3 kPa. (2) A substance, mixture, solution or article is included in Class 2, Gasses if it is (a) comprised of compressed gases, liquefied gases, dissolved gases, refrigerated liquefied gases or adsorbed gases; (b) a mixture of one or more gases with one or more vapours of substances included in other classes; (c) an article charged with a gas; or (d) an aerosol.

Proposed text

(3) The transport condition of a gas is described according to its physical state as:

(a) Compressed gas – a gas which, when packaged under pressure for transport, is entirely gaseous at a temperature of -50°C; this category includes all gases with a critical temperature which is less than or equal to -50°C;

(b) Liquefied gas – a gas which when packaged under pressure for transport is partially liquid at temperatures above -50°C. A distinction is made between:

(i) High pressure liquefied gas – a gas with a critical temperature between -50°C and +65°C, and

(ii) Low pressure liquefied gas – a gas with a critical temperature above +65°C;

(c) Refrigerated liquefied gas – a gas which when packaged for transport is made partially liquid because of its low temperature; or

(d) Dissolved gas – a gas which when packaged under pressure for transport is dissolved in a liquid phase solvent;

(e) Adsorbed gas – a gas which when packaged for transport is adsorbed onto a solid porous material resulting in an internal receptacle pressure of less than 101.3 kPa at 20°C and less than 300 kPa at 50°C.

2.18 Divisions

(1) Substances included in Class 2 are assigned to one of three divisions based on the hazards of the gas during transport.

(a) Division 2.1 Flammable gases, which consists of gases that at 20°C and a standard pressure of 101.3 kPa:

(i) are ignitable when in a mixture of 13 % or less by volume with air; or

(ii) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Flammability must be determined by tests or by calculations in accordance with methods such as ISO10156:2010.

(b) Division 2.2 Non-flammable, non-toxic gases, which consists of gases that:

(i) exert in the packaging a pressure of 200 kPa or greater at 20°C;

(ii) are asphyxiant - gases which dilute or replace the oxygen normally in the atmosphere; or

(iii) are oxidizing - gases which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does; or

(iv) do not meet the criteria to be included in Division 2.1 or Division 2.3;

(c) Division 2.3 Toxic gases, which consists of gases that:

(i) are known to be so toxic or corrosive to humans as to pose a hazard to health; or

(ii) are presumed to be toxic or corrosive to humans because they have an LC_{50} value (as defined in section 2.54) less than or equal to 5 000 mL/m^3 (ppm).

(2) Despite paragraph (1)(c) gases meeting the above criteria owing to their corrosivity are to be classified as toxic with a subsidiary corrosive hazard.

(3) Gases and gas mixtures with hazards associated with more than one division take the following precedence:

(a) Division 2.3 takes precedence over all other divisions;

(b) Division 2.1 takes precedence over Division 2.2.

2.19 Exemptions

(1) Gases of Division 2.2 are not subject to these Regulations if they are transported at a pressure of less than 200 kPa at 20°C and are not liquefied or refrigerated liquefied gases.

(2) Gases that are at an absolute pressure between 101.3 kPa and 280 kPa at 20°C, other than gases included in Division 2.1 or Division 2.3, may be handled, offered for transport or transported on a road vehicle, a railway vehicle or a ship on a domestic voyage as Division 2.2, Non-flammable, Non-toxic gas. In that case, the requirements of these Regulations that relate to gases included in Division 2.2 must be complied with.

Proposed text

(3) Gases of Division 2.2 are not subject to these Regulations when they are contained in the following:

(a) Foodstuffs, including carbonated beverages other than UN 1950;
(b) Balls intended for use in sports;
(c) Tires;
(d) Lamps if:
  (i) they do not contain radioactive material and do not contain mercury in quantities above those specified in special provision 184 of Schedule 2; and
  (ii) are packaged so that any pieces of a ruptured bulb are contained by the packaging.

2.20 Mixtures of gases

Gas mixtures are to be classified in one of the three divisions (including vapours of substances from other classes) by applying the following procedures:

(a) Flammability must be determined by tests or by calculation in accordance with methods such as ISO10156:2010;

(b) The level of toxicity is determined either by tests to measure the LC_{50} value or by a calculation method using the following formula:

LC_{50} Toxic (mixture)= $\frac{1}{\sum_{i=1}^{n}\frac{fi}{Ti}}$

where:

f_i = mole fraction of the i^{th} component substance of the mixture
T_i = Toxicity index of the i^{th} component substance of the mixture (the T_i equals the LC50 value when available)

*When LC50 values are unknown the toxicity index is determined by using the lowest LC_{50} value of substances of similar physiological and chemical effects, or through testing if this is the only practical possibility;

(c) A gas mixture has a subsidiary hazard of corrosivity when the mixture is known by human experience to be destructive to the skin, eyes or mucous membranes or when the LC_{50} value of the corrosive components of the mixture is less than or equal to 5 000 ml/m^3 (ppm) when the LC_{50} is calculated by the formula:

LC_{50} Corrosive (mixture)= $\frac{1}{\sum_{i=1}^{n}\frac{fci}{Tci}}$

where:
f_{ci} = mole fraction of the i^{th} corrosive component substance of the mixture
T_{ci} = Toxicity index of the i^{th} corrosive component substance of the mixture (the T_{ci} equals the LC_{50} value when available);

(d) Oxidizing ability is determined by tests or by calculation methods such as ISO10156:2010.

2.21 Aerosols

(1) Dangerous goods contained in an aerosol container must be transported under UN1950, AEROSOLS.

(2) The dangerous goods are included

(a) in Division 2.1, Flammable Gases, if the dangerous goods contain at least 85% by mass of flammable components and the chemical heat of combustion is greater than or equal to 30 kJ/g; or

(b) in Division 2.2, Non-flammable and Non-toxic Gases, if the dangerous goods contain not more than 1% by mass of flammable components and the heat of combustion is less than 20 kJ/g.

(3) The dangerous goods must be classified in accordance with section 31 of Part III of the Manual of Tests and Criteria.

(4) The dangerous goods must not contain gases included in Division 2.3, Toxic Gases.

Proposed text
(5) The dangerous goods must have a subsidiary hazard of 6.1, Toxic Substances, or 8, Corrosive Substances, if the dangerous goods – other than the propellant to be ejected from the aerosol container – are included in Class 6.1, Toxic Substances, Packing Groups II or III, or Class 8, Corrosive Substances, Packing Groups II or III. (6) The dangerous goods are forbidden for transport when they are included in Packing Group I for toxicity or corrosiveness.

Class 3, Flammable Liquids

The classification provisions for flammable liquids would be modified to provide clarity and harmonize with the 19th edition of the UN Recommendations. Specially, further clarity would be provided on the scope of a "viscous liquid" that is regulated in the TDG Regulations.

Proposed text
Class 3 (Flammable Liquids) **2.22 Definition and general provisions** (1) Class 3, Flammable Liquids includes: (a) Flammable liquids; (b) Liquid desensitized explosives. (2) Flammable liquids are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (for example, paints, varnishes, lacquers, etc., but not including substances otherwise classified on account of their dangerous characteristics) which give off a flammable vapour at temperatures of not more than 60°C, closed-cup test, or not more than 65.6°C, open-cup test, normally referred to as the flash point. This class also includes: (a) Liquids offered for transport at temperatures at or above their flash point; and (b) Substances that are transported or offered for transport at elevated temperatures in a liquid state and which give off a flammable vapour at a temperature at or below the maximum transport temperature. (3) Liquids meeting the definition in subsection (2) with a flash point of more than 35°C which do not sustain combustion need not be considered as flammable liquids for the purposes of these Regulations. Liquids are considered to be unable to sustain combustion for the purposes of these Regulations (i.e. they do not sustain combustion under defined test conditions) if: (a) They have passed a suitable combustibility test (see SUSTAINED COMBUSTIBILITY TEST prescribed in the Manual of Tests and Criteria, Part III, sub-section 32.5.2); (b) Their fire point according to ISO 2592:2000 is greater than 100°C; or (c) They are water miscible solutions with a water content of more than 90% by mass. (4) Liquid desensitized explosives are explosive substances which are dissolved or suspended in water or other liquid substances, to form an homogeneous liquid mixture to suppress their explosive properties. Shipping names in Schedule 1 for liquid desensitized explosives are: UN1204, UN2059, UN3064, UN3343, UN3357 and UN3379. **2.23 Packing Groups** (1) Flammable liquids included in Class 3, Flammable Liquids, are included in one of the following packing groups: (a) Packing Group I, if they have an initial boiling point of 35°C or less at an absolute pressure of 101.3 kPa and any flash point; (b) Packing Group II, if they have an initial boiling point greater than 35°C at an absolute pressure of 101.3 kPa and a flash point less than 23°C; or (c) Packing Group III, if the criteria for inclusion in Packing Group I or II are not met. (2) Despite subsection (1), for dangerous goods included in Class 3, Flammable Liquids, (a) when the packing group is unknown, the consignor may include the dangerous goods in Packing Group I; or

Proposed text

(b) when the packing group is reasonably believed or is known to be Packing Group II or III, the consignor may include the dangerous goods in Packing Group II but, if the substance has the same characteristics as UN1203, GASOLINE, it may also be transported as Packing Group II.

Table

Packing group	Flash point (closed-cup)	Initial boiling point
I	--	≤ 35°C
II	< 23°C	> 35°C
III	≥ 23°C ≤ 60°C	> 35°C

(3) Despite paragraph (1)(b), a viscous flammable liquid that has a flash point less than 23°C may be included in Packing Group III if

(a) the liquid or any separated solvent does not meet the criteria for inclusion in Class 6.1 or Class 8;

(b) less than 3% of the clear solvent layer separates when the solvent separation test set out in subsection 32.5.1 of Part III of the Manual of Tests and Criteria is carried out;

(c) the viscosity and flash-point of the liquid are in accordance with the table to this subsection; and

(d) the viscosity test is carried out in accordance with the procedure set out in subsection 32.4 of Part III of the Manual of Tests and Criteria or the procedure set out in ISO 2431.

Table

Kinematic viscosity (extrapolated) v (at near-zero shear rate) mm^2/s at 23° C	Flow-time t (seconds)	Jet diameter (mm)	Flash-point, closed-cup (°C)
20 < v ≤ 80	20 < t ≤ 60	4	above 17
80 < v ≤ 135	60 < t ≤ 100	4	above 10
135 < v ≤ 220	20 < t ≤ 32	6	above 5
220 < v ≤ 300	32 < t ≤ 44	6	above -1
300 < v ≤ 700	44 < t ≤ 100	6	above -5
700 < v	100 < t	6	No limit

(4) If a liquid referred to in subsection (3) is non-Newtonian or a flow cup method of viscosity determination is otherwise unsuitable, a variable shear-rate viscometer must be used to determine the dynamic viscosity coefficient of the liquid, at 23°C, at a number of shear rates. The values obtained must be plotted against shear rate and then extrapolated to zero shear rate. The dynamic viscosity thus obtained, divided by the density, gives the apparent kinematic viscosity at near-zero shear rate.

2.24 Viscous Liquids

(1) Viscous liquids are liquids that::

(a) have a flash point greater than or equal to 23°C but less than or equal to 60°C;
(b) are not toxic, corrosive or environmentally hazardous;
(c) contain not more than 20 % nitrocellulose provided the nitrocellulose contains not more than 12.6 % nitrogen by dry mass;
(d) are offered for transport in a packaging of less than or equal to 450 L capacity;

(2) Despite subsection (1) viscous liquids are not subject to these Regulations, if:

(a) in the solvent separation test, determined in accordance with the Manual of Tests and Criteria, Part III, sub-section 32.5.1, the height of the separated layer of solvent is less than 3 % of the total height; and

Proposed text
(b) the flowtime in the viscosity test , determined in accordance with the Manual of Tests and Criteria, Part III, sub-section 32.4.3, with a jet diameter of 6 mm is greater than or equal to : **(i)** 60 seconds; or **(ii)** 40 seconds if the viscous liquid contains not more than 60% of Class 3, Flammable Liquids **2.25 Elevated temperature Liquids** Substances classified as flammable liquids due to them being offered for transport or transported at elevated temperatures are included in packing group III.

Class 4, Flammable Solids, Substances Liable to Spontaneous Combustion; Substances That on Contact with Water Emit Flammable Gases (Water-reactive substances)

The classification provisions for flammable solids, substances liable to spontaneous combustion, substances that on contact with water emit flammable gases (water-reactive substances) would be modified to provide clarity and harmonize with the 19th edition of the UN Recommendations. Some of the proposed changes are:

- The list of currently assigned self-reactive substances in packagings would be added to help regulatees identify and package self-reactive substances.
- The flowcharts in the UN Recommendations for self-reactive and organometallic substances would be added to help regulatees classify their dangerous goods depending on its properties. These visual aids would add clarity on how to classify these dangerous goods.

Proposed text
Class 4, Flammable Solids; Substances Liable to Spontaneous Combustion; Substances That on Contact with Water Emit Flammable Gases (Water-reactive substances) **2.26 Definitions and general provisions** (1) Class 4 is divided into three divisions as follows: (a) Division 4.1 Flammable solids Solids which, under conditions encountered in transport, are readily combustible or may cause or contribute to fire through friction; self-reactive substances and polymerizing substances which are liable to undergo a strongly exothermic reaction; solid desensitized explosives which may explode if not diluted sufficiently; (b) Division 4.2 Substances liable to spontaneous combustion Substances which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up in contact with air, and being then liable to catch fire; (c) Division 4.3 Substances which in contact with water emit flammable gases Substances which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities. (2) Division 4.1 includes the following types of substances: (a) Flammable solids; (b) Self-reactive substances; (c) Solid desensitized explosives; and (d) Polymerizing substances. (3) Division 4.2 includes the following types of substances: (a) Solid pyrophoric substances; (b) Liquid pyrophoric substances; and (c) Self-heating substances. (4) Division 4.3 includes the substances which in contact with water emit flammable gases.

Proposed text

2.27 **Division 4.1 - Flammable Solids - Definitions**

(1) Flammable solids are readily combustible solids and solids which may cause fire through friction.

(2) Readily combustible solids are powdered, granular, or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly. The danger may come not only from the fire but also from toxic combustion products. Metal powders are especially dangerous because of the difficulty of extinguishing a fire since normal extinguishing agents such as carbon dioxide or water can increase the hazard.

2.28 Classification of Flammable Solids

(1) Powdered, granular or pasty substances must be classified as readily combustible solids of Division 4.1 when the time of burning of one or more of the test runs, performed in accordance with the test method described in the Manual of Tests and Criteria, Part III, sub-section 33.2.1, is less than 45 s or the rate of burning is more than 2.2 mm/s. Powders of metals or metal alloys must be classified in Division 4.1 when they can be ignited and the reaction spreads over the whole length of the sample in 10 minutes or less.

(2) Solids which may cause fire through friction must be classified in Division 4.1 by analogy with existing shipping names.

2.29 Assignment of Packing Groups for Flammable Solids

(1) Packing groups are assigned on the basis of the test methods referred to in subsection 2.28(1). For readily combustible solids (other than metal powders), Packing group II must be assigned if the burning time is less than 45 seconds and the flame passes the wetted zone. Packing group II must be assigned to powders of metal or metal alloys if the zone of reaction spreads over the whole length of the sample in five minutes or less.

(2) Packing groups are assigned on the basis of the test methods referred to in subsection 2.28(1). For readily combustible solids (other than metal powders), Packing group III must be assigned if the burning time is less than 45 seconds and the wetted zone stops the flame propagation for at least four minutes. Packing group III must be assigned to metal powders if the reaction spreads over the whole length of the sample in more than five minutes but not more than ten minutes.

(3) For solids which may cause fire through friction, the packing group must be assigned by analogy with existing shipping names or in accordance with any appropriate special provision.

2.30 Division 4.1 Self-reactive Substances – Definitions and Properties

(1) Self-reactive substances are thermally unstable substances liable to undergo a strongly exothermic decomposition even without participation of oxygen (air).

(2) Substances are not considered to be self-reactive substances of Division 4.1, if:

(a) They are explosives according to the criteria of Class 1;

(b) They are oxidizing substances according to the classification procedure for Division 5.1 except that mixtures of oxidizing substances which contain 5% or more of combustible organic substances must be subjected to the classification procedure defined in subsection (4);

(c) They are organic peroxides according to the criteria of Division 5.2;

(d) Their heat of decomposition is less than 300 J/g in accordance with an internationally recognized method such as differential scanning calorimetry and adiabatic calorimetry; or

(e) Their self-accelerating decomposition temperature (SADT) is more than 75 °C for a 50 kg package.

(3) Any substance which shows the properties of a self-reactive substance must be classified as such, even if this substance gives a positive test result according to section 2.38 for inclusion in Division 4.2.

(4) Mixtures of oxidizing substances meeting the criteria of Division 5.1 which contain at least 5 % of combustible organic substances, which do not meet the criteria mentioned in (a), (c), (d) or (e) above, must be subjected to the self-reactive substance classification procedure.

(5) mixtures showing the properties of a self-reactive substance, type B to F, shall be classified as a self-reactive substance of Division 4.1.

(6) mixtures showing the properties of a self-reactive substance, type G, according to the principle of 2.32(g) shall be considered for classification as a substance of Division 5.1.

Proposed text

(7) The decomposition of self-reactive substances can be initiated by heat, contact with catalytic impurities (e.g. acids, heavy-metal compounds, bases), friction or impact. The rate of decomposition increases with temperature and varies with the substance. Decomposition, particularly if no ignition occurs, may result in the evolution of toxic gases or vapours. For certain self-reactive substances, the temperature must be controlled. Some self-reactive substances may decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Some self-reactive substances burn vigorously.

Self-reactive substances are, for example, some compounds of the types listed below:

(a) Aliphatic azo compounds (-C-N=N-C-);

(b) Organic azides (-C-N3);

(c) Diazonium salts (-CN2+Z-);

(d) N-nitroso compounds (-N-N=O); and

(e) Aromatic sulphohydrazides (-SO2-NH-NH2).

This list is not exhaustive and substances with other reactive groups and some mixtures of substances may have similar properties.

2.31 Classification of Self-reactive Substances

(1) Self-reactive substances are classified into seven types according to the degree of danger they present. The types of self-reactive substance range from type A, which may not be accepted for transport in the packaging in which it is tested, to type G, which is not subject to the provisions for self-reactive substances of Division 4.1. The classification of types B to F is directly related to the maximum quantity allowed in one packaging.

(2) Self-reactive substances permitted for transport in packagings are listed in the subsection (3), those permitted for transport in IBCs are listed in packing instruction IBC520 of CGSB 43-146 and those permitted for transport in portable tanks are listed in portable tank instruction T23 of CSA B625. For each permitted substance listed, the appropriate generic entry in Schedule 1 (UN3221 to UN3240) is assigned, and appropriate subsidiary hazards and remarks providing relevant transport information are given. The generic shipping names specify:

(a) Self-reactive substance type (B to F);

(b) Physical state (liquid or solid); and

(c) Temperature control, when required.

(3) Table of Currently Assigned Self-reactive Substances in Packagings

(a) In the column “Packing Method” of the codes “OP1” to “OP8” refer to packing methods in packing instruction P520 of TP14850. Self-reactive substances to be transported must fulfil the classification and the control and emergency temperatures (derived from the SADT) as listed. For substances permitted in IBCs, see packing instruction IBC520 of CGSB 43-146, and for those permitted in tanks, see portable tank instruction T23 of CSA B625.

The classification given in this table is based on the technically pure substance (except where a concentration of less than 100% is specified). For other concentrations, the substances may be classified differently following the procedures in sections 2.31 and 2.32.

Table of Currently Assigned Self-reactive Substances in Packagings

SELF-REACTIVESUBSTANCE	Concen-tration (%)	Packing method	Control tempera- ture (°C)	Emergency tempera- ture (°C)	UN generic entry	Remarks
ACETONE-PYROGALLOLCOPOLYMER2- DIAZO-1-NAPHTHOL-5-SULPHONATE	100	OP8			3228	
AZODICARBONAMIDE FORMULATION TYPE B, TEMPERATURE CONTROLLED	< 100	OP5			3232	(1) (2)
AZODICARBONAMIDE FORMULATION TYPE C	< 100	OP6			3224	(3)
AZODICARBONAMIDE FORMULATION TYPE C, TEMPERATURE CONTROLLED	< 100	OP6			3234	(4)
AZODICARBONAMIDE FORMULATION TYPE D	< 100	OP7			3226	(5)
AZODICARBONAMIDE FORMULATION TYPE D, TEMPERATURE CONTROLLED	< 100	OP7			3236	(6)

Proposed text						
2,2'-AZODI(2,4-DIMETHYL- 4-METHOXYVALERONITRILE)	100	OP7	-5	+5	3236	
2,2'-AZODI(2,4-DIMETHYL- VALERONITRILE)	100	OP7	+10	+15	3236	
2,2'-AZODI(ETHYL-2-METHYLPROPIONATE)	100	OP7	+20	+25	3235	
1,1-AZODI(HEXAHYDROBENZONITRILE)	100	OP7			3226	
2,2'-AZODI(ISOBUTYRONITRILE)	100	OP6	+40	+45	3234	
2,2'-AZODI(ISOBUTYRONITRILE) as a water based paste	≤50	OP6			3224	
2,2'-AZODI(2-METHYLBUTYRONITRILE)	100	OP7	+35	+40	3236	
BENZENE-1,3-DISULPHONYL HYDRAZIDE, as a paste	52	OP7			3226	
BENZENESULPHONYL HYDRAZIDE	100	OP7			3226	
4-(BENZYL(ETHYL)AMINO)-3-ETHOXY- BENZENEDIAZONIUM ZINC CHLORIDE	100	OP7			3226	
4-(BENZYL(METHYL)AMINO)-3-ETHOXY BENZENEDIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
3-CHLORO-4-DIETHYLAMINOBENZENE- DIAZONIUM ZINC CHLORIDE	100	OP7			3226	
2-DIAZO-1-NAPHTHOL-4- SULPHONYL- CHLORIDE	100	OP5			3222	(2)
2-DIAZO-1-NAPHTHOL-5- SULPHONYL CHLORIDE	100	OP5			3222	(2)
2-DIAZO-1-NAPHTHOL SULPHONIC ACID ESTER MIXTURE, TYPE D	<100	OP7			3226	(9)
2,5-DIBUTOXY-4-(4-MORPHOLINYL) BENZENEDIAZONIUM, TETRACHLOROZINCATE (2:1)	100	OP8			3228	
2,5-DIETHOXY-4-MORPHOLINO- BENZENEDIAZONIUM ZINC CHLORIDE	67-100	OP7	+35	+40	3236	
2,5-DIETHOXY-4-MORPHOLINO- BENZENEDIAZONIUM ZINC CHLORIDE	66	OP7	+40	+45	3236	
2,5-DIETHOXY-4-MORPHOLINO- BENZENEDIAZONIUM TETRAFLUOROBORATE	100	OP7	+30	+35	3236	
2,5-DIETHOXY-4-(4-MORPHOLINYL)- BENZENEDIAZONIUM SULPHATE	100	OP7			3226	
2,5- DIETHOXY-4-(PHENYLSULPHONYL)- BENZENEDIAZONIUM ZINC CHLORIDE	67	OP7	+40	+45	3236	
DIETHYLENEGLYCOL BIS (ALLYL CARBONATE) + DI ISOPROPYLPEROXYDICARBONATE	≥88 + ≤12	OP8	-10	0	3237	
2,5-DIMETHOXY-4-(4-METHYL- PHENYLSULPHONYL)BENZENE-DIAZONIUM ZINC CHLORIDE	79	OP7	+40	+45	3236	
4-(DIMETHYLAMINO)-BENZENE- DIAZONIUM TRICHLOROZINCATE (-1)	100	OP8			3228	
4-DIMETHYLAMINO-6-(2-DIMETHYL- AMINOETHOXY) TOLUENE-2-DIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
N,N'-DINITROSO-N,N'-DIMETHYL TEREPHTHALAMIDE, as a paste	72	OP6			3224	
N,N'-DINITROSOPENTAMETHYLENE- TETRAMINE	82	OP6			3224	(7)
DIPHENYLOXIDE-4,4'-DISULPHONYL HYDRAZIDE	100	OP7			3226	
4-DIPROPYLAMINOBENZENE- DIAZONIUM ZINC CHLORIDE	100	OP7			3226	
2-(N,N-ETHOXYCARBONYL- PHENYLAMINO)-3-METHOXY-4- (N-METHYL-N-CYCLOHEXYLAMINO BENZENEDIAZONIUM ZINC CHLORIDE	63-92	OP7	+40	+45	3236	
2-(N,N-ETHOXYCARBONYL- PHENYLAMINO)-3-METHOXY-4-(N-METHYL-N- CYCLOHEXYLAMINO) BENZENEDIAZONIUM ZINC CHLORIDE	62	OP7	+35	+40	3236	
N-FORMYL-2-(NITROMETHYLENE) -1,3-PERHYDROTHIAZINE	100	OP7	+45	+50	3236	
2-(2-HYDROXYETHOXY)-1- (PYRROLIDIN-1-YL)BENZENE-4-DIAZONIUM ZINC CHLORIDE	100	OP7	+ 45	+ 50	3236	
3-(2-HYDROXYETHOXY)-4- (PYRROLIDIN-1-YL)BENZENE DIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
2-(N,N-METHYLAMINOETHYL- CARBONYL)-4-(3,4-DIMETHYL-PHENYLSULPHONYL)BENZENE- DIAZONIUM HYDROGEN SULPHATE	96	OP7	+45	+50	3236	
4-METHYLBENZENESULPHONYL- HYDRAZIDE	100	OP7			3226	
3-METHYL-4-(PYRROLIDIN-1-YL) BENZENEDIAZONIUM TETRAFLUOROBORATE	95	OP6	+45	+50	3234	

Proposed text

4-NITROSOPHENOL	100	OP7	+35	+40	3236	
SELF-REACTIVE LIQUID, SAMPLE		OP2			3223	(8)
SELF-REACTIVE LIQUID, SAMPLE, TEMPERATURECONTROLLED		OP2			3233	(8)
SELF-REACTIVE SOLID, SAMPLE		OP2			3224	(8)
SELF-REACTIVE SOLID, SAMPLE, TEMPERATURECONTROLLED		OP2			3234	(8)
SODIUM2-DIAZO-1-NAPHTHOL- 4-SULPHONATE	100	OP7			3226	
SODIUM2-DIAZO-1-NAPHTHOL- 5-SULPHONATE	100	OP7			3226	
TETRAMINE PALLADIUM (II) NITRATE	100	OP6	+30	+35	3234	

Remarks

(1) Azodicarbonamide formulations which fulfil the criteria of paragraph 2.31(2)(b). The control and emergency temperatures must be determined by the procedure given in 7.1.5.3 to 7.1.5.3.1.3 of the UN Recommendations.
(2) "EXPLOSIVE" subsidiary risk label required.
(3) Azodicarbonamide formulations which fulfil the criteria of paragraph 2.31(2)(c).
(4) Azodicarbonamide formulations which fulfil the criteria of paragraph 2.31(2)(c).The control and emergency temperatures must be determined by the procedure given in 7.1.5.3 to 7.1.5.3.1.3 of the UN Recommendations.
(5) Azodicarbonamide formulations which fulfil the criteria of paragraph 2.31(2)(d).
(6) Azodicarbonamide formulations which fulfil the criteria of paragraph 2.31(2)(d). The control and emergency temperatures must be determined by the procedure given in 7.1.5.3 to 7.1.5.3.1.3 of the UN Recommendations.
(7) With a compatible diluent having a boiling point of not less than 150°C.
(8) This entry applies to mixtures of esters of 2-diazo-1-naphthol-4-sulphonic acid and 2-diazo-1- naphthol-5-sulphonic acid meeting the criteria of paragraph 2.31(2)(d).

(4) Classification of self-reactive substances not listed in subsection (3), packing instruction IBC520 of CGSB 43-146 or portable tank instruction T23 of CSA B625. The classification procedures, test methods and criteria, and an example of a suitable test report, are provided in the Manual of Tests and Criteria, Part II.

(a) Activators may be added to some self-reactive substances to change their reactivity. Depending on both the type and the concentration of the activator, this may result in a decrease in thermal stability and a change in explosive properties. If either of these properties is altered, the new formulation must be assessed in accordance with the procedure described under section 33 of the Manual of Tests and Criteria.

2.32 Principles of Classification of self-reactive substances

(1) This section refers only to those properties of self-reactive substances which are decisive for their classification. A flow chart, presenting the classification principles in the form of a graphically arranged scheme of questions concerning the decisive properties together with the possible answers, is given in Figure 1, Flow Chart Scheme for Self-reactive Substances. These properties must be determined experimentally using the test methods and criteria given in the Manual of Tests and Criteria, Part II.

(2) A self-reactive substance is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.

(3) The following principles apply to the classification of self-reactive substances not listed in subsection 2.31(3).

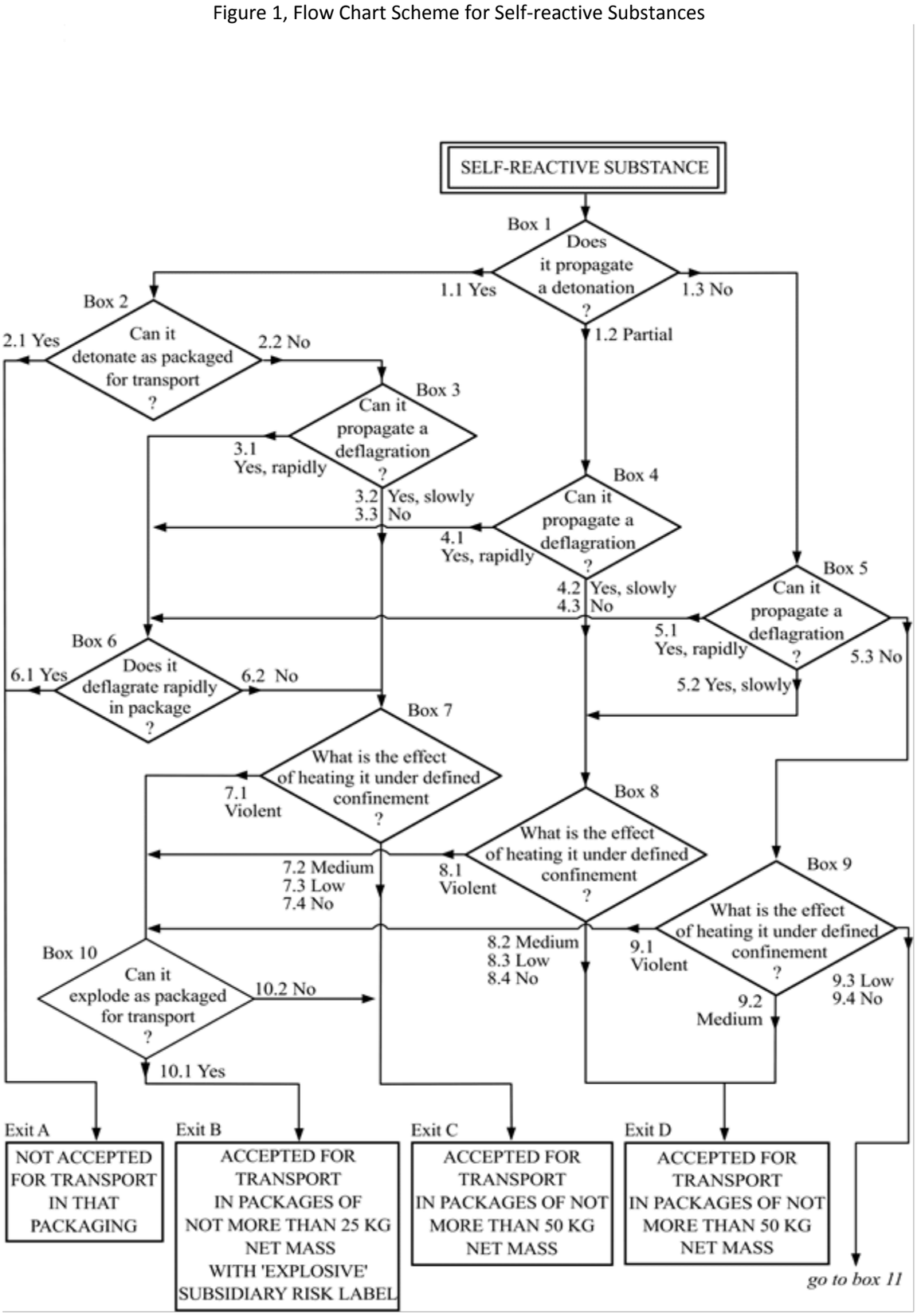
(a) Any substance which can detonate or deflagrate rapidly, as packaged for transport, is prohibited from transport under the provisions for self-reactive substances of Division 4.1 in that packaging (defined as self-reactive substance type A, exit box A of Figure 1, Flow Chart Scheme for Self-reactive Substances);

(b) Any substance possessing explosive properties and which, as packaged for transport, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package, must also bear an "EXPLOSIVE" subsidiary hazard label. Such a substance may be packaged in amounts of up to 25 kg unless the maximum quantity has to be limited to a lower amount to preclude detonation or rapid deflagration in the package (defined as self-reactive substance type B, exit box B of Figure 1, Flow Chart Scheme for Self-reactive Substances);

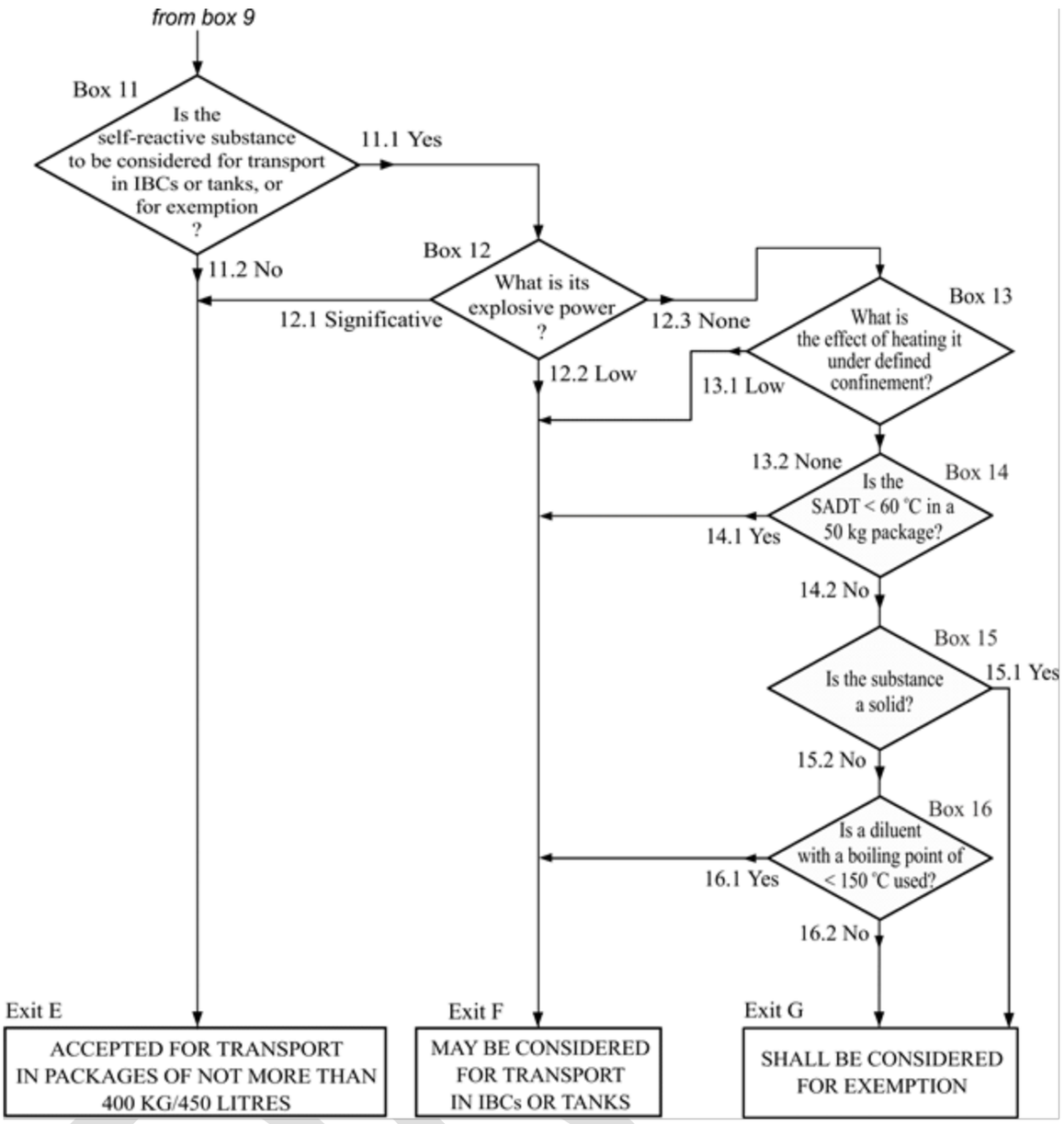
Proposed text
(c) Any substance possessing explosive properties may be transported without an "EXPLOSIVE" subsidiary hazard label when the substance as packaged (maximum 50 kg) for transport cannot detonate or deflagrate rapidly or undergo a thermal explosion (defined as self-reactive substance type C, exit box C of Figure 1, Flow Chart Scheme for Self-reactive Substances); (d) Any substance which in laboratory testing: (i) detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) does not detonate or deflagrate at all and shows a medium effect when heated under confinement; may be accepted for transport in packages of not more than 50 kg net mass (defined as self-reactive substance type D, exit box D of Figure 1, Flow Chart Scheme for Self-reactive Substances); (e) Any substance which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement may be accepted for transport in packages of not more than 400 kg/450 litres (defined as self-reactive substance type E, exit box E of Figure 1, Flow Chart Scheme for Self-reactive Substances); (f) Any substance which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power may be considered for transport in IBCs or tanks (defined as self-reactive substance type F, exit box F of Figure 1, Flow Chart Scheme for Self-reactive Substances); (g) Any substance which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power must be exempted from classification as a self-reactive substance of Division 4.1 provided that the formulation is thermally stable (self-accelerating decomposition temperature 60°C to 75°C for a 50 kg package) and any diluent meets the requirements of "desensitization of self-reactive substances " (defined as self-reactive substance type G, exit box G of Figure 1, Flow Chart Scheme for Self-reactive Substances). If the formulation is not thermally stable or a compatible diluent having a boiling point less than 150°C is used for desensitization, the formulation shall be defined as self-reactive liquid/solid type.

Proposed text

Figure 1, Flow Chart Scheme for Self-reactive Substances



Proposed text



2.33 Temperature Control Requirements for Self-reactive Substances

Self-reactive substances are subject to temperature control in transport if their self-accelerating decomposition temperature (SADT) is less than or equal to 55°C. Test methods for determining the SADT are given in the *Manual of Tests and Criteria*, Part II, section 28. The test selected must be conducted in a manner which is representative, both in size and material, of the package to be transported.

2.34 Desensitization of self-reactive substances

(1) Self-reactive substances may be desensitized through the use of a diluent. If a diluent is used, the self-reactive substance must be tested with the diluent present in the concentration and form used in transport.

(2) Diluents which may allow a self-reactive substance to concentrate to a dangerous extent in the event of leakage from a package must not be used.

(3) The diluent must be compatible with the self-reactive substance. In this regard, compatible diluents are those solids or liquids which have no detrimental influence on the thermal stability and hazard type of the self-reactive substance.

(4) Liquid diluents in liquid formulations requiring temperature control must have a boiling point of at least 60°C and a flash point not less than 5°C. The boiling point of the liquid must be at least 50°C higher than the control temperature of the self-reactive substance.

Proposed text

2.35 Division 4.1 Solid Desensitized Explosives

(1) Solid desensitized explosives are explosive substances which are wetted with water or alcohols or are diluted with other substances, to form a homogeneous solid mixture to suppress their explosive properties. Shipping names in Schedule 1 for solid desensitized explosives are UN1310, UN1320 to UN1322, UN1336, UN1337, UN1344, UN1347 to UN1349, UN1354 to UN1357, UN1517, UN1571, UN2555 to UN2557, UN2852, UN2907, UN3317, UN3319, UN3344, UN3364 to UN3370, UN3376, UN3380 and UN3474.

(2) Substances that:

(a) have been provisionally accepted into Class 1 according to Test Series 1 and 2 but exempted from Class 1 by Test Series 6;

(b) are not self-reactive substances of Division 4.1;

(c) are not substances of Class 5;

are also assigned to Division 4.1. Though not desensitized explosives, UN2956, UN3241, UN3242 and UN3251 are such shipping names that are assigned to Division 4.1.

2.36 Division 4.1 Polymerizing Substances and Mixtures (stabilized) – Definitions and Properties

(1) Polymerizing substances are substances which, without stabilization, are liable to undergo a strongly exothermic reaction resulting in the formation of larger molecules or resulting in the formation of polymers under conditions normally encountered in transport. Such substances are considered to be polymerizing substances of Division 4.1 if it

(a) has a self-accelerating polymerization temperature (SAPT) that is less than or equal to 75°C under the conditions in which the substance or mixture is to be transported, with or without chemical stabilization as offered for transport, and in the means of containment in which the substance or mixture is to be transported;

(b) exhibit a heat of reaction of more than 300 J/g; and

(c) does not meet any other criteria for inclusion in Classes 1-8.

(2) A mixture meeting the criteria of a polymerizing substance must be classified as a polymerizing substance of Division 4.1.

(3) A person must not offer for transport, handle or transport the following polymerizing substances unless they are stabilized by temperature control:

(a) a polymerizing substance that is in packaging or an intermediate bulk container (IBC) and whose self-accelerating polymerization temperature (SAPT) is 50°C or less in that packaging or IBC; or

(b) a polymerizing substance that is in a portable tank and whose SAPT is 45°C or less in that portable tank.

2.37 Division 4.2 Substances Liable to Spontaneous Combustion – Definitions and Properties

(1) Division 4.2 includes:

(a) Pyrophoric substances, which are substances, including mixtures and solutions (liquid or solid), which even in small quantities ignite within five minutes of coming in contact with air. These are the Division 4.2 substances are the most liable to spontaneous combustion; and

(b) Self-heating substances, which are substances, other than pyrophoric substances, which in contact with air without energy supply are liable to self-heating. These substances will ignite only when in large amounts (kilograms) and after long periods of time (hours or days).

(2) Self-heating of a substance is a process where the gradual reaction of that substance with oxygen (in air) generates heat. If the rate of heat production exceeds the rate of heat loss, then the temperature of the substance will rise which, after an induction time, may lead to self-ignition and combustion.

2.38 Classification in Division 4.2

(1) Solids are considered pyrophoric solids which must be classified in Division 4.2 if, in tests performed in accordance with the test method given in the Manual of Tests and Criteria, Part III, sub-section 33.3.1.4, the sample ignites in one of the tests.

(2) Liquids are considered pyrophoric liquids which must be classified in Division 4.2 if, in tests performed in accordance with the test method given in the Manual of Tests and Criteria, Part III, sub-section 33.3.1.5, the liquid ignites in the first part of the test, or if it ignites or chars the filter paper.

Proposed text

(3) A substance must be classified as a self-heating substance of Division 4.2 if, in tests performed in accordance with the test method given in the Manual of Tests and Criteria, Part III, sub-section 33.3.1.6:

(a) A positive result is obtained using a 25 mm cube sample at 140°C;

(b) A positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 100 mm cube sample at 120°C and the substance is to be transported in packages with a volume of more than 3 m^3;

(c) A positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 100 mm cube sample at 100°C and the substance is to be transported in packages with a volume of more than 450 litres;

(d) A positive result is obtained in a test using a 100 mm sample cube at 140°C and a positive result is obtained using a 100 mm cube sample at 100°C.

(4) Self-reactive substances, except for type G, giving also a positive result with this test method, must not be classified in Division 4.2 but in Division 4.1 as per subsection 2.29(3).

(5) A substance must not be classified in Division 4.2 if:

(a) A negative result is obtained in a test using a 100 mm cube sample at 140°C;

(b) A positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm cube sample at 140°C, a negative result is obtained in a test using a 100 mm cube sample at 120°C and the substance is to be transported in packages with a volume not more than 3 m^3;

(c) A positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm cube sample at 140°C, a negative result is obtained in a test using a 100 mm cube sample at 100°C and the substance is to be transported in packages with a volume not more than 450 litres.

2.39 Assignment of Packing Groups for Division 4.2

(1) Packing group I must be assigned to all pyrophoric solids and liquids.

(2) Packing group II must be assigned to self-heating substances which give a positive result in a test using a 25 mm sample cube at 140°C.

(3) Packing group III must be assigned to self-heating substances if:

(a) A positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm cube sample at 140°C and the substance is to be transported in packages with a volume of more than 3 m^3;

(b) A positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm cube sample at 140°C, a positive result is obtained in a test using a 100 mm cube sample at 120°C and the substance is to be transported in packages with a volume of more than 450 litres;

(c) A positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm cube sample at 140°C and a positive result is obtained in a test using a 100 mm cube sample at 100°C.

2.40 Division 4.3, Substances which in Contact with Water Emit Flammable Gases – Definitions and Properties

Certain substances in contact with water may emit flammable gases that can form explosive mixtures with air. The test method referred to in section 2.41 is used to determine whether the reaction of a substance with water leads to the development of a dangerous amount of gases which may be flammable. This test method must not be applied to pyrophoric substances.

2.41 Classification in Division 4.3

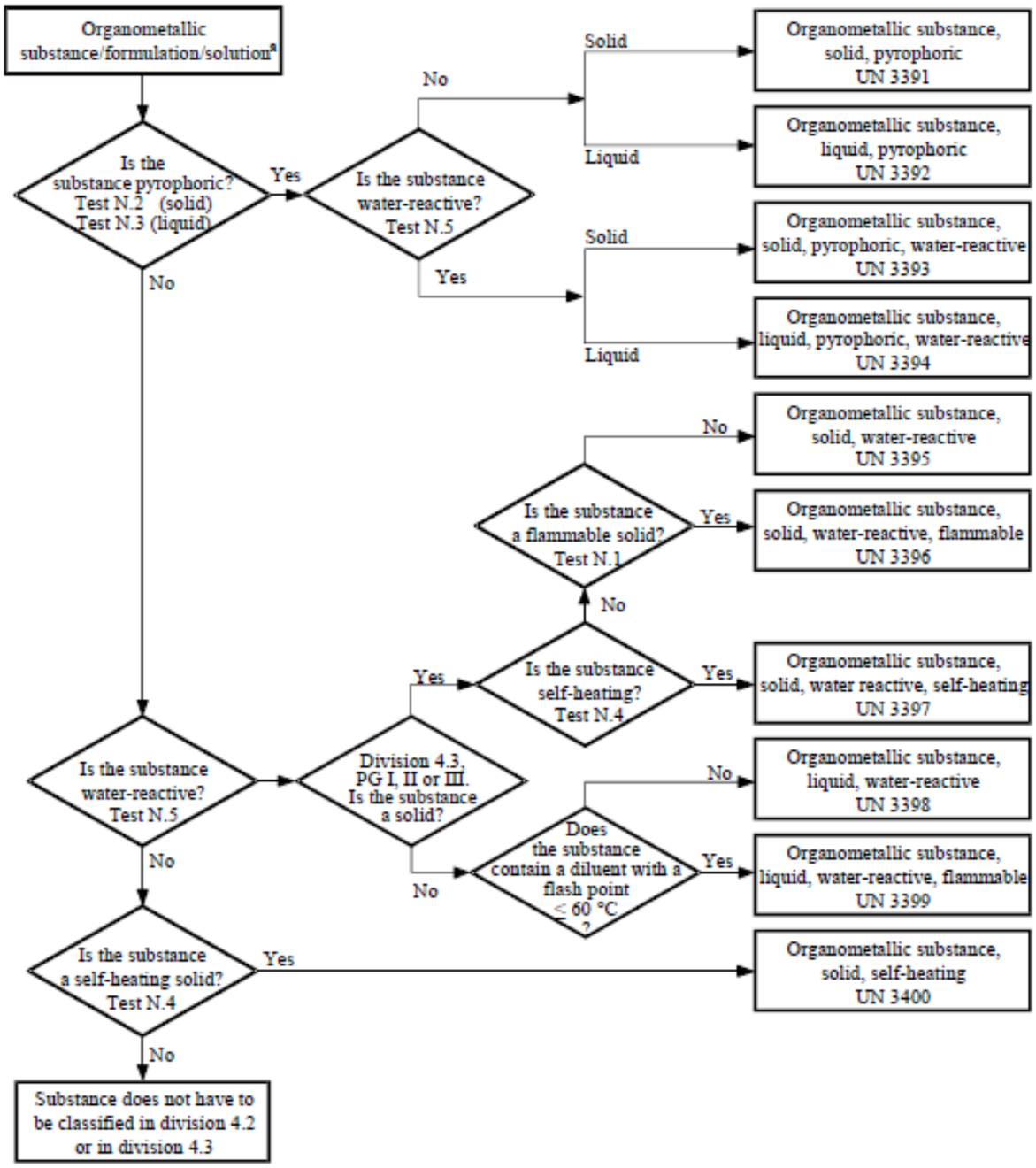
Substances which in contact with water emit flammable gases must be classified in Division 4.3 if, in tests performed in accordance with the test method given in the Manual of Tests and Criteria, Part III, sub-section 33.4.1:

(a) Spontaneous ignition takes place in any step of the test procedure; or

Proposed text
(b) There is an evolution of a flammable gas at a rate greater than 1 litre per kilogram of the substance per hour. **2.42 Assignment of Packing Groups for Division 4.3** (1) Packing group I must be assigned to any substance which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is at least 10 litres per kilogram of substance over any one minute. (2) Packing group II must be assigned to any substance which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is at least 20 litres per kilogram of substance per hour, and which does not meet the criteria for inclusion in packing group I; or (3) Packing group III must be assigned to any substance which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is greater than 1 litre per kilogram of substance per hour, and which does not meet the criteria for inclusion in packing groups I or II. **2.43 Classification of Organometallic Substances** Depending on their properties, organometallic substances may be classified in divisions 4.2 or 4.3, as appropriate, in accordance with the flowchart scheme given in Figure 2, Flow Chart Scheme for Organometallic Substances.

Proposed text

Figure 2, Flow Chart Scheme for Organometallic Substances



Class 5, Oxidizing Substances and Organic Peroxides

The classification provisions for oxidizing substances and organic peroxides would be modified to provide clarity and harmonize with the 19th edition of the UN Recommendations. The list of currently assigned organic peroxides would be added to the proposed amendment to aid in fulfilling classification, control and emergency temperature requirements for dangerous goods such as dibenzoyl peroxide, peroxylauric acid and cyclohexane peroxides.

Proposed text
Class 5, Oxidizing Substances and Organic Peroxides **2.44 Definitions and General Provisions** (1) Substances are included in Class 5 if they are oxidizing substances or organic peroxides and meet the criteria for inclusion in one of the divisions of Class 5. (2) Class 5 is divided into two divisions as follows: (a) Division 5.1 Oxidizing substances Substances which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material. Such substances may be contained in an article; (b) Division 5.2 Organic peroxides Organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. Organic peroxides are thermally unstable substances, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties: (i) be liable to explosive decomposition; (ii) burn rapidly; (iii) be sensitive to impact or friction; (iv) react dangerously with other substances; (v) cause damage to the eyes. **2.45 Classification of Oxidizing Substances in Division 5.1** Oxidizing substances must be classified in Division 5.1 in accordance with the test methods, procedures and criteria in sections 2.46 to 2.49 and the Manual of Tests and Criteria, Part III, section 34. In the event of divergence between test results and known experience, judgement based on known experience must take precedence over test results. **2.46 Criteria for classification of Oxidizing Solids in Division 5.1** (1) Tests are performed to measure the potential for the solid substance to increase the burning rate or burning intensity of a combustible substance when the two are thoroughly mixed. The procedure is given in the Manual of Tests and Criteria, Part III, sub-section 34.4.1 (test O.1) or alternatively, in sub-section 34.4.3 (test O.3). Tests are conducted on the substance to be evaluated mixed with dry fibrous cellulose in mixing ratios of 1:1 and 4:1, by mass, of sample to cellulose. The burning characteristics of the mixtures are compared: (a) In the test O.1, with the standard 3:7 mixture, by mass, of potassium bromate to cellulose. If the burning time is less than or equal to this standard mixture, the burning times must be compared with those from the packing group I or II reference standards, 3:2 and 2:3 ratios, by mass, of potassium bromate to cellulose respectively; or (b) In the test O.3, with the standard 1:2 mixture, by mass, of calcium peroxide to cellulose. If the burning rate is greater than or equal to this standard mixture, the burning rates must be compared with those from the packing group I or II reference standards 3:1 and 1:1 ratios, by mass, of calcium peroxide to cellulose, respectively. (2) The classification test results are assessed on the basis of: (a) The comparison of the mean burning time (for the test O.1) or burning rate (for the test O.3) with those of the reference mixtures; and (b) Whether the mixture of substance and cellulose ignites and burns.

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(3) A solid substance is classified in Division 5.1 if the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits:

(a) In the test O.1, a mean burning time less than or equal to the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose; or

(b) In the test O.3, a mean burning rate greater than or equal to the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose

2.47 Assignment of Packing Groups for Oxidizing Solids of Division 5.1

The packing group for a solid substance that is included in Class 5.1, Oxidizing Substances, must be determined by using a test sample of the substance that is prepared in accordance with section 2.46; and Test procedure set out in either subsection 34.4.1 (test O.1) or subsection 34.4.3 (test O.3) of Part III of the Manual of Tests and Criteria must be carried out on the test sample. The substance is included in

(a) Packing Group I if the test sample exhibits an average burning time that is
  (i) less than the mean burning time of a 3:2 potassium bromate/cellulose mixture by mass when test O.1 is used, or
  (ii) greater than the mean burning rate of a 3:1 calcium peroxide/cellulose mixture by mass when test O.3 is used;

(b) Packing Group II, if the criteria for Packing Group I are not met and the test sample exhibits an average burning time that is

  (i) less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture by mass, when test O.1 is used, or

  (ii) equal to or greater than the mean burning rate of a 1:1 calcium peroxide/cellulose mixture by mass, when test O.3 is used; or

(c) Packing Group III, if the criteria for Packing Groups I and II are not met and the test sample exhibits an average burning time that is

  (i) less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture by mass, when test O.1 is used, or

  (ii) equal to or greater than the mean burning rate of a 1:2 calcium peroxide/cellulose mixture by mass, when test O.3 is used.

2.48 Criteria for Classification of Oxidizing Liquids in Division 5.1

(1) A test is performed to determine the potential for a liquid substance to increase the burning rate or burning intensity of a combustible substance or for spontaneous ignition to occur when the two are thoroughly mixed. The procedure is given in the Manual of Tests and Criteria, Part III, sub-section 34.4.2 (Test O.2). It measures the pressure rise time during combustion. Whether a liquid is an oxidizing substance of Division 5.1 and, if so, whether packing groups I, II or III must be assigned, is decided on the basis of the test result.

(2) The classification test results are assessed on the basis of:

(a) Whether the mixture of substance and cellulose spontaneously ignites;

(b) The comparison of the mean time taken for the pressure to rise from 690 kPa to 2070 kPa gauge with those of the reference substances.

(3) A liquid substance is classified in Division 5.1 if the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 65% aqueous nitric acid and cellulose.

2.49 Assignment of Packing Groups for Oxidizing Liquids of Division 5.1

The packing group for a liquid substance that is included in Class 5.1, Oxidizing Substances, must be determined by using a test sample of the substance prepared in accordance with section 2.48 and the test procedure set out in sub-section 34.4.2 (test O.2) of Part III of the Manual of Tests and Criteria must be carried out on the test sample. The substance is included in

(a) Packing Group I, if the test sample in a 1:1 mixture by mass of substance and cellulose spontaneously ignites or the mean pressure rise time is less than that of a 1:1 mixture by mass of 50% perchloric acid and cellulose;

Proposed text

(b) Packing Group II, if the mean pressure rise time is less than or equal to the mean pressure rise time of a 1:1 mixture by mass of 40% aqueous sodium chlorate solution and cellulose and the criteria for inclusion in Packing Group I are not met; or

(c) Packing Group III, if the mean pressure rise time is less than or equal to the mean pressure rise time of a 1:1 mixture by mass of 65% aqueous nitric acid solution and cellulose and the criteria for inclusion in Packing Group I or II are not met.

2.50 Division 5.2 Organic Peroxides – Properties

Organic peroxides are liable to exothermic decomposition at normal or elevated temperatures. The decomposition can be initiated by heat, contact with impurities (e.g. acids, heavy-metal compounds, amines), friction or impact. The rate of decomposition increases with temperature and varies with the organic peroxide formulation. Decomposition may result in the evolution of harmful, or flammable, gases or vapours. Some organic peroxides may decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings.

2.51 Classification of Organic Peroxides

(1) Any organic peroxide must be considered for classification in Division 5.2, unless the organic peroxide formulation contains:

(a) Not more than 1 % available oxygen from the organic peroxides when containing not more than 1 % hydrogen peroxide; or

(b) Not more than 0.5 % available oxygen from the organic peroxides when containing more than 1 % but not more than 7 % hydrogen peroxide.

The available oxygen content (%) of an organic peroxide formulation is given by the formula:

$16x \Sigma (n_i \times c_i / m_i)$

where:

n_i = number of peroxygen groups per molecule of organic peroxide i;

c_i = concentration (mass %) of organic peroxide i;

m_i = molecular mass of organic peroxide i.

(2) Organic peroxides are classified into seven types according to the degree of danger they present. The types of organic peroxide range from type A, which may not be accepted for transport in the packaging in which it is tested, to type G, which is not subject to the provisions for organic peroxides of Division 5.2. The classification of types B to F is directly related to the maximum quantity allowed in one packaging.

(3) Organic peroxides permitted for transport in packagings are listed in the table presented in subsection (4), those permitted for transport in IBC's are listed in packing instruction IBC520 of CGSB-43.126 and those permitted for transport in portable tanks are listed in portable tank instruction T23 of CSA-B625. For each permitted substance listed, the generic entry in Schedule 1 (UN3101 to UN3120) is assigned, appropriate subsidiary hazard and remarks providing relevant transport information are given. The generic shipping names specify:

(a) Organic peroxide type (B to F);

(b) Physical state ; and

(c) Temperature control, when required.

(4) Mixtures may be classified as the same type of organic peroxide as that of the most dangerous component and be transported under the conditions of transport given for this type. However, as two stable components can form a thermally less stable mixture, the self-accelerating decomposition temperature (SADT) of the mixture shall be determined and, if necessary, temperature control applied as required by section 2.53.

(5) List of Currently Assigned Organic Peroxides in Packagings

Organic peroxides permitted for transport in packagings are listed in the List of Currently Assigned Organic Peroxides in Packagings. "Packing Method" codes "OP1" to "OP8" refer to packing methods in packing instruction P520 of TP14850. Peroxides to be transported should fulfil the classification and the control and emergency temperatures (derived from the SADT) as listed. For substances permitted in IBCs see packing instruction IBC520 of CGSB 43-146, and for those permitted in tanks, see portable tank instruction T23 of CSA B625.

Proposed text

List of Currently Assigned Organic Peroxides in Packagings.

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B[1] (%)	Inert solid (%)	Water (%)	Packing Method	Control tempe-rature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
ACETYL ACETONE PEROXIDE	≤ 42	≥ 48			≥8	OP7			3105	2)
"	≤ 32 as a paste					OP7			3106	20)
ACETYL CYCLOHEXANESULPHONYL PEROXIDE	≤ 82				≥ 12	OP4	-10	0	3112	3)
"	≤ 32		≥ 68			OP7	-10	0	3115	
tert-AMYL HYDROPEROXIDE	≤ 88	≥ 6			≥ 6	OP8			3107	
tert-AMYL PEROXYACETATE	≤ 62	≥ 38				OP7			3105	
tert-AMYL PEROXYBENZOATE	≤ 100					OP5			3103	
tert-AMYL PEROXY-2-ETHYLHEXANOATE	≤ 100					OP7	+20	+25	3115	
tert-AMYL PEROXY-2-ETHYLHEXYL CARBONATE	≤ 100					OP7			3105	
tert-AMYL PEROXY ISOPROPYL CARBONATE	≤77	≥ 23				OP5			3103	
tert-AMYL PEROXYNEODECANOATE	≤ 77		≥ 23			OP7	0	+10	3115	
"	≤ 47	≥ 53				OP8	0	+ 10	3119	
tert-AMYL PEROXYPIVALATE	≤ 77		≥ 23			OP5	+10	+15	3113	
tert-AMYLPEROXY-3,5,5-TRIMETHYLHEXANOATE	≤ 100					OP7			3105	
tert-BUTYL CUMYL PEROXIDE	> 42 - 100					OP8			3109	
"	≤ 52			≥ 48		OP8			3108	
n-BUTYL-4,4-DI-(tert-BUTYLPEROXY)VALERATE	> 52 - 100					OP5			3103	
"	≤ 52			≥ 48		OP8			3108	
tert-BUTYL HYDROPEROXIDE	>79 - 90				≥ 10	OP5			3103	13)
"	≤ 80	≥ 20				OP7			3105	4) 13)
"	≤ 79				> 14	OP8			3107	13) 23)
"	≤ 72				≥ 28	OP8			3109	13)
tert-BUTYL HYDROPEROXIDE + DI-tert-BUTYLPEROXIDE	< 82 + >9				≥ 7	OP5			3103	13)

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B[1] (%)	Inert solid (%)	Water (%)	Packing Method	Control tempe-rature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
tert-BUTYL MONOPEROXYMALEATE	> 52 - 100					OP5			3102	3)
"	≤ 52	≥ 48				OP6			3103	
"	≤ 52			≥ 48		OP8			3108	
"	≤ 52 as a paste					OP8			3108	
tert-BUTYL PEROXYACETATE	> 52 - 77	≥ 23				OP5			3101	3)
"	> 32 - 52	≥ 48				OP6			3103	
"	≤ 32		≥ 68			OP8			3109	
tert-BUTYL PEROXYBENZOATE	> 77 - 100					OP5			3103	
"	> 52 - 77	≥23				OP7			3105	
"	≤ 52			≥ 48		OP7			3106	
tert-BUTYL PEROXYBUTYL FUMARATE	≤ 52	≥ 48				OP7			3105	
tert-BUTYL PEROXYCROTONATE	≤ 77	≥ 23				OP7			3105	
tert-BUTYL PEROXYDIETHYLACETATE	≤ 100					OP5	+20	+25	3113	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE	> 52 – 100					OP6	+20	+25	3113	
"	> 32 - 52		≥ 48			OP8	+30	+35	3117	
"	≤ 52			≥ 48		OP8	+20	+25	3118	
"	≤ 32		≥ 68			OP8	+40	+45	3119	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE + 2,2-DI-(tert-BUTYLPEROXY)BUTANE	≤ 12 +≤ 14	≥ 14		≥ 60		OP7			3106	
"	≤ 31 + ≤ 36		≥ 33			OP7	+35	+40	3115	
tert-BUTYL PEROXY-2-ETHYLHEXYLCARBONATE	≤ 100					OP7			3105	
tert-BUTYL PEROXYISOBUTYRATE	> 52 - 77		≥ 23			OP5	+15	+20	3111	3)
"	≤ 52		≥ 48			OP7	+15	+20	3115	
tert-BUTYLPEROXY ISOPROPYLCARBONATE	≤ 77	≥ 23				OP5			3103	
1-(2-tert-BUTYLPEROXY ISOPROPYL)-3-ISOPROPENYLBENZENE	≤ 77	≥ 23				OP7			3105	
"	≤ 42			≥ 58		OP8			3108	
tert-BUTYL PEROXY-2-METHYLBENZOATE	≤ 100					OP5			3103	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B[1] (%)	Inert solid (%)	Water (%)	Packing Method	Control tempe-rature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
tert-BUTYL PEROXYNEODECANOATE	> 77 - 100					OP7	-5	+5	3115	
"	≤ 77		≥ 23			OP7	0	+10	3115	
"	≤ 52 as a stable dispersion in water					OP8	0	+10	3119	
"	≤ 42 as a stable dispersion in water (frozen)					OP8	0	+10	3118	
"	≤ 32	≥ 68				OP8	0	+10	3119	
tert-BUTYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23				OP7	0	+10	3115	
"	≤ 42 as a stable dispersion in water					OP8	0	+10	3117	
tert-BUTYL PEROXYPIVALATE	> 67 - 77	≥ 23				OP5	0	+10	3113	
"	> 27 - 67		≥ 33			OP7	0	+10	3115	
"	≤ 27		≥ 73			OP8	+30	+35	3119	
tert-BUTYLPEROXY STEARYLCARBONATE	≤ 100					OP7			3106	
tert-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	> 37 - 100					OP7			3105	
"	≤ 42			≥ 58		OP7			3106	
"	≤ 37		≥ 63			OP8			3109	
3-CHLOROPEROXYBENZOIC ACID	> 57 - 86			≥ 14		OP1			3102	3)
"	≤ 57			≥ 3	≥ 40	OP7			3106	
"	≤ 77			≥ 6	≥ 17	OP7			3106	
CUMYL HYDROPEROXIDE	> 90 - 98	≤10				OP8			3107	13)
"	≤ 90	≥ 10				OP8			3109	13) 18)
CUMYL PEROXYNEODECANOATE	≤ 87	≥ 13				OP7	- 10	0	3115	
"	≤ 77		≥ 23			OP7	-10	0	3115	
"	≤ 52 as a stable dispersion in water					OP8	-10	0	3119	
CUMYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23				OP7	-10	0	3115	
CUMYL PEROXYPIVALATE	≤ 77		≥ 23			OP7	-5	+5	3115	

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B[1] (%)	Inert solid (%)	Water (%)	Packing Method	Control tempe-rature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
DI-tert-BUTYL PEROXIDE	> 52 - 100					OP8			3107	
"	≤ 52		≥ 48			OP8			3109	25)
DI-tert-BUTYL PEROXYAZELATE	≤ 52	≥ 48				OP7			3105	
2,2-DI-(tert-BUTYLPEROXY)BUTANE	≤ 52	≥ 48				OP6			3103	
1,6-DI-(tert-BUTYLPEROXYCARBONYLOXY) HEXANE	≤ 72	≥ 28				OP5			3103	
1,1-DI-(tert-BUTYLPEROXY) CYCLOHEXANE	> 80 - 100					OP5			3101	3)
"	≤ 72		≥ 28			OP5			3103	30)
"	> 52 - 80	≥ 20				OP5			3103	
"	> 42 - 52	≥ 48				OP7			3105	
"	≤ 42	≥ 13		≥ 45		OP7			3106	
"	≤ 42	≥ 58				OP8			3109	
"	≤ 27	≥ 25				OP8			3107	21)
"	≤ 13	≥ 13	≥ 74			OP8			3109	
1,1-DI-(tert-BUTYLPEROXY)CYCLOHEXANE + tert-BUTYL PEROXY-2-ETHYLHEXANOATE	≤ 43 + ≤ 16	≥ 41				OP 7			3105	
DI-n-BUTYL PEROXYDICARBONATE	> 27 - 52		≥ 48			OP7	-15	-5	3115	
"	≤ 42 as a stable dispersion in water (frozen)					OP8	-15	-5	3118	
"	≤ 27		≥ 73			OP8	-10	0	3117	
DI-sec-BUTYL PEROXYDICARBONATE	> 52 - 100					OP4	-20	-10	3113	
"	≤ 52		≥ 48			OP7	-15	-5	3115	
DI-(tert-BUTYLPEROXYISOPROPYL)BENZENE(S)	> 42 - 100			≤ 57		OP7			3106	
"	≤ 42			≥ 58					Exempt	29)
DI-(tert-BUTYLPEROXY) PHTHALATE	> 42 - 52	≥ 48				OP7			3105	
"	≤ 52 as a paste					OP7			3106	20)
"	≤ 42	≥ 58				OP8			3107	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B[1] (%)	Inert solid (%)	Water (%)	Packing Method	Control tempe-rature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
CYCLOHEXANONE PEROXIDE(S)	≤ 91				≥ 9	OP6			3104	13)
"	≤ 72	≥ 28				OP7			3105	5)
"	≤ 72 as a paste					OP7			3106	5) 20)
"	≤ 32			≥ 68					Exempt	29)
([3R-(3R,5aS,6S,8aS,9R,10R,12S,12aR**)]-DECAHYDRO-10-METHOXY-3,6,9-TRIMETHYL-3,12-EPOXY-12H-PYRANO[4,3-j]-1,2-BENZODIOXEPIN)	≤ 100					OP7			3106	
DIACETONE ALCOHOL PEROXIDES	≤ 57		≥ 26		≥ 8	OP7	+40	+45	3115	6)
DIACETYL PEROXIDE	≤ 27		≥ 73			OP7	+20	+25	3115	7) 13)
DI-tert-AMYL PEROXIDE	≤ 100					OP8			3107	
2,2-DI-(tert-AMYLPEROXY)BUTANE	≤ 57	≥ 43				OP7			3105	
1,1-DI-(tert-AMYLPEROXY)CYCLOHEXANE	≤ 82	≥ 18				OP6			3103	
DIBENZOYL PEROXIDE	> 52 - 100			≤ 48		OP2			3102	3)
"	> 77 - 94				≥ 6	OP4			3102	3)
"	≤ 77				≥ 23	OP6			3104	
"	≤ 62			≥ 28	≥ 10	OP7			3106	
"	> 52 – 62 as a paste					OP7			3106	20)
"	> 35 - 52			≥ 48		OP7			3106	
"	> 36 - 42	≥ 18			≤ 40	OP8			3107	
"	≤ 56.5 as a paste				≥ 15	OP8			3108	
"	≤ 52 as a paste					OP8			3108	20)
"	≤ 42 as a stable dispersion in water					OP8			3109	
"	≤ 35			≥ 65					Exempt	29)
DI-(4-tert-BUTYLCYCLOHEXYL) PEROXYDICARBONATE	≤ 100					OP6	+30	+35	3114	
"	≤ 42 as a stable dispersion in water					OP8	+30	+35	3119	

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B[1] (%)	Inert solid (%)	Water (%)	Packing Method	Control tempe-rature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
2,2-DI-(tert-BUTYLPEROXY)PROPANE	≤ 52	≥ 48				OP7			3105	
"	≤ 42	≥ 13		≥ 45		OP7			3106	
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYLCYCLOHEXANE	> 90 - 100					OP5			3101	3)
"	≤ 90		≥ 10			OP5			3103	30)
"	> 57 - 90	≥ 10				OP5			3103	
"	≤ 77		≥ 23			OP5			3103	
"	≤ 57			≥ 43		OP8			3110	
"	≤ 57	≥ 43				OP8			3107	
"	≤ 32	≥ 26	≥ 42			OP8			3107	
DICETYL PEROXYDICARBONATE	≤ 100					OP8	+30	+35	3120	
"	≤ 42 as a stable dispersion in water					OP8	+30	+35	3119	
DI-4-CHLOROBENZOYL PEROXIDE	≤ 77				≥ 23	OP5			3102	3)
"	≤ 52 as a paste					OP7			3106	20)
"	≤ 32			≥ 68					Exempt	29)
DICUMYL PEROXIDE	> 52 - 100					OP8			3110	12)
"	≤ 52			≥ 48					Exempt	29)
DICYCLOHEXYL PEROXYDICARBONATE	> 91 - 100					OP3	+10	+15	3112	3)
"	≤ 91				≥ 9	OP5	+10	+15	3114	
"	≤ 42 as a stable dispersion in water					OP8	+15	+20	3119	
DIDECANOYL PEROXIDE	≤ 100					OP6	+30	+35	3114	
2,2-DI-(4,4-DI (tert-BUTYLPEROXY)CYCLOHEXYL) PROPANE	≤ 42			≥ 58		OP7			3106	
"	≤ 22		≥ 78			OP8			3107	
DI-2,4-DICHLOROBENZOYL PEROXIDE	≤ 77				≥ 23	OP5			3102	3)
"	≤ 52 as a paste					OP8	+ 20	+ 25	3118	
"	≤ 52 as a paste with silicon oil					OP7			3106	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B[1] (%)	Inert solid (%)	Water (%)	Packing Method	Control tempe-rature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
DI-(2-ETHOXYETHYL) PEROXYDICARBONATE	≤ 52		≥ 48			OP7	-10	0	3115	
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE	> 77 - 100					OP5	-20	-10	3113	
"	≤ 77		≥ 23			OP7	-15	-5	3115	
"	≤ 62 as a stable dispersion in water					OP8	-15	-5	3119	
"	≤ 52 as a stable dispersion in water (frozen)					OP8	-15	-5	3120	
2,2-DIHYDROPEROXYPROPANE	≤ 27			≥ 73		OP5			3102	3)
DI-(1-HYDROXYCYCLOHEXYL) PEROXIDE	≤ 100					OP7			3106	
DIISOBUTYRYL PEROXIDE	> 32 - 52		≥ 48			OP5	-20	-10	3111	3)
"	≤ 32		≥ 68			OP7	-20	-10	3115	
DIISOPROPYLBENZENE DIHYDROPEROXIDE	≤ 82	≥ 5			≥ 5	OP7			3106	24)
DIISOPROPYL PEROXYDICARBONATE	> 52-100					OP2	-15	-5	3112	3)
"	≤ 52		≥ 48			OP7	-20	-10	3115	
"	≤ 32	≥ 68				OP7	-15	-5	3115	
DILAUROYL PEROXIDE	≤ 100					OP7			3106	
"	≤ 42 as a stable dispersion in water					OP8			3109	
DI-(3-METHOXYBUTYL) PEROXYDICARBONATE	≤ 52		≥ 48			OP7	-5	+5	3115	
DI-(2-METHYLBENZOYL) PEROXIDE	≤ 87				≥ 13	OP5	+30	+35	3112	3)
DI-(3-METHYLBENZOYL) PEROXIDE + BENZOYL (3-METHYLBENZOYL) PEROXIDE + DIBENZOYL PEROXIDE	≤ 20 + ≤ 18 + ≤ 4		≥ 58			OP7	+35	+40	3115	
DI-(4-METHYLBENZOYL) PEROXIDE	≤ 52 as a paste with silicon oil					OP7			3106	
2,5-DIMETHYL-2,5-DI-(BENZOYLPEROXY)HEXANE	> 82-100					OP5			3102	3)
"	≤ 82			≥ 18		OP7			3106	
"	≤ 82				≥ 18	OP5			3104	

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B[1] (%)	Inert solid (%)	Water (%)	Packing Method	Control tempe-rature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXANE	> 90 - 100					OP5			3103	
"	> 52 - 90	≥ 10				OP7			3105	
"	≤ 77			≥ 23		OP8			3108	
"	≤ 52	≥ 48				OP8			3109	
"	≤ 47 as a paste					OP8			3108	
2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXYNE-3	> 86-100					OP5			3101	3)
"	>52-86	≥ 14				OP5			3103	26)
"	≤ 52			≥ 48		OP7			3106	
2,5-DIMETHYL-2,5-DI-(2-ETHYLHEXANOYLPEROXY) HEXANE	≤ 100					OP5	+20	+25	3113	
2,5-DIMETHYL-2,5-DIHYDROPEROXYHEXANE	≤ 82				≥ 18	OP6			3104	
2,5-DIMETHYL-2,5-DI-(3,5,5-TRIMETHYLHEXANOYL-PEROXY)HEXANE	≤ 77	≥ 23				OP7			3105	
1,1-DIMETHYL-3-HYDROXYBUTYL PEROXYNEOHEPTANOATE	≤ 52	≥ 48				OP8	0	+10	3117	
DIMYRISTYL PEROXYDICARBONATE	≤ 100					OP7	+20	+25	3116	
"	≤ 42 as a stable dispersion in water					OP8	+20	+25	3119	
DI-(2-NEODECANOYLPEROXYISOPROPYL) BENZENE	≤ 52	≥ 48				OP7	-10	0	3115	
DI-n-NONANOYL PEROXIDE	≤ 100					OP7	0	+10	3116	
DI-n-OCTANOYL PEROXIDE	≤ 100					OP5	+10	+15	3114	
DI-(2-PHENOXYETHYL) PEROXYDICARBONATE	>85-100					OP5			3102	3)
"	≤ 85				≥ 15	OP7			3106	
DIPROPIONYL PEROXIDE	≤ 27		≥ 73			OP8	+15	+20	3117	
DI-n-PROPYL PEROXYDICARBONATE	≤ 100					OP3	-25	-15	3113	
"	≤ 77		≥ 23			OP5	-20	-10	3113	
DISUCCINIC ACID PEROXIDE	> 72-100					OP4			3102	3) 17)
"	≤ 72				≥ 28	OP7	+10	+15	3116	

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ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B[1] (%)	Inert solid (%)	Water (%)	Packing Method	Control tempe-rature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
DI-(3,5,5-TRIMETHYLHEXANOYL) PEROXIDE	> 52-82	≥ 18				OP7	0	+10	3115	
"	≤ 52 as a stable dispersion in water					OP8	+10	+15	3119	
"	> 38-52	≥ 48				OP8	+10	+15	3119	
"	≤ 38	≥ 62				OP8	+20	+25	3119	
ETHYL 3,3-DI-(tert-AMYLPEROXY)BUTYRATE	≤ 67	≥ 33				OP7			3105	
ETHYL 3,3-DI-(tert-BUTYLPEROXY)BUTYRATE	> 77 - 100					OP5			3103	
"	≤ 77	≥ 23				OP7			3105	
"	≤ 52			≥ 48		OP7			3106	
1-(2-ETHYLHEXANOYLPEROXY)-1,3-DIMETHYLBUTYL PEROXYPIVALATE	≤ 52	≥ 45	≥ 10			OP7	-20	-10	3115	
tert-HEXYL PEROXYNEODECANOATE	≤ 71	≥ 29				OP7	0	+10	3115	
tert-HEXYL PEROXYPIVALATE	≤ 72		≥ 28			OP7	+10	+15	3115	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 77	≥ 23				OP 7	- 5	+ 5	3115	
"	≤ 52	≥ 48				OP 8	- 5	+ 5	3117	
"	≤ 52 as a stable dispersion in water					OP 8	- 5	+ 5	3119	
ISOPROPYL sec-BUTYL PEROXYDICARBONATE + DI-sec-BUTYL PEROXYDICARBONATE+DI-ISOPROPYL PEROXYDICARBONATE	≤ 32 + ≤ 15 - 18 ≤ 12 - 15	≥ 38				OP7	-20	-10	3115	
"	≤ 52 + ≤ 28 + ≤ 22					OP5	-20	-10	3111	3)
ISOPROPYLCUMYL HYDROPEROXIDE	≤ 72	≥ 28				OP8			3109	13)
p-MENTHYL HYDROPEROXIDE	> 72 - 100					OP7			3105	13)
"	≤ 72	≥ 28				OP8			3109	27)
METHYLCYCLOHEXANONE PEROXIDE(S)	≤ 67		≥ 33			OP7	+35	+40	3115	
METHYL ETHYL KETONE PEROXIDE(S)	See remark 8)	≥ 48				OP5			3101	3) 8) 13)
"	See remark 9)	≥ 55				OP7			3105	9)
"	See remark 10)	≥ 60				OP8			3107	10)
METHYL ISOBUTYL KETONE PEROXIDE(S)	≤ 62	≥ 19				OP7			3105	22)

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B[1] (%)	Inert solid (%)	Water (%)	Packing Method	Control tempe-rature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
METHYL ISOPROPYL KETONE PEROXIDE(S)	See remark 31)	≥ 70				OP8			3109	31)
ORGANIC PEROXIDE, LIQUID, SAMPLE						OP2			3103	11)
ORGANIC PEROXIDE, LIQUID, SAMPLE, TEMPERATURE CONTROLLED						OP2			3113	11)
ORGANIC PEROXIDE, SOLID, SAMPLE						OP2			3104	11)
ORGANIC PEROXIDE, SOLID, SAMPLE, TEMPERATURE CONTROLLED						OP2			3114	11)
3,3,5,7,7-PENTAMETHYL-1,2,4-TRIOXEPANE	≤ 100					OP8			3107	
PEROXYACETIC ACID, TYPE D, stabilized	≤ 43					OP7			3105	13) 14) 19)
PEROXYACETIC ACID, TYPE E, stabilized	≤ 43					OP8			3107	13) 15) 19)
PEROXYACETIC ACID, TYPE F, stabilized	≤ 43					OP8			3109	13) 16) 19)
PEROXYLAURIC ACID	≤ 100					OP8	+35	+40	3118	
PINANYL HYDROPEROXIDE	> 56 - 100					OP7			3105	13)
"	≤ 56	≥ 44				OP8			3109	
POLYETHER POLY-tert-BUTYLPEROXYCARBONATE	≤ 52		≥ 48			OP8			3107	
1,1,3,3-TETRAMETHYLBUTYL HYDROPEROXIDE	≤ 100					OP7			3105	
1,1,3,3-TETRAMETHYLBUTYL PEROXY-2 ETHYL-HEXANOATE	≤ 100					OP7	+15	+20	3115	
1,1,3,3- TETRAMETHYLBUTYL PEROXYNEODECANOATE	≤ 72		≥ 28			OP7	-5	+5	3115	
"	≤ 52 as a stable dispersion in water					OP8	-5	+5	3119	
1,1,3,3-TETRAMETHYLBUTYL PEROXYPIVALATE	≤ 77	≥ 23				OP7	0	+10	3115	
3,6,9-TRIETHYL-3,6,9-TRIMETHYL-1,4,7 TRIPEROXONANE	≤ 42	≥ 58				OP7			3105	28)
"	≤ 17	≥ 18		≥ 65		OP8			3110	

Notes on List of Currently Assigned Organic Peroxides in Packagings:

1) Diluent type B may always be replaced by diluent type A. The boiling point of diluent type B should be at least 60°C higher than the SADT of the organic peroxide.
2) Available oxygen ≤ 4.7%.
3) "EXPLOSIVE" subsidiary hazard label required (label and placard for Divisions 1.1, 1.2, 1.3, see Appendix to Part 4 (Dangerous Goods Marks)).
4) Diluent may be replaced by di-tert-butyl peroxide.
5) Available oxygen ≤ 9%.
6) With ≤ 9% hydrogen peroxide; available oxygen ≤ 10%.
7) Only non-metallic packagings allowed.
8) Available oxygen > 10% and ≤ 10.7%, with or without water.

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9) Available oxygen ≤ 10%, with or without water.
10) Available oxygen ≤ 8.2%, with or without water.
11) See 2.5.3.2.5.1.
12) Up to 2 000 kg per receptacle assigned to ORGANIC PEROXIDE TYPE F on the basis of large scale trials.
13) "CORROSIVE" subsidiary hazard label required (label and placard for Class 8, Corrosives, see Appendix to Part 4).
14) Peroxyacetic acid formulations which fulfil the criteria of paragraph 2.52(3)(d).
15) Peroxyacetic acid formulations which fulfil the criteria of paragraph 2.52(3)(e).
16) Peroxyacetic acid formulations which fulfil the criteria of paragraph 2.52(3)(f).
17) Addition of water to this organic peroxide will decrease its thermal stability.
18) No "CORROSIVE" subsidiary risk label required for concentrations below 80%.
19) Mixtures with hydrogen peroxide, water and acid(s).
20) With diluent type A, with or without water.
21) With ≥ 25% diluent type A by mass, and in addition ethylbenzene.
22) With ≥ 19% diluent type A by mass, and in addition methyl isobutyl ketone.
23) With < 6% di-tert-butyl peroxide.
24) With ≤ 8% 1-isopropylhydroperoxy-4-isopropylhydroxybenzene.
25) Diluent type B with boiling point > 110°C.
26) With < 0.5% hydroperoxides content.
27) For concentrations more than 56%, "CORROSIVE" subsidiary hazard label (label and placard for Class 8, Corrosives, see Appendix to Part 4 (Dangerous Goods Marks)) required.
28) Available active oxygen ≤ 7.6% in diluent Type A having a 95% boil-off point in the range of 200 - 260°C.
29) Not subject to the requirements for Division 5.2.
30) Diluent type B with boiling point > 130°C.
31) Active oxygen ≤ 6.7%.

(6) Classification of organic peroxides not listed in subsection 2.52(5), packing instruction IBC520 or portable tank instruction T23 and assignment to a generic entry must be made on the basis of a test report. Principles applying to the classification of such substances are provided in section 2.52. The applicable classification procedures, test methods and criteria, and the test report must comply with the *Manual of Tests and Criteria*, Part II. The test report must contain the classification and the relevant transport conditions.

(7) Samples of new organic peroxides or new formulations of organic peroxides not listed in subsection 2.52(5), for which complete test data are not available and which are to be transported for further testing or evaluation, may be assigned to one of the appropriate shipping names for ORGANIC PEROXIDE TYPE C provided the following conditions are met:

(a) The available data indicate that the sample would be no more dangerous than ORGANIC PEROXIDE TYPE B;

(b) The sample is packaged in accordance with packing method OP2 (see applicable packing instruction) and the quantity per cargo transport unit is limited to 10 kg;

(c) The available data indicate that the control temperature, if any, is sufficiently low to prevent any dangerous decomposition and sufficiently high to prevent any dangerous phase separation.

2.52 Principles for Classification of Organic Peroxides

(1) This section refers only to those properties of organic peroxides which are decisive for their classification. A flow chart, presenting the classification principles in the form of a graphically arranged scheme of questions concerning the decisive properties together with the possible answers, is given in Figure 3, Flow Chart Scheme for Organic Peroxides. These properties must be determined experimentally. Suitable test methods with pertinent evaluation criteria are given in the Manual of Tests and Criteria, Part II.

(2) An organic peroxide formulation must be regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.

(3) The following principles apply to the classification of organic peroxide formulations not listed in subsection 2.51(5):

(a) Any organic peroxide formulation which can detonate or deflagrate rapidly, as packaged for transport, is prohibited from transport in that packaging under Division 5.2 (defined as ORGANIC PEROXIDE TYPE A, exit box A of Figure 3, Flow Chart Scheme for Organic Peroxides);

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(b) Any organic peroxide formulation possessing explosive properties and which, as packaged for transport, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package, must bear an “EXPLOSIVE” subsidiary hazard label (label and placard for Divisions 1.1, 1.2, 1.3, see Appendix to Part 4 (Dangerous Goods Marks)). Such an organic peroxide may be packaged in amounts of up to 25 kg unless the maximum quantity has to be limited to a lower amount to preclude detonation or rapid deflagration in the package (defined as ORGANIC PEROXIDE TYPE B, exit box B of Figure 3, Flow Chart Scheme for Organic Peroxides); (c) Any organic peroxide formulation possessing explosive properties may be transported without an “EXPLOSIVE” subsidiary hazard label when the substance as packaged (maximum 50 kg) for transport cannot detonate or deflagrate rapidly or undergo a thermal explosion (defined as ORGANIC PEROXIDE TYPE C, exit box C of Figure 3, Flow Chart Scheme for Organic Peroxides); (d) Any organic peroxide formulation is acceptable for transport in packages of not more than 50 kg net mass (defined as ORGANIC PEROXIDE TYPE D, exit box D of Figure 3, Flow Chart Scheme for Organic Peroxides) if in laboratory testing: **(i)** detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or **(ii)** does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or **(iii)** does not detonate or deflagrate at all and shows a medium effect when heated under confinement; (e) Any organic peroxide formulation which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement is acceptable for transport in packages of not more than 400 kg/450 litres (defined as ORGANIC PEROXIDE TYPE E, exit box E of Figure 3, Flow Chart Scheme for Organic Peroxides); (f) Any organic peroxide formulation which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power may be considered for transport in IBCs or tanks (defined as ORGANIC PEROXIDE TYPE F, exit box F of Figure 3, Flow Chart Scheme for Organic Peroxides); for additional requirements see CGSB-43.146; (g) Any organic peroxide formulation which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power must be exempted from Division 5.2, provided that the formulation is thermally stable (self-accelerating decomposition temperature is 60°C or higher for a 50 kg package) and for liquid formulations diluent type A is used for desensitization (defined as ORGANIC PEROXIDE TYPE G, exit box G of Figure 3, Flow Chart Scheme for Organic Peroxides). If the formulation is not thermally stable or a diluent other than type A is used for desensitization, the formulation must be defined as ORGANIC PEROXIDE TYPE F.

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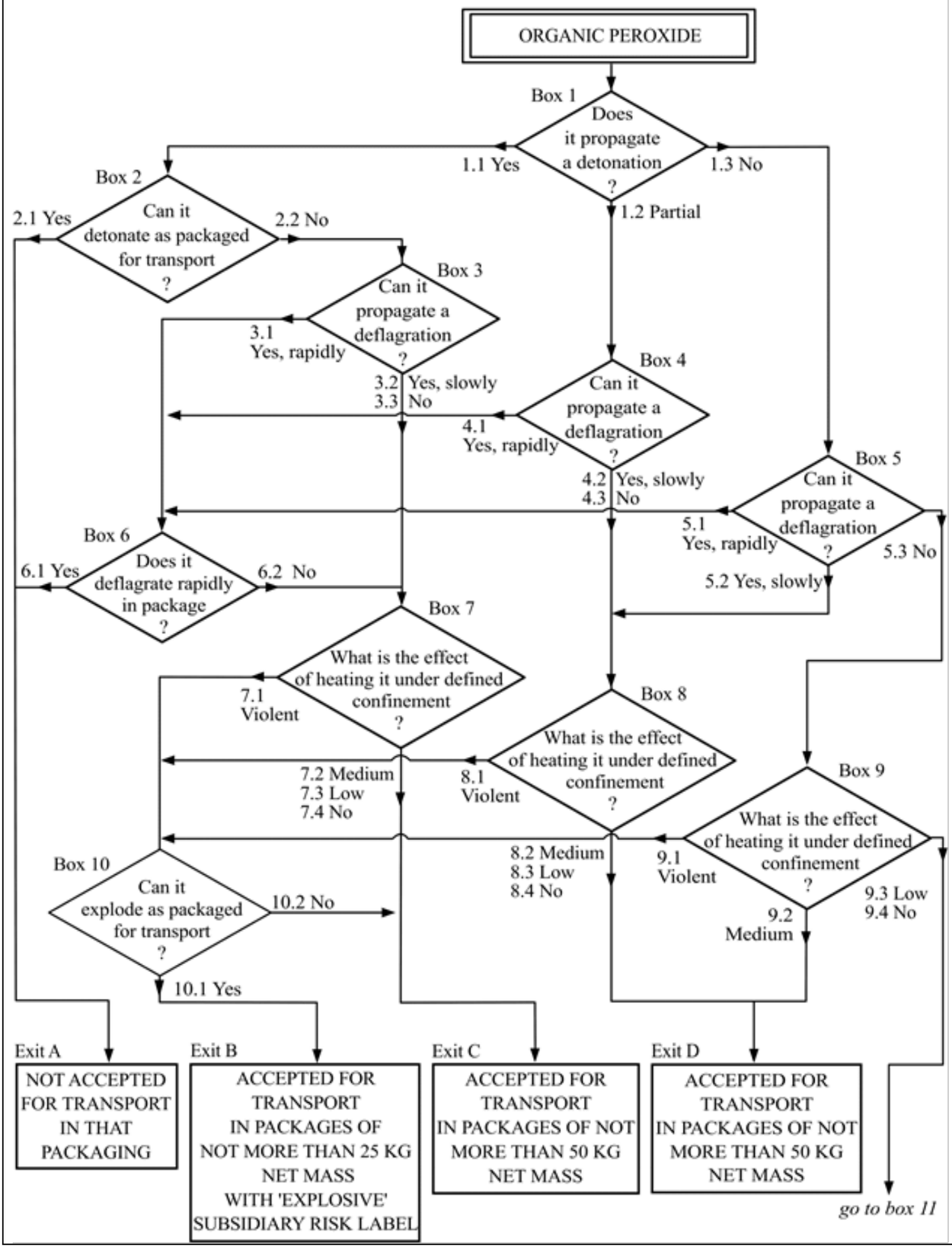
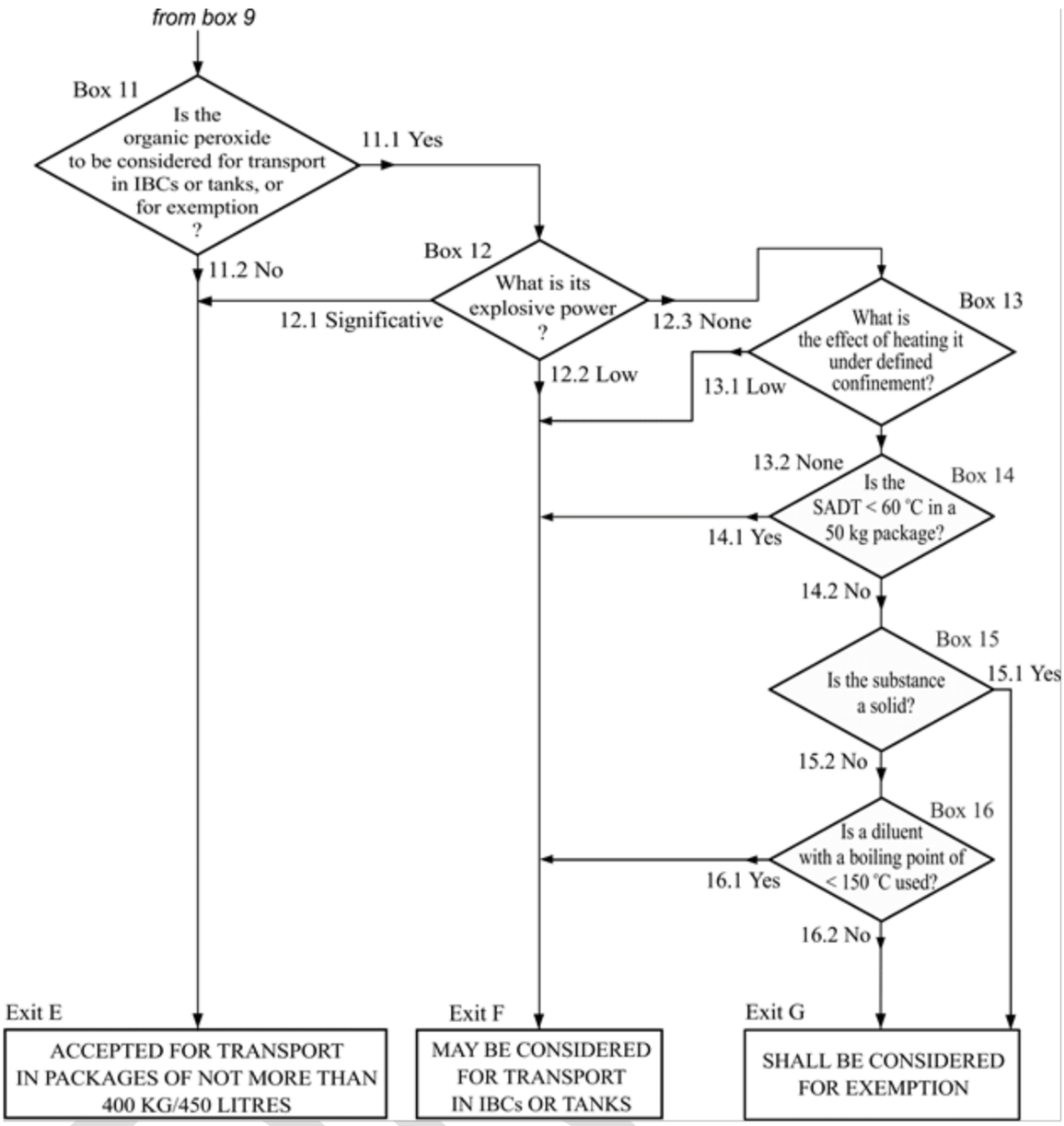
Figure 3, Flow Chart Scheme for Organic Peroxides



Proposed text



2.53 Temperature Control Requirements

(1) The following organic peroxides must be subjected to temperature control during transport:

(a) Organic peroxides type B and C with an SADT ≤50°C;

(b) Organic peroxides type D showing a medium effect when heated under confinement with an SADT ≤ 50°C or showing a low or no effect when heated under confinement with an SADT ≤ 45°C; and

(c) Organic peroxides types E and F with an SADT ≤ 45°C;

(2) Test methods for determining the SADT are given in the Manual of Tests and Criteria, Part II, section 28. The test selected must be conducted in a manner which is representative, both in size and material, of the package to be transported;

(3) Test methods for determining the flammability are given in the Manual of Tests and Criteria, Part III, sub-section 32.4. Because organic peroxides may react vigorously when heated it is recommended to determine their flash point using small sample sizes such as described in ISO 3679.

2.54 Desensitization of Organic Peroxides

(1) In order to ensure safety during transport, organic peroxides are in many cases desensitized by organic liquids or solids, inorganic solids or water. Where a percentage of a substance is stipulated, this refers to the percentage by mass, rounded to the nearest whole number. In general, desensitization must be such that, in case of spillage or fire, the organic peroxide will not concentrate to a dangerous extent.

Proposed text
(2) Unless otherwise stated for the individual organic peroxide formulation, the following definitions apply for diluents used for desensitization: (a) Diluents type A are organic liquids which are compatible with the organic peroxide and which have a boiling point of not less than 150°C. Type A diluents may be used for desensitizing all organic peroxides; (b) Diluents type B are organic liquids which are compatible with the organic peroxide and which have a boiling point of less than 150°C but not less than 60°C and a flash point of not less than 5°C. Type B diluents may be used for desensitization of all organic peroxides provided that the boiling point is at least 60°C higher than the SADT in a 50 kg package. (3) Diluents, other than type A or type B, may be added to organic peroxide formulations as listed in subsection 2.51(5) provided that they are compatible. However, replacement of all or part of a type A or type B diluent by another diluent with differing properties requires that the organic peroxide formulation be re-assessed in accordance with the normal acceptance procedure for Division 5.2. (4) Water may only be used for the desensitization of organic peroxides which are shown in subsection 2.51(5) or in the statement of approval according to subsection 2.51(6) as being with water or as a stable dispersion in water. (5) Organic and inorganic solids may be used for desensitization of organic peroxides provided that they are compatible i.e. those which have no detrimental influence on the thermal stability and hazard type of the organic peroxide formulation.

Class 6, Toxic and Infectious Substances

The classification provisions for toxic and infectious substances would be modified to provide clarity and harmonize with the 19th edition of the UN Recommendations. Some of the proposed changes are:

- Many definitions would be updated and added (i.e. LC_{50}, patient specimen).
- A new table from the UN Recommendations which lists various Category A substances would be added.

Proposed text
Class 6, Infectious Substances **2.55 Definitions and General Provisions** (1) Class 6 is divided into two divisions as follows: (a) Division 6.1 Toxic substances These are substances liable either to cause death or serious injury or to harm human health swallowed or inhaled or by skin contact; (b) Division 6.2 Infectious substances These are substances known or reasonably expected to contain pathogens. Pathogens are defined as microorganisms (including bacteria, viruses, rickettsiae, parasites, fungi) and other agents such as prions, which can cause disease in humans and animals (2) *LD_{50} (median lethal dose) for acute oral toxicity* is the statistically derived single dose of a substance that can be expected to cause death within 14 days in 50 % of young adult albino rats when administered by the oral route. The LD_{50} value is expressed in terms of mass of test substance per mass of test animal (mg/kg). (3) *LD_{50} for acute dermal toxicity* is that dose of the substance which, administered by continuous contact for 24 hours with the bare skin of albino rabbits, is most likely to cause death within 14 days in one half of the animals tested. The number of animals tested must be sufficient to give a statistically significant result and be in conformity with good pharmacological practice. The result is expressed in milligrams per kg body mass.

Proposed text

(4) *LC_{50} for acute toxicity on inhalation* is that concentration of vapour, mist or dust which, administered by continuous inhalation to both male and female young adult albino rats for one hour, is most likely to cause death within 14 days in one half of the animals tested. A solid substance must be tested if at least 10% (by mass) of its total mass is likely to be dust in a respirable range, e.g. the aerodynamic diameter of that particle fraction is 10 microns or less. A liquid substance must be tested if a mist is likely to be generated in a release. Both for solid and liquid substances more than 90% (by mass) of a specimen prepared for inhalation toxicity must be in the respirable range as defined above. The result is expressed in milligrams per litre of air for dusts and mists or in millilitres per cubic metre of air (parts per million) for vapours.

(5) *Biological products* are those products derived from living organisms which are manufactured and distributed in accordance with the requirements of appropriate national authorities, which may have special licensing requirements, and are used either for prevention, treatment, or diagnosis of disease in humans or animals, or for development, experimental or investigational purposes related thereto. They include, but are not limited to, finished or unfinished products such as vaccines.

(6) *Cultures* are the result of a process by which pathogens are intentionally propagated. This definition does not include human or animal patient specimens as defined in subsection 2.55(8)

(7) *Patient specimens* are human or animal materials, collected directly from humans or animals, including, but not limited to, excreta, secreta, blood and its components, tissue and tissue fluid swabs, and body parts being transported for purposes such as research, diagnosis, investigational activities, disease treatment and prevention.

2.56 Assignment of Packing Groups for Division 6.1, Toxic Substances

(1) Substances included in Division 6.1, are assigned to the three packing groups according to their degree of toxic hazard in transport as follows:

(a) Packing group I: Substances and mixtures presenting a very severe toxicity hazard;

(b) Packing group II: Substances and mixtures presenting a serious toxicity hazard;

(c) Packing group III: Substances and mixtures presenting a relatively low toxicity hazard.

(2) In assigning packing groups, human experience in instances of accidental poisoning and special properties possessed by any individual substance, such as liquid state, high volatility, any special likelihood of penetration, and special biological effects, must be taken into account.

(3) In the absence of human experience the packing group must be based on data obtained from animal experiments. Three possible routes of administration must be examined. These routes are exposure through:

(a) Oral ingestion;

(b) Dermal contact; and

(c) Inhalation of dusts, mists, or vapours.

(4) When a substance exhibits a different order of toxicity by two or more of the routes of administration listed in subsection (3), the most stringent packing group must be assigned.

(5) The criteria for the oral and dermal routes as well as for inhalation of dusts and mists are as shown in the following table:

*Grouping Criteria For Administration Through Oral Ingestion, Dermal Contact And Inhalation Of Dusts And Mists

Packing group	Oral toxicity LD_{50} (mg/kg)	Dermal toxicity LD_{50} (mg/kg)	Inhalation toxicity by dusts and mists LC_{50} (mg/l)
I	≤ 5.0	≤ 50	≤ 0.2
II	> 5.0 and ≤ 50	> 50 and ≤ 200	> 0.2 and ≤ 2.0
III	> 50 and ≤ 300	> 200 and ≤ 1 000	> 2.0 and ≤ 4.0

(a) Tear gas substances must be included in packing group II even if their toxicity data correspond to packing group III values.

(b) Substances meeting the criteria of Class 8 and with an inhalation toxicity of dusts and mists (LC_{50}) leading to packing group I are only accepted for an allocation to Division 6.1 if the toxicity through oral ingestion or dermal contact is at least in the range of packing group I or II. Otherwise an allocation to Class 8 is made when appropriate.

Proposed text

(6) The criteria for inhalation toxicity of dusts and mists in subsection 2.56(5) are based on LC_{50} data relating to 1 hour exposures and where such information is available it must be used. However, where only LC_{50} data relating to 4 hours exposures to dusts and mists are available, such figures can be multiplied by four and the product substituted in the above criteria, i.e. LC_{50} (4 hours) x 4 is considered the equivalent of LC_{50} (1 hour).

(7) Liquids having toxic vapours must be assigned to the following packing groups, where "V" is the saturated vapour concentration in millilitres per cubic metre of air (volatility) at 20°C and standard atmospheric pressure:

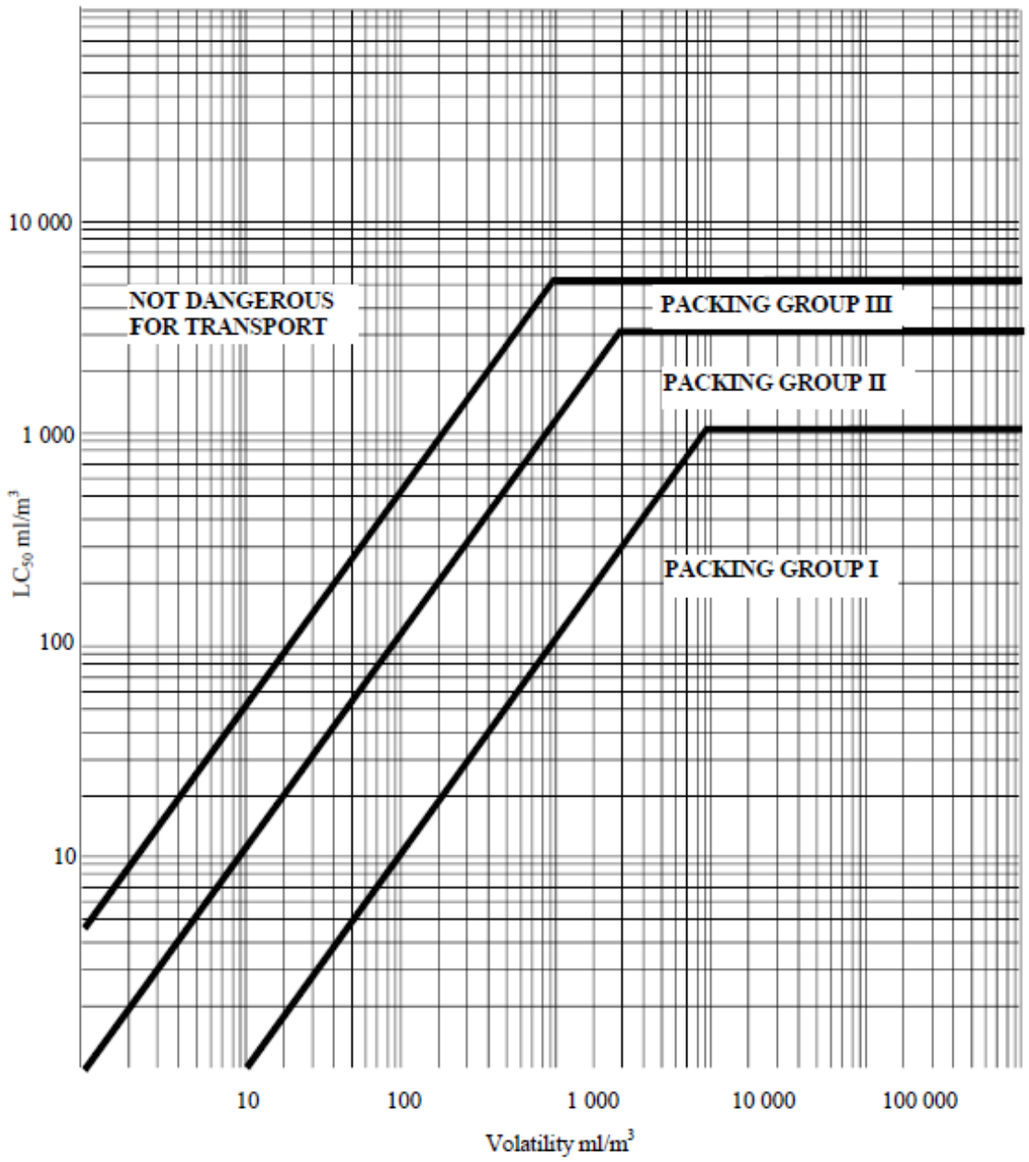
(a) Packing group I: If $V \geq 10\ LC_{50}$ and $LC_{50} \leq 1\ 000\ ml/m^3$;

(b) Packing group II: If $V \geq LC_{50}$ and $LC_{50} \leq 3\ 000\ ml/m^3$, and not meeting the criteria for packing group I;

(c) Packing group III* : If $V \geq 1/5\ LC_{50}$ and $LC_{50} \leq 5\ 000\ ml/m^3$, and not meeting the criteria for packing groups I or II

(8) In Figure 4, Inhalation Toxicity: Packing Group Borderlines, the criteria according to subsection (7) are expressed in graphical form, as an aid to easy classification. However, because of approximations inherent in the use of graphs, substances on or near packing group borderlines must be checked using numerical criteria.

Figure 4, Inhalation Toxicity: Packing Group Borderlines



(9) The criteria for inhalation toxicity of vapours in subsection (7) are based on LC_{50} data relating to 1 hour exposure, and where such information is available it must be used. However, where only LC_{50} data relating to 4 hours exposures to the vapours are available, such figures can be multiplied by two and the product substituted in the above criteria, i.e. LC_{50} (4 hours) x 2 is considered to be the equivalent of LC_{50} (1 hour).

Proposed text

(10) Mixtures of liquids that are toxic by inhalation must be assigned to packing groups according to subsection (11) or subsection (12).

(11) If LC_{50} data are available for each of the toxic substances comprising a mixture, the packing group may be determined as follows:

(a) Estimate the LC_{50} of the mixture using the formula:

$$LC_{50}\,(\text{mixture}) = \frac{1}{\sum_{i=1}^{n}\left(\frac{f_i}{LC_{50i}}\right)}$$

Where:

f_i= mole fraction of the i^{th} component substance of the mixture;

LC_{50i}= mean lethal concentration of the ith component substance in mL/m^3;

(b) Estimate the volatility of each component substance comprising the mixture using the formula:

$$Vi = \left(Pi \times \frac{10^6}{101{,}3}\right) ml/m^3$$

Where

Pi= the partial pressure of the ith component substance in kPa at 20°C and one atmosphere pressure

(c) Calculate the ratio of the volatility to the LC_{50} using the formula:

$$R = \sum_{i=1}^{n}\left(\frac{V_i}{LC_{50_i}}\right)$$

(d) Using the calculated values LC_{50}(mixture) and R, the packing group for the mixture is determined:

Packing Group I, if

(i) Packing group I: R ≥ 10 and LC_{50} (mixture) ≤ 1 000 ml/m^3;

(ii) Packing group II: R ≥ 1 and LC_{50} (mixture) ≤ 3 000 ml/ m^3 and not meeting criteria for packing group I;

(iii) Packing group III: R ≥ 1/5 and LC_{50} (mixture) ≤ 5 000 ml/ m^3 and not meeting criteria for packing groups I or II.

(12) In the absence of LC50 data on the toxic constituent substances, the mixture may be assigned a packing group based on the following simplified threshold toxicity tests. When these threshold tests are used, the most restrictive packing group determined is used for transporting the mixture.

(a) A mixture is assigned to packing group I only if it meets both of the following criteria:

(i) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 1 000 ml/m^3 vaporized mixture in air. Ten albino rats (five male and five female) are exposed to the test atmosphere for one hour and observed for fourteen days. If five or more of the animals die within the fourteen day observation period, the mixture is presumed to have an LC50 less than or equal to 1 000 ml/m^3;

(ii) A sample of the vapour in equilibrium with the liquid mixture at 20°C is diluted with 9 equal volumes of air to form a test atmosphere. Ten albino rats (five male and five female) are exposed to the test atmosphere for one hour and observed for fourteen days. If five or more of the animals die within the fourteen day observation period, the mixture is presumed to have a volatility greater than or equal to 10 times the mixture LC50;

Proposed text

(b) A mixture is assigned to packing group II only if it meets both of the following criteria, and the mixture does not meet the criteria for packing group I:

(i) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 3 000 ml/m3 vaporized mixture in air. Ten albino rats (five male and five female) are exposed to the test atmosphere for one hour and observed for fourteen days. If five or more of the animals die within the fourteen day observation period, the mixture is presumed to have an LC50 less than or equal to 3 000 ml/m3;

(ii) A sample of the vapour in equilibrium with the liquid mixture at 20°C is used to form a test atmosphere. Ten albino rats (five male and five female) are exposed to the test atmosphere for one hour and observed for fourteen days. If five or more of the animals die within the fourteen day observation period, the mixture is presumed to have a volatility greater than or equal to the mixture LC50;

(c) A mixture is assigned to packing group III only if it meets both of the following criteria, and the mixture does not meet the criteria for packing groups I or II:

(i) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 5 000 ml/m3 vaporized mixture in air. Ten albino rats (five male and five female) are exposed to the test atmosphere for one hour and observed for fourteen days. If five or more of the animals die within the fourteen day observation period, the mixture is presumed to have an LC50 less than or equal to 5 000 ml/m3;

(ii) The vapour pressure of the liquid mixture is measured and if the vapour concentration is greater than or equal to 1 000 ml/m3, the mixture is presumed to have a volatility greater than or equal to 1/5 the mixture LC50.

2.57 Methods for Determining Oral and Dermal Toxicity of Mixtures

(1) When classifying and assigning the appropriate packing group to mixtures in Division 6.1, in accordance with the oral and dermal toxicity criteria in section 2.56, it is necessary to determine the acute LD_{50} of the mixture.

(2) If a mixture contains only one active substance, and the LD_{50} of that constituent is known, in the absence of reliable acute oral and dermal toxicity data on the actual mixture to be transported, the oral or dermal LD_{50} may be obtained by the following method:

$$LD_{50}\text{ value of preparation} = \frac{LD_{50}\text{ value of active substance} \times 100}{\text{percentage of active substance by mass}}$$

(3) If a mixture contains more than one active constituent, there are three possible approaches that may be used to determine the oral or dermal LD_{50} of the mixture. The preferred method is to obtain reliable acute oral and dermal toxicity data on the actual mixture to be transported. If reliable, accurate data are not available, then either of the following methods may be performed:

(a) Classify the formulation according to the most hazardous constituent of the mixture as if that constituent were present in the same concentration as the total concentration of all active constituents; or

(b) Apply the formula :

$$\frac{C_A}{T_A} + \frac{C_B}{T_B} + \ldots + \frac{C_Z}{T_Z} = \frac{100}{T_M}$$

where:

C = the % concentration of constituent A, B ... Z in the mixture;

T = the oral LD_{50} values of constituent A, B ... Z;

T_M = the oral LD_{50} value of the mixture.

(4) The formula found in paragraph (3) can also be applied to determine the dermal toxicities values provided that this information is available on the same species for all constituents. The use of this formula does not take into account any potentiation or protective phenomena

Proposed text

2.58 Classification of Pesticides

(1) All active pesticide substances and their preparations for which the LC_{50} and/or LD_{50} values are known and which are classified in Division 6.1 must be classified under appropriate packing groups in accordance with the criteria given in section 2.56. Substances and mixtures which are characterized by subsidiary hazards must be classified according to section 2.9 with the assignment of appropriate packing groups.

(2) If the oral or dermal LD_{50} value for a pesticide mixture is not known, but the LD_{50} value of its active substance(s) is known, the LD_{50} value for the mixture may be obtained by applying the procedures in section 2.57.

(3) The proper shipping name used in the transport of the pesticide must be selected on the basis of the active ingredient, of the physical state of the pesticide and any subsidiary hazards it may exhibit.

2.59 Classification of Infectious Substances

(1) Infectious substances must be classified in Division 6.2 and assigned to UN2814, UN2900, UN3291 or UN3373, as appropriate.

(2) Infectious substances are divided into the following categories:

(a) Category A: An infectious substance which is transported in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals.

(i) Infectious substances meeting these criteria which cause disease in humans or both in humans and animals must be assigned to UN2814. Infectious substances which cause disease only in animals shall be assigned to UN2900.

(ii) Assignment to UN2814 or UN2900 must be based on the known medical history and symptoms of the source human or animal, endemic local conditions, or professional judgement concerning individual circumstances of the source human or animal.

(iii) Infectious substances, including new or emerging pathogens, which do not appear in the Table of Indicative Examples of Infectious Substances Included in Category A in An Form unless Otherwise Indicated but which meet the same criteria must be assigned to Category A. In addition, if there is doubt as to whether or not a substance meets the criteria it must be included in Category A.

(b) Category B: An infectious substance which does not meet the criteria for inclusion in Category A. Infectious substances in Category B must be assigned to UN3373.

INDICATIVE EXAMPLES OF INFECTIOUS SUBSTANCES INCLUDED IN CATEGORY A IN ANY FORM UNLESS OTHERWISE INDICATED (2.59(2)(a))	
UN Number and Proper Shipping Name	**Microorganism**
UN 2814 Infectious substances affecting humans	*Bacillus anthracis (cultures only) Brucella abortus (cultures only) Brucella melitensis (cultures only) Brucella suis (cultures only)* *Burkholderia mallei - Pseudomonas mallei* – Glanders *(cultures only) Burkholderia pseudomallei – Pseudomonas pseudomallei (cultures only) Chlamydia psittaci* - avian strains (cultures only) *Clostridium botulinum (cultures only) Coccidioides immitis (cultures only) Coxiella burnetii (cultures only)* Crimean-Congo haemorrhagic fever virus Dengue virus (cultures only) Eastern equine encephalitis virus (cultures only) *Escherichia coli*, verotoxigenic (cultures only) Ebola virus Flexal virus *Francisella tularensis (cultures only)* Guanarito virus Hantaan virus Hantaviruses causing haemorrhagic fever with renal syndrome Hendra virus Hepatitis B virus (cultures only) Herpes B virus (cultures only)

Proposed text	
	Human immunodeficiency virus (cultures only) Highly pathogenic avian influenza virus (cultures only) Japanese Encephalitis virus (cultures only) Junin virus Kyasanur Forest disease virus Lassa virus Machupo virus Marburg virus Monkeypox virus *Mycobacterium tuberculosis (cultures only)* Nipah virus Omsk haemorrhagic fever virus Poliovirus (cultures only) Rabies virus (cultures only) *Rickettsia prowazekii (cultures only) Rickettsia rickettsii* (cultures only) Rift Valley fever virus (cultures only) Russian spring-summer encephalitis virus (cultures only) Sabia virus *Shigella dysenteriae type 1 (cultures only)* Tick-borne encephalitis virus (cultures only) Variola virus Venezuelan equine encephalitis virus (cultures only) West Nile virus (cultures only) Yellow fever virus (cultures only) *Yersinia pestis* (cultures only)
UN 2900 Infectious substances affecting animals only	African swine fever virus (cultures only) Avian paramyxovirus Type 1 - Velogenic Newcastle disease virus (cultures only) Classical swine fever virus (cultures only) Foot and mouth disease virus (cultures only) Lumpy skin disease virus (cultures only) *Mycoplasma mycoides* - Contagious bovine pleuropneumonia (cultures only) Peste des petits ruminants virus (cultures only) Rinderpest virus (cultures only) Sheep-pox virus (cultures only) Goatpox virus (cultures only) Swine vesicular disease virus (cultures only) Vesicular stomatitis virus (cultures only)

NOTE: In the table, the microorganisms written in italics are bacteria, mycoplasmas, rickettsia or fungi.

2.60 Medical or Clinical Waste

Dangerous goods that are medical or clinical waste must be classified

(a) under UN2814 or, as applicable, under UN2900, if they contain Category A infectious substances;
(b) under UN3291, if they contain Category B infectious substances; or
(c) under UN3291, if the shipper has reasonable grounds to believe that they have a low probability of containing infectious substances.

2.61 Infected Animals

Animal material affected by pathogens must be classified:

(a) Under UN2814 or, as applicable, under UN2900, if they are assigned to Category A or which would be assigned to Category A in cultures only.
(b) Under UN3373, if they are assigned to Category B other than those which would be assigned to Category A if they were in cultures.

Class 7, Radioactive Material

The TDG Regulations would still require that the *Packaging and Transport of Nuclear Substances Regulations, 2015* be used for the classification of radioactive material, however the reference to the requirement would be moved from section 2.2 (Responsibility for classification) to the section on classification of Class 7, Radioactive Material. The classification provisions in the UN Recommendations would not be included in the TDG Regulations. The Canadian Nuclear Safety Commission is the leading authority and expert for the classification of Radioactive Material.

Proposed text
Class 7, Radioactive Material **2.62 General** (1) Substances defined as Radioactive Material in the *Packaging and Transport of Nuclear Substances Regulations, 2015* are included in Class 7, Radioactive Material. (2) Radioactive material and packages (containing radioactive material) must be classified in accordance with section 6 of the *Packaging and Transport of Nuclear Substances Regulations, 2015.*

Class 8, Corrosives

The classification provisions for corrosives would be modified to add clarity and harmonize with the 20th edition of the UN Recommendations which would be publish in 2017. Alternative methods presented at the United Nations Economic Commission for Europe would also be introduced for the classification of corrosives. Some of the proposed changes are:

- The term “full thickness of destruction of human skin” would be replaced with “irreversible damage of intact skin tissue.”
- Bridging principles (i.e. batching, diluting) that do not negatively impact animals would be introduced.
- A non-invasive approach to safeguard animal health in corrosivity testing would be introduced.

Proposed text
Class 8, Corrosives **2.63 General** Substances are included in Class 8, Corrosives, if they (a) are known to cause, by chemical action, irreversible damage of intact skin tissue, or, in the case of leakage, damage to other goods or packaging; (b) cause irreversible damage of intact skin tissue, as determined in accordance with OECD Guidelines 430 or OECD Guidelines 431; or (c) are liquids, or solids which may become liquid during transport, which do not cause irreversible damage (or full thickness destruction) to intact skin tissue but cause corrosion to certain metal surfaces in accordance with the criteria in subparagraph 2.64(5)(c)(ii). **2.64 Assignment of Packing Groups** (1) Substances and mixtures of Class 8 are divided among the three packing groups according to their degree of danger in transport: (a) Packing group I: Very dangerous substances and mixtures; (b) Packing group II: Substances and mixtures presenting medium danger; (c) Packing group III: Substances and mixtures presenting minor danger. (2) New substances and mixtures can be assigned to packing groups on the basis of the length of time of contact necessary to produce irreversible damage of intact skin tissue in accordance with the criteria in subsection (5). Alternatively, for mixtures, the criteria in 2.65 can be used.

Proposed text

(3) A substance or mixture meeting the criteria of Class 8 having an inhalation toxicity of dusts and mists (LC_{50}) in the range of packing group I, but toxicity through oral ingestion or dermal contact only in the range of packing group III or less, must be classified as Class 8.

(4) If a substance is known to be included in Class 8, Corrosives, and that knowledge is based on documentary evidence published in technical journals or government publications and testing is not done to determine the packing group, the substance must be included in Packing Group I.

(5) Class 8, Corrosives, are included in one of the following packing groups:

(a) Packing Group I, if

(i) they are known to cause irreversible damage of intact skin tissue within an observation period up to 60 minutes starting after the exposure time of three minutes or less; as determined in accordance with OECD Guidelines 404 or OECD Guidelines 435;

(b) Packing Group II, if they cause irreversible damage of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than three minutes but not more than 60 minutes, as determined in accordance with OECD Guidelines 404 or OECD Guidelines 435; or

(c) Packing Group III, if

(i) they cause irreversible damage [full thickness destruction] of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than 60 minutes but not more than 4 hours, as determined in accordance with OECD Guidelines 404 or OECD Guidelines 435, or

(ii) they exhibit a corrosion rate that exceeds 6.25 mm per year at a test temperature of 55°C on steel or aluminum surfaces as prescribed in the Manual of Tests and Criteria, Part III, Section 37.

Packing Group	Exposure Time	Observation Period	Effect
I	≤ 3 min	≤ 60 min	irreversible damage of intact skin
II	> 3 min ≤ 1 h	≤ 14 d	irreversible damage of intact skin
III	> 1 h ≤ 4 h	≤ 14 d	irreversible damage of intact skin
III	-	-	Corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55 ºC when tested on both materials

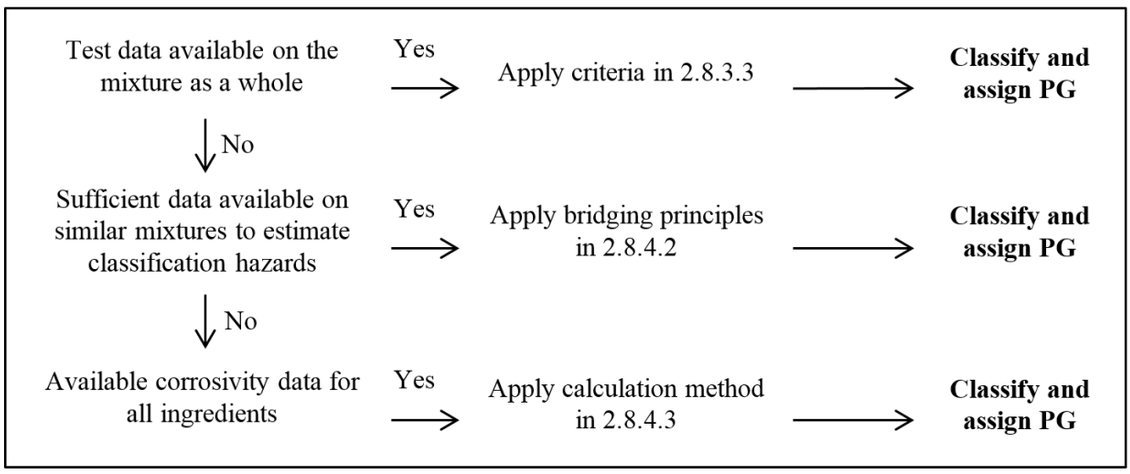
(3) An in vitro test may be used instead of the test in the OECD Guidelines**.**

2.65 Alternative packing group assignment methods for mixtures: Step-wise approach

(1) For mixtures it is necessary to obtain or derive information that allows the criteria to be applied to the mixture for the purpose of classification and assignment of packing groups. The approach to classification and assignment of packing groups is tiered, and is dependent upon the amount of information available for the mixture itself, for similar mixtures and/or for its ingredients. The flow chart of Figure 5 below outlines the process to be followed:

Proposed text

Figure 5 Step-wise approach to classify and assign packing group of corrosive mixtures



(2) Bridging principles

Where a mixture has not been tested to determine its skin corrosion potential, but there are sufficient data on both the individual ingredients and similar tested mixtures to adequately classify and assign a packing group for the mixture, these data may be used in accordance with the following bridging principles.

(a) Dilution: If a tested mixture is diluted with a diluent which does not meet the criteria for Class 8 and does not affect the packing group of other ingredients, the new diluted mixture may be assigned to the same packing group as the original tested mixture. However, if diluting the mixture or substance leads to an increase in the corrosive properties, the dilution bridging principle cannot be used.

(b) Batching: The skin corrosion potential of a tested production batch of a mixture may be assumed to be equivalent to that of another untested production batch of the same commercial product when produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the skin corrosion potential of the untested batch has changed. If the latter occurs, a new classification is necessary.

(c) Concentration of mixtures of packing group I: If a tested mixture meeting the criteria for inclusion in packing group I is concentrated, the more concentrated untested mixture may be assigned to packing group I without additional testing.

(d) Interpolation within one packing group: For three mixtures (A, B and C) with identical ingredients, where mixtures A and B have been tested and are in the same skin corrosion packing group, and where untested mixture C has the same Class 8 ingredients as mixtures A and B but has concentrations of Class 8 ingredients intermediate to the concentrations in mixtures A and B, then mixture C is assumed to be in the same skin corrosion packing group as A and B.

(e) Substantially similar mixtures: Given the following:

(i) Two mixtures: (A+B) and (C+B);

(ii) The concentration of ingredient B is the same in both mixtures;

(iii) The concentration of ingredient A in mixture (A+B) equals the concentration of ingredient C in mixture (C+B);

(iv) Data on skin corrosion for A and C are available and substantially equivalent, i.e. they are the same skin corrosion packing group and do not affect the skin corrosion potential of B.

(v) If mixture (A+B) or (C+B) is already classified based on test data, then the other mixture may be assigned to the same packing group.

(3) Calculation method based on the classification of the substances

(a) Where a mixture has not been tested to determine its skin corrosion potential, nor is sufficient data available on similar mixtures, the corrosive properties of the substances in the mixture shall be considered to classify and assign a packing group. This is possible when all substances in the mixture (i.e. present in concentrations of >1%) are considered for classification in accordance with this Part.

(b) Applying the calculation method is only allowed if there are no synergistic effects that make the mixture more corrosive than the sum of its substances. This restriction applies only if packing group II or III would be assigned to the mixture.

Proposed text

(c) When using the calculation method, all Class 8 ingredients present at a concentration of ≥ 1% shall be taken into account, or <1% if these ingredients are still relevant for classifying the mixture to be corrosive to skin.

(d) To determine whether a mixture containing corrosive substances shall be considered a corrosive mixture and to assign a packing group, the calculation method in the flow chart in Figure 6 must be applied.

(e) When a specific concentration limit (SCL) is assigned to a substance following its entry in the Dangerous Goods List or in a Special Provision, this limit must be used instead of the generic concentration limits (GCL). This is appears where 1% is used in the first step for the assessment of the PGI substances, and where 5% is used for the other steps respectively in Figure 6.

(f) For this purpose, the summation formula for each step of the calculation method must be adapted. This means that, where applicable, the generic concentration limit must be substituted by the specific concentration limit assigned to the substance(s) (SCLi), and the adapted formula is a weighted average of the different concentration limits assigned to the different substances in the mixture:

$$\frac{PGx1}{GCL} + \frac{PGx2}{SCL2} + \cdots + \frac{PGxi}{SCLi} \geq 1$$

Where:

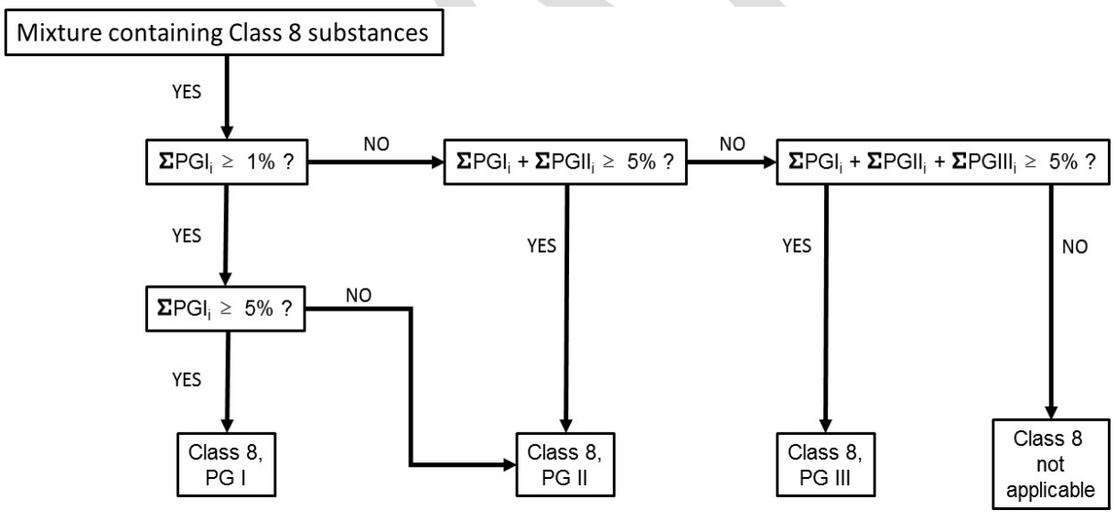
PG xi = concentration of substance 1, 2 …i in the mixture, assigned to packing group x (I, II or III)

GCL = generic concentration limit

SCLi = specific concentration limit assigned to substance i

The criterion for a packing group is fulfilled when the result of the calculation is ≥ 1.

Figure 6 : Calculation method



Class 9, Miscellaneous Products, Substances or Organisms

The classification provisions for miscellaneous products, substances or organisms would be harmonized with those in the 19th edition of the UN Recommendations. Class 9 dangerous goods which are currently assigned to Packing Group II would no longer have a Packing Group.

Proposed text
Class 9 (Miscellaneous) **2.66 General** A substance is included in Class 9, Miscellaneous Products, Substances or Organisms, if it (a) is included in Class 9 in column 3 of Schedule 1; or (b) is not included in Class 9 in column 3 of Schedule 1 and does not meet the criteria for inclusion in any of Classes 1 to 8 and (i) is a marine pollutant under section 2.12 of Part 2 (Classification), or (ii) except for asphalt or tar, is offered for transport or transported at a temperature greater than or equal to 100°C if it is in a liquid state or at a temperature greater than or equal to 240°C if it is in a solid state. **2.67 Lithium Cells and Batteries** (1) A person must not handle, offer for transport or transport lithium cells and batteries under any of the following shipping names unless the cells and batteries meet the conditions set out in subsection (2): (a) UN3090, LITHIUM METAL BATTERIES; (b) UN3091, LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT; (c) UN3480, LITHIUM ION BATTERIES; or (d) UN3481, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT. (2) The conditions are as follows: (a) the cell or battery type passes each test set out in subsection 38.3 of Part III of the Manual of Tests and Criteria; (b) each cell or battery has a safety venting device or is designed to prevent a violent rupture under normal conditions of transport; (c) each cell or battery is equipped to prevent external short circuits; and (d) each battery containing cells or a series of cells connected in parallel is equipped with diodes, fuses or other devices that prevent reverse current flow.