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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

Sub-Committee of Experts on the Transport of Dangerous Goods
(Twenty-second session, 2-6 December 2002 agenda item 3)

DRAFT AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS (Model Regulations and Manual of Tests and Criteria)

This document contains the draft amendments to the Model Regulations on the Transport of Dangerous Goods (as annexed to the 12th revised edition of the Recommendations on the Transport of Dangerous Goods, ST/SG/AC.10/1/Rev.12) and to the Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.3) adopted by the Sub-committee of Experts at its 19th, 20th and 21st sessions.

It contains two annexes:

Annex 1: Draft amendments to the Model Regulations on the Transport of Dangerous Goods;

Annex 2: Draft amendments to the Manual of Tests and Criteria.

ANNEX 1

DRAFT AMENDMENTS TO THE MODEL REGULATIONS ANNEXED TO THE TWELFTH REVISED EDITION OF THE UNITED NATIONS RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS (ST/SG/AC.10/1/Rev.12)

United Nations Recommendations on the Transport of Dangerous Goods

Amend paragraph 10 (page 2 of the English text) to read:

"10. Many of the substances listed in Classes 1 to 9 are deemed as being dangerous to the environment. Additional labelling is not always specified except for transport by sea. Criteria for substances and mixtures dangerous to the aquatic environment are given in Chapter 2.9 of the Model Regulations."

In the data sheet (figure 1 in page 5 of the English test), under Section 6, add the following new 6.2.1:

"6.2.1 Bulk containers (6.8*)? yes/no
If yes, give details in Sections …….. and/or 7."

Existing 6.2.1 and 6.2.2 become 6.2.2 and 6.2.3 respectively.

"**Section 7. BULK CONTAINERS (only complete if yes in 6.2.1)**

7.1 Proposed type(s) ……..".

Renumber existing sections 7 and 8 accordingly.

PART 1

Chapter 1.1

1.1.1.2 Delete (a) and rename (b) and (c) accordingly.

1.1.2.6 Add a new sub-section to read as follows:

"**1.1.2.6** ***Non-compliance***

1.1.2.6.1 In the event of a non-compliance with any limit in these Regulations applicable to radiation level or contamination,

(a) the consignor shall be informed of the non-compliance by the carrier if the non-compliance is identified during transport; or the consignee if the non-compliance is identified at receipt;

(b) the carrier, consignor or consignee, as appropriate shall:

(i) take immediate steps to mitigate the consequences of the non-compliance;

(ii) investigate the non-compliance and its causes, circumstances and consequences;

(iii) take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of similar circumstances that led to the non-compliance; and

(iv) communicate to the relevant competent authority(ies) on the causes of the non-compliance and on corrective or preventive actions taken or to be taken; and

(c) the communication of the non-compliance to the consignor and relevant competent authority(ies), respectively, shall be made as soon as practicable and it shall be immediate whenever an emergency exposure situation has developed or is developing.".

Chapter 1.2

1.2.1 In the definition of "portable tank", subparagraph (a), insert "Class 1 and" before "Classes 3 to 9" and delete the words "having a capacity of more than 450 litres" in the first sentence.

In the definition of "tank", delete the words "with a capacity of not less than 450 litres" and add at the end "and has a capacity of not less than 450 litres when used for the transport of substances of Class 2.".

- Insert a new definition for "*Routine maintenance of flexible IBCs*" under "*Intermediate Bulk Containers (IBCs)"* as follows:

"*Routine maintenance of flexible IBCs* is the routine performance on plastics or textile flexible IBCs of operations, such as:

a) cleaning; or

b) replacement of non-integral components, such as non-integral liners and closure ties, with components conforming to the original manufacturer's specification;

provided that these operations do not adversely affect the containment function of the flexible IBC or alter the design type.

***NOTE**: For rigid IBCs, see* "*Routine maintenance of rigid IBCs*".".

- Replace "*Routine maintenance of IBCs*" with "*Routine maintenance of rigid IBCs*" and add a note at the end of the existing text to read as follows:

*"**NOTE**: For flexible IBCs, see "Routine maintenance of flexible IBCs".".*

- Insert an entry for "*Routine maintenance of flexible IBCs*" in alphabetical order with the following reference: "(see "*Intermediate Bulk Containers (IBCs)*")".

- In the definition of "*Repaired IBCs*", insert the word "rigid" before "IBCs" in the last but one sentence and add the following sentence at the end of the existing text: "Flexible IBCs are not repairable unless approved by the competent authority.".

Insert the following new definitions:

"Bulk containers are containment systems (including any liner or coating) intended for the transport of solid substances which are in direct contact with the containment system, packagings, intermediate bulk containers (IBCs), large packagings and portable tanks are not included.

Bulk containers are:

- of a permanent character and accordingly strong enough to be suitable for repeated use;

- specially designed to facilitate the transport of goods by one or more means of transport without intermediate reloading;

- fitted with devices permitting its ready handling;

- have a capacity of not less than 1.0 cubic metres.

Examples of bulk containers are freight containers, offshore bulk containers, skips, bulk bins, swap bodies, trough-shaped containers, roller containers, load compartments of vehicles.

Freight container means an article of transport equipment that is of a permanent character and accordingly strong enough to be suitable for repeated use; specially designed to facilitate the transport of goods, by one or other modes of transport, without intermediate reloading: designed to be secured and /or readily handled, having fittings for these purposes, and approved in accordance with the International Convention for Safe Freight Containers (CSC), 1972, as amended. The term "freight container" includes neither vehicle nor packaging. However a freight container that is carried on a chassis is included. For freight containers for the transport of Class 7 materials, see 2.7.2.

[*GHS* means the Globally Harmonized System for Hazard Classification and Communication, published by the United Nations as document (symbol to be inserted)].

Offshore bulk container means a bulk container specially designed for repeated use for transport of dangerous goods to, from and between offshore facilities. An offshore bulk container is designed and constructed in accordance with the Guidelines for the Approval of Containers Handled in Open Seas specified by the International Maritime Organization in document MSC/Circ.860.".

PART 2

Chapter 2.3

2.3.1.4 In the last sentence, replace "and UN 3357" with ", UN 3357 and UN 3379".

Chapter 2.4

Add a new introductory note to read as follows:

*"**NOTE 3:** Since organometallic substances can be classified in divisions 4.2 or 4.3 with additional subsidiary risks, depending on their properties, a specific classification flow chart for these substances is given in 2.4.5."*

2.4.2.3.2.2 Amend the two first sentences of this paragraph to read as follows:

"Self-reactive substances permitted for transport in packagings are listed in 2.4.2.3.2.3, those permitted for transport in IBCs are listed in packing instruction IBC520 and those permitted for transport in portable tanks are listed in portable tank instruction T23. For each permitted substance listed, the appropriate generic entry of the Dangerous Goods List (UN Nos. 3221 to 3240) is assigned, and appropriate subsidiary risks and remarks providing relevant transport information are given.".

2.4.2.3.2.3 In the title, add at the end: "in packages".

Add the following text before the existing Note 1: "In the column "Packing Method" codes "OP1" to "OP8" refer to packing methods in packing instruction P520. Self-reactive substances to be transported shall fulfill the classification and the control and emergency temperatures (derived from the SADT) as listed.".

Delete NOTE 2. As a consequence, "***NOTE 1***" becomes "***NOTE***".

2.4.2.3.2.4 Amend the beginning of the first sentence to read: "Classification of self-reactive substances not listed in 2.4.2.3.2.3, packing instruction IBC520 or portable tank instruction T23 and assignment to…".

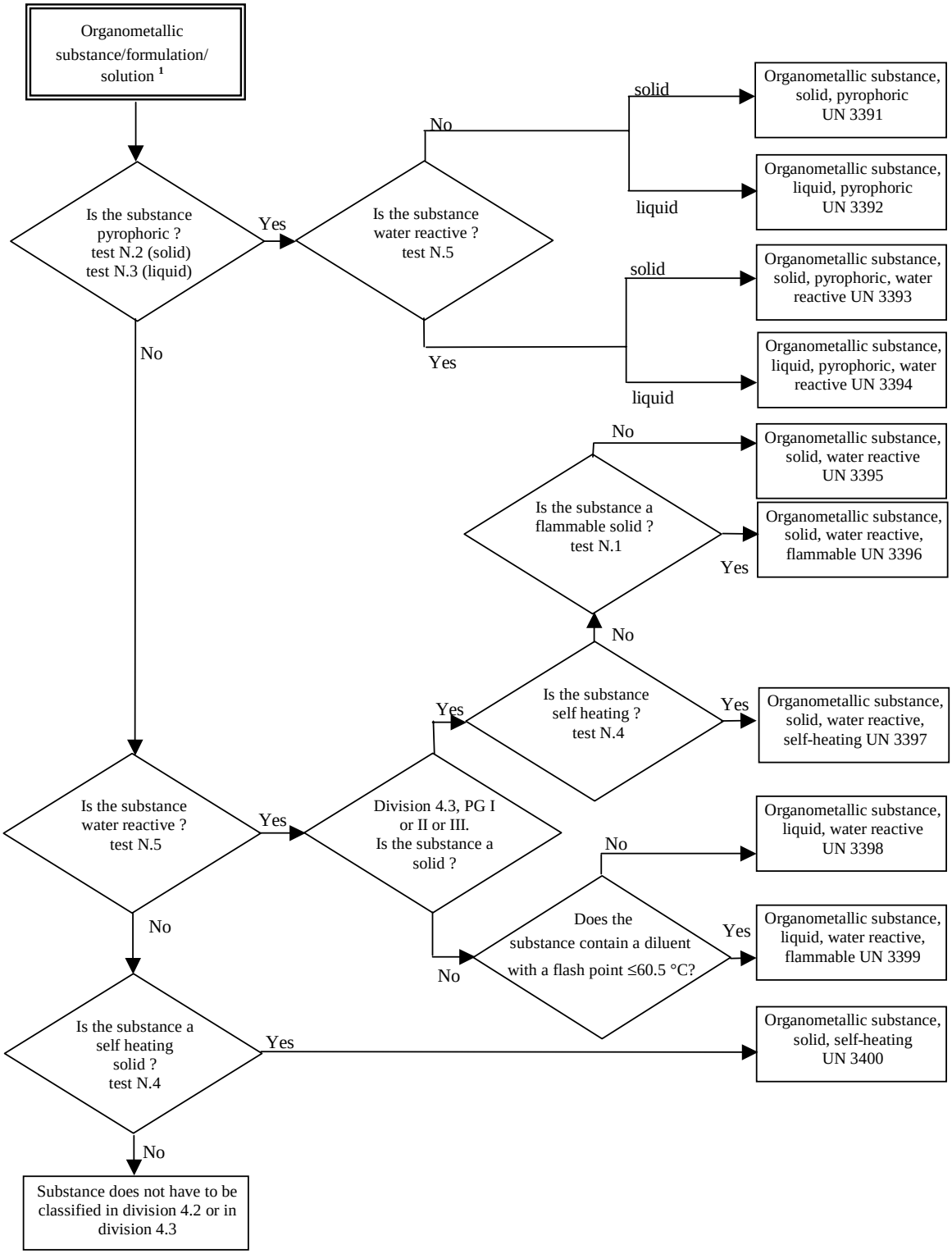
2.4.2.4.1 Add UN 3380 to the list of UN numbers.

2.4.5 Add a new paragraph 2.4.5 and a new figure 2.4.2 as follows:

"**2.4.5 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 2.4.2.

Figure 2.4.2: Flowchart scheme for organometallic substances



[1] *If applicable and testing is relevant, taking into account reactivity properties, class 6.1 and 8 properties should be considered according to the precedence of hazard table 2.0.3.3.*

Chapter 2.5

2.5.3.2.3 Amend the two first sentences of this paragraph to read as follows:

"Organic peroxides permitted for transport in packagings are listed in 2.5.3.2.4, those permitted for transport in IBCs are listed in packing instruction IBC520 and those permitted for transport in portable tanks are listed in portable tank instruction T23. For each permitted substance listed, the generic entry of the Dangerous Goods List (UN Nos. 3101 to 3120) is assigned, appropriate subsidiary risks and remarks providing relevant transport information are given.".

2.5.3.2.4 In the title add, at the end: "in packages".

Replace the existing note under the title with the following text:

"Packing Method" codes "OP1" to "OP8" refer to packing methods in packing instruction P520. Peroxides to be transported shall fulfill the classification and the control and emergency temperatures (derived form the SADT) as listed. For substances permitted in IBCs see packing instruction IBC520 and, for those permitted in tanks, see portable tank instruction T23."

In the table:
In the column "Subsidiary risks and remarks", delete "30)".
Amend the entries listed below as follows:

Organic peroxide		Column	Amendment
ACETYL BENZOYL PEROXIDE		Delete	
tert-AMYL PEROXYACETATE		Packing method	Replace "OP8" with "OP7"
		Number	Replace "3107" with "3105"
tert-BUTYL CUMYL PEROXIDE	(1st row)	Packing method	Replace "OP7" with "OP8"
		Number	Replace "3105" with "3107"
	(2nd row)	Concentration	Replace "≤ 42" with "≤ 52"
		Inert solid	Replace "≥ 58" with "≥ 48"
		Packing method	Replace "OP7" with "OP8"
		Number	Replace "3106" with "3108"
n-BUTYL-4,4-DI-(tert-BUTYLPEROXY) VALERATE	(2nd row)	Delete	
	(3rd row)	Concentration	Replace "≤ 42" with "≤ 52"
		Inert solid	Replace "≥ 58" with "≥ 48"
tert-BUTYL HYDROPEROXIDE	(4th row)	Packing method	Delete ",N,M"
tert-BUTYL MONOPEROXYPHTHALATE		Delete	
tert-BUTYL PEROXYACETATE	(3rd row)	Diluant type A	Delete "≥ 68"
		Diluant type B	Add "≥ 68"
		Packing method	Delete ",N"
	(4th and 5th rows)	Delete	
tert-BUTYL PEROXYBENZOATE	(1st row)	Diluent type A	Delete "< 22"
tert-BUTYL PEROXYDIETHYLACETATE + tert-BUTYL PEROXYBENZOATE		Delete	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE	6th and 7th rows	Delete	

Organic peroxide		Column	Amendment
tert-BUTYL PEROXYISOBUTYRATE	(1st row)	Diluent type B	Replace ">23" with "≥23"
	(2nd row)	Diluent type B	Replace ">48" with "≥48"
tert-BUTYL PEROXYNEODECANOATE	(3rd row)	Delete	
	(4th row)	Number	Replace "3117" with "3119"
	(6th row)	Packing method	Delete ",N"
tert-BUTYL PEROXYPIVALATE	(4th and 5th rows)	Delete	
3-tert-BUTYLPEROXY-3-PHENYLPHTHALIDE		Delete	
tert-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	(2nd row)	Diluent type A	Delete "≥ 68"
		Diluent type B	Add "≥ 68"
		Packing method	Delete ", N"
	(3rd row)	Delete	
CUMYL HYDROPEROXIDE	(2nd row)	Packing method	Delete ", M, N"
CUMYL PEROXYNEODECANOATE	(3rd row)	Delete	
DIBENZOYL PEROXIDE	(8th row)	Delete	
	(11th row)	Packing method	Delete ",N"
DIBENZYL PEROXYDICARBONATE		Delete	
DI-(4-tert-BUTYLCYCLOHEXYL) PEROXYDICARBONATE	(2nd row)	Packing method	Delete ",N"
DI-tert-BUTYL PEROXIDE	(1st row)	Concentration	Replace ">32" with ">52
	(2nd row)	Packing method	Delete ",N"
	(3rd row)	Delete	
1,1-DI-(tert-BUTYLPEROXY) CYCLOHEXANE	(5th row)	Diluent type A	Replace "≥ 36" with "≥ 25"
	(6th row)	Packing method	Delete ",N"
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYLCYCLOHEXANE	(3rd row)	Packing method Number	Replace "OP7" with "OP5" Replace "3105" with "3103"
	(4th row)	Packing method Number	Replace "OP7" with "OP8" Replace "3106" with "3110"
DICETYL PEROXYDICARBONATE	(2nd row)	Packing method	Delete ",N"
DICUMYL PEROXIDE	(1st row)	Concentration Packing method	Replace "42" with "52" Delete ",M"
DICYCLOHEXYL PEROXYDICARBONATE	(1st and 2nd rows)	Control temperature Emergency temperature	Replace "+5" with "+10" Replace "+10" with "+15"
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE	(3rd row)	Organic peroxide	Do not apply to the English version
	(5th row)	Delete	
	(6th row)	Concentration Number	Replace "42" with "52" Replace "3118" with "3120"
DIETHYL PEROXYDICARBONATE		Delete	
DIISOTRIDECYL PEROXYDICARBONATE		Delete	
DILAUROYL PEROXIDE	(2nd row)	Packing method	Delete ",N"
2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXANE	(2nd row)	Delete	

Organic peroxide		Column	Amendment
DIMYRISTYL PEROXYDICARBONATE	(3rd row)	Delete	
DIPEROXY AZELAIC ACID		Delete	
DIPEROXY DODECANE DIACID		Delete	
DISTEARYL PEROXYDICARBONATE		Delete	
DI-(3,5,5-TRIMETHYLHEXANOYL) PEROXIDE	(2nd row)	Packing method	Delete ", N"
	(4th and 5th rows)	Delete	
DI-(3,5,5-TRIMETHYL-1,2-DIOXOLANYL-3) PEROXIDE		Delete	
3,3,6,6,9,9-HEXAMETHYL-1,2,4,5-TETRAOXACYCLONONANE		Delete	
ISOPROPYLCUMYL HYDROPEROXIDE		Packing method	Delete ", M, N"
p-MENTHYL HYDROPEROXIDE	(2nd row)	Packing method	Delete ", M, N"
METHYL ETHYL KETONE PEROXIDE(S)	(1st row)	Concentration	Replace "≤ 52" with "see remark 8)"
	(2nd row)	Concentration	Replace "≤ 45" with "see remark 9)"
	(3rd now)	Concentration	Replace "≤ 40" with "see remark 10)"
	(4th row)	Delete	
PEROXYACETIC ACID, TYPE F, stabilized	(1st row)	Packing method	Delete ", N"
	(2nd row)	Delete	
PINANYL HYDROPEROXIDE	(1st row)	Concentration	Replace "56" with ">56"
	(2nd row)	Concentration Diluent type A Packing method	Replace "<56" with "≤ 56" Replace ">44" with "≥44" Delete ", M"
TETRAHYDRONAPHTHYL HYDROPEROXIDE		Delete	
1,1,3,3-TETRAMETHYLBUTYL PEROXY-2 ETHYLHEXANOATE		Control temperature Emergency temperature	Replace "+20" with "+15" Replace "+25" with "+20"
1,1,3,3-TETRAMETHYLBUTYL PEROXYPHENOACETATE		Delete	

Insert the following new entries:

Organic peroxide	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
tert-AMYLPEROXY ISOPROPYL CARBONATE	≤ 77	≥ 23				OP5			3103	
tert-BUTYL PEROXYNEO-HEPTANOATE *(new second row)*	≤ 42 as a stable dispersion in water					OP8	0	+10	3117	
1,6-Di-(tert-BUTYLPEROXY-CARBONYLOXY) HEXANE	≤ 72	≥ 28				OP5			3103	
DICYCLOHEXYL PEROXYDICARBONATE *(new third row)*	≤ 42 as a stable dispersion in water					OP8	+15	+20	3119	

Organic peroxide	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1-(2-ETHYLHEXANOYL-PEROXY)-1,3-DIMETHYLBUTYL PEROXYPIVALATE	≤ 52	≥ 45	≥ 10			OP7	-20	-10	3115	
PEROXYLAURIC ACID	≤ 100					OP8	+35	+40	3118	
POLYETHER POLY-tert-BUTYLPEROXY-CARBONATE	≤ 52		≥ 23			OP8			3107	
1,1,3,3-TETRAMETHYL-BUTYL PEROXYPIVALATE	≤ 77	≥ 23				OP7	0	+10	3315	

2.5.3.2.4 Notes after the table:

Note 1): Add the following sentence at the end: "*Boiling point diluent type B should be at least 60°C higher than the SADT of the organic peroxide*.".

Note 3): Add at the end: *"(Model No. 1, see 5.2.2.2.2)."*.

Note 8): Amend to read as follows: "*Available oxygen > 10% and ≤10.7%, with or without water."*.

Note 9): Amend to read as follows: "*Available oxygen ≤ 10%, with or without water."*.

Note 10): Amend to read as follows: "*Available oxygen ≤ 8,2%, with or without water."*.

Note 13): Add at the end: *"(Model No. 8, see 5.2.2.2.2)."*.

Note 21): Amend to read as follows: "*With ≥25% diluent type A by mass, and in addition ethylbenzene."*.

Note 22): Amend to read as follows: "*With ≥19% diluent type A by mass, and in addition methyl isobutyl ketone."*.

Note 27): Add at the end: *"(Model No. 8, see 5.2.2.2.2)."*.

Note 29): Replace "*regulations*" with "*Model Regulations*".

Note 30): Delete

2.5.3.2.5 Amend the beginning of the first sentence to read: "Classification of organic peroxides not listed in 2.5.3.2.4, packing instruction IBC520 or portable tank instruction T23 and assignment to…".

Chapter 2.6

2.6.1(b) Replace "or recombinant micro-organisms (hybrid or mutant), that are known or reasonably expected to cause infectious disease in animals or humans." with "and other agents such as prions, which can cause disease in humans or animals.".

2.6.2.1.1 Replace the existing definition for " *LD_{50} for acute oral toxicity*" with the following text: "*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 per cent 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).".

2.6.2.2.4.3 In footnote "*", replace "Tear gases" with "Tear gas substances".

2.6.3 Replace the existing text with the following:

"2.6.3 Division 6.2 - Infectious substances

2.6.3.1 *Definitions*

For the purposes of these Regulations:

2.6.3.1.1 *Infectious substances* are substances which are known or are reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsiae, parasites, fungi) and other agents such as prions, which can cause disease in humans or animals.

2.6.3.1.2 *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.

2.6.3.1.3 *Cultures* (laboratory stocks) are the result of a process by which pathogens are amplified or propagated in order to generate high concentrations, thereby increasing the risk of infection when exposure to them occurs. This definition does not include specimens for diagnostic or clinical purposes in growth or non growth promoting medium.

2.6.3.1.4 *Genetically modified micro-organisms and organisms* are micro-organisms and organisms in which genetic material has been purposely altered through genetic engineering in a way that does not occur naturally.

2.6.3.1.5 *Medical or clinical wastes* are wastes derived from the medical treatment of animals or humans or from bio-research.

2.6.3.2 ***Classification of infectious substances***

2.6.3.2.1 Infectious substances shall be classified in Division 6.2 and assigned to UN 2814, UN 2900 or UN 3373, as appropriate.

2.6.3.2.2 Infectious substances are divided into the following categories:

2.6.3.2.2.1 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 to humans or animals. Indicative examples of substances that meet these criteria are given in the table in this paragraph.

NOTE : *An exposure occurs when an infectious substance is released outside of the protective packaging, resulting in physical contact with humans or animals.*

(a) Infectious substances meeting these criteria which cause disease in humans or both in humans and animals shall be assigned to UN 2814. Infectious substances which cause disease only in animals shall be assigned to UN 2900.

(b) Assignment to UN 2814 or UN 2900 shall 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.

***NOTE 1**: The proper shipping name for UN 2814 is INFECTIOUS SUBSTANCE, AFFECTING HUMANS. The proper shipping name for UN 2900 is INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only.*

***NOTE 2*: The following table is not exhaustive. Infectious substances, including new or emerging pathogens, which do not appear in the table but which meet the same criteria shall be assigned to Category A. In addition, if there is doubt as to whether or not a substance meets the criteria it shall be included in Category A.**

***NOTE 3:** In the following table, the micro-organisms written in italics are bacteria, mycoplasmas, rickettsia or fungi.*

INDICATIVE EXAMPLES OF INFECTIOUS SUBSTANCES INCLUDED IN CATEGORY A IN ANY FORM UNLESS OTHERWISE INDICATED (2.6.3.2.2.1 (a))	
UN Number and Proper Shipping Name	**Micro-organism**
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 hemorrhagic 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 hantavirus pulmonary syndrome Hendra virus Hepatitis B virus (cultures only) Herpes B virus (cultures only) 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

INDICATIVE EXAMPLES OF INFECTIOUS SUBSTANCES INCLUDED IN CATEGORY A IN ANY FORM UNLESS OTHERWISE INDICATED (2.6.3.2.2.1 (a))	
UN Number and Proper Shipping Name	**Micro-organism**
UN 2814 Infectious substances affecting humans *(cont'd)*	*Mycobacterium tuberculosis (cultures only)* Nipah virus Omsk hemorrhagic fever virus Poliovirus (cultures only) Rabies virus *Rickettsia prowazekii (cultures only)* *Rickettsia rickettsii* (cultures only) Rift Valley fever virus 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 West Nile virus (cultures only) Yellow fever virus (cultures only) *Yersinia pestis* (cultures only)
UN 2900 Infectious substances affecting humans	African horse sickness virus African swine fever virus Avian paramyxovirus Type 1 - Newcastle disease virus Bluetongue virus Classical swine fever virus Foot and mouth disease virus Lumpy skin disease virus *Mycoplasma mycoides* - Contagious bovine pleuropneumonia Peste des petits ruminants virus Rinderpest virus Sheep-pox virus Goatpox virus Swine vesicular disease virus Vesicular stomatitis virus

2.6.3.2.2.2 Category B: An infectious substance which does not meet the criteria for inclusion in Category A. Infectious substances in Category B shall be assigned to UN 3373 except that cultures, as defined in 2.6.3.1.3, shall be assigned to UN 2814 or UN 2900 as appropriate.

NOTE: *The proper shipping name of UN 3373 is "DIAGNOSTIC SPECIMENS" or "CLINICAL SPECIMENS."*

2.6.3.2.3 Substances which do not contain infectious substances or substances which are unlikely to cause disease in humans or animals are not subject to these Regulations unless they meet the criteria for inclusion in another class.

2.6.3.2.4 Blood which has been collected for the purpose of blood transfusion or for the preparation of blood products, blood products, and any tissues or organs intended for use in transplants are not subject to these Regulations.

2.6.3.2.5 Substances for which there is a low probability that infectious substances are present, or where the concentration is at a level naturally encountered, are not subject to these Regulations. Examples are: foodstuffs, water samples, living persons and substances which have been treated so that the pathogens have been neutralized or deactivated.

2.6.3.3 *Biological products*

2.6.3.3.1 For the purposes of these Regulations, biological products are divided into the following groups:

(a) those which are manufactured and packaged in accordance with the requirements of appropriate national authorities and transported for the purposes of final packaging or distribution, and use for personal health care by medical professionals or individuals. Substances in this group are not subject to these Regulations.

(b) those which do not fall under paragraph (a) and are known or reasonably believed to contain infectious substances and which meet the criteria for inclusion in Category A or Category B. Substances in this group shall be assigned to UN 2814, UN 2900 or UN 3373, as appropriate.

***NOTE**: Some licensed biological products may present a biohazard only in certain parts of the world. In that case, competent authorities may require these biological products to be in compliance with local requirements for infectious substances or may impose other restrictions.*

2.6.3.4 Genetically modified micro-organisms and organisms

2.6.3.4.1 Genetically modified micro-organisms not meeting the definition of infectious substance shall be classified according to Chapter 2.9.

2.6.3.5 Medical or clinical wastes

2.6.3.5.1 Medical or clinical wastes containing Category A infectious substances or containing Category B infectious substances in cultures shall be assigned to UN 2814 or UN 2900 as appropriate. Medical or clinical wastes containing infectious substances in Category B, other than cultures, shall be assigned to UN 3291.

2.6.3.5.2 Medical or clinical wastes which are reasonably believed to have a low probability of containing infectious substances shall be assigned to UN 3291.

***NOTE**: The proper shipping name for UN 3291 is CLINICAL WASTE, UNSPECIFIED, N.O.S. or (BIO) MEDICAL WASTE, N.O.S. or REGULATED MEDICAL WASTE, N.O.S.*

2.6.3.5.3 Decontaminated medical or clinical wastes which previously contained infectious substances are not subject to these Regulations unless they meet the criteria for inclusion in another class.".

Chapter 2.7

Except for the definition in 2.7.2, replace, all throughout the chapter, "Industrial package Type 1 (Type IP-1)" with "Type IP-1 package" and "Industrial package Type 2 (Type IP-2)" with "Type IP-2 package".

2.7.1.2 In (e), insert the following text after "naturally occurring radionuclides":
"which are either in their natural state, or have only been processed for purposes other than for extraction of the radionuclides, and"

Add a new (f) as follows:

"(f) Non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of the limit defined in 2.7.2".

2.7.2 In the definition of "package", add "package" after "Type IP-1", "Type IP-2" and "Type IP-3".

2.7.6.1.1 Amend the title of the table to read: "Multiplication factor for tanks, freight containers and unpackaged LSA-I and SCO-I".

2.7.6.2.2 Amend to read: "The criticality safety index for each overpack or freight container shall be determined as the sum of the CSIs of all the packages contained. The same procedure shall be followed for determining the total sum of the CSIs in a consignment or aboard a conveyance."

2.7.7.2.1 In the table, for "Cf-252", replace "5×10^{-2}" with "1×10^{-1}" under the heading A_1.

2.7.8.3 Insert the words "or overpack" after "package".

2.7.9.3 (b) Amend to read as follows:

" (b) Each instrument or article bears the marking "RADIOACTIVE" except:

i) radioluminescent time-pieces or devices;

ii) consumer products that either have received regulatory approval according to 2.7.1.2(d) or do not individually exceed the activity limit for an exempt consignment in Table 2.7.7.2.1 (column 5), provided such products are transported in a *package* that bears the marking "RADIOACTIVE" on an internal surface in such a manner that warning of the presence of radioactive material is visible on opening the package, and ".

Chapter 2.8

2.8.2.5 (c) (ii) Replace the two last sentences of this subparagraph with the following text:

"[For the purposes of testing steel, type **S235JR+CR (1.0037 resp. St 37-2), S275J2G3+CR (1.0144 resp. St 44-3)**, ISO 3574 or Unified Numbering System (UNS) G10200 or a similar type,] and for testing aluminium, non-clad, types 7075–T6 or AZ5GU-T6 shall be used. An acceptable test is prescribed in the Manual of Tests and Criteria, Part III, Section 37".

Chapter 2.9

Replace the existing text with the following:

"CHAPTER 2.9

CLASS 9 – MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES

2.9.1 Definitions

2.9.1.1 *Class 9 substances and articles (miscellaneous dangerous substances and articles)* are substances and articles which, during transport present a danger not covered by other classes.

2.9.1.2 *Genetically modified micro-organisms (GMMOs) and genetically modified organisms (GMOs)* are micro-organisms and organisms in which genetic material has been purposely altered through genetic engineering in a way that does not occur naturally.

2.9.2 Assignment to Class 9

2.9.2.1 Class 9 includes, inter alia:

a) environmentally hazardous substances;

b) elevated temperature substances (i.e. substances that are transported or offered for transport at temperatures equal to or exceeding 100°C in a liquid state or at temperatures equal or exceeding 240°C in a solid state);

c) GMMOs or GMOs which do not meet the definition of infectious substances (see 2.6.3) but which are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction. They shall be assigned to UN 3245.

GMMOs or GMOs are not subject to these Regulations when authorized for use by the competent authorities of the Governments of the countries of origin, transit and destination.

2.9.3 Environmentally hazardous substances (aquatic environment)

2.9.3.1 *General definition*

2.9.3.1.1 Environmentally hazardous substances include, inter alia, liquid or solid substances pollutant to the aquatic environment and solutions and mixtures of such substances (such as preparations and wastes).

2.9.3.1.2 The aquatic environment may be considered in terms of the aquatic organisms that live in the water, and the aquatic ecosystem of which they are part[1]. The basis, therefore, of the identification of hazard is the aquatic toxicity of the substance or mixture, although this may be modified by further information on the degradation and bioaccumulation behaviour.

[1] *This does not address aquatic pollutants for which there may be a need to consider effects beyond the aquatic environment such as the impacts on human health etc.*

2.9.3.1.3 While the following classification procedure is intended to apply to all substances and mixtures, it is recognised that in some cases, e.g. metals or poorly soluble inorganic compounds, special guidance will be necessary[2].

2.9.3.2 ***Definitions and data requirements***

2.9.3.2.1 The basic elements for classification of environmentally hazardous substances (aquatic environment) are:

- acute aquatic toxicity;
- potential for or actual bioaccumulation;
- degradation (biotic or abiotic) for organic chemicals; and
- chronic aquatic toxicity.

2.9.3.2.2 While data from internationally harmonised test methods are preferred, in practice, data from national methods may also be used where they are considered as equivalent. In general, freshwater and marine species toxicity data can be considered as equivalent data and are preferably to be derived using OECD Test Guidelines or equivalent according to the principles of Good Laboratory Practices (GLP). Where such data are not available, classification shall be based on the best available data.

2.9.3.2.3 **Acute aquatic toxicity** shall normally be determined using a fish 96 hour LC_{50} (OECD Test Guideline 203 or equivalent), a crustacea species 48 hour EC_{50} (OECD Test Guideline 202 or equivalent) and/or an algal species 72 or 96 hour EC_{50} (OECD Test Guideline 201 or equivalent). These species are considered as surrogates for all aquatic organisms. Data on other species such as Lemna may also be considered if the test methodology is suitable.

2.9.3.2.4 **The potential for bioaccumulation** shall normally be determined by using the octanol/water partition coefficient, usually reported as a log K_{ow} determined according to OECD Test Guideline 107 or 117. While this represents a potential to bioaccumulate, an experimentally determined Bioconcentration Factor (BCF) provides a better measure and shall be used in preference when available. A BCF shall be determined according to OECD Test Guideline 305.

2.9.3.2.5 **Environmental degradation** for organic chemicals may be biotic or abiotic (eg. hydrolysis) and the criteria used reflect this fact. Ready biodegradation is most easily defined using the OECD biodegradability tests (OECD Test Guideline 301 (A - F)). A pass level in these tests may be considered as indicative of rapid degradation in most aquatic environments. As these are freshwater tests, use of results from OECD Test Guideline 306, which is more suitable for the marine environment, is also included. Where such data are not available, a BOD(5 days)/COD ratio >0.5 is considered as indicative of rapid degradation. Abiotic degradation such as hydrolysis, primary degradation, both abiotic and biotic, degradation in non-aquatic media and proven rapid degradation in the environment may all be considered in defining rapid degradability[3].

Substances are considered rapidly degradable in the aquatic environment if the following criteria are met:

---

[2] *This can be found in Annex 9 of the GHS.*

[3] *Special guidance on data interpretation is provided in Chapter 3.10 and Annex 8 of the GHS.*

(a) In 28-day ready biodegradation studies, the following levels of degradation are achieved:

(i) Tests based on dissolved organic carbon: 70%;

(ii) Tests based on oxygen depletion or carbon dioxide generation: 60% of theoretical maxima;

These levels of biodegradation shall be achieved within 10 days of the start of degradation which point is taken as the time when 10% of the substance has been degraded; or

(b) In those cases where only BOD and COD data are available, when the ratio of BOD_5/COD is ≥ 0.5; or

(c) If other convincing scientific evidence is available to demonstrate that the substance or mixture can be degraded (biotically and/or abiotically) in the aquatic environment to a level above 70% within a 28 day period.

2.9.3.2.6 **Chronic aquatic toxicity** data are less available than acute data and the range of testing procedures less standardised. Data generated according to the OECD Test Guidelines 210 (Fish Early Life Stage), 202 Part 2 or 211 (Daphnia Reproduction) and 201 (Algal Growth Inhibition) may be accepted. Other validated and internationally accepted tests may also be used. The "No Observed Effect Concentrations" (NOECs) or other equivalent L(E)Cx shall be used.

2.9.3.3 ***Substance classification categories and criteria***

2.9.3.3.1 Substances shall be classified as "environmentally hazardous substances (aquatic environment)", if they satisfy the criteria for Acute I, Chronic I or Chronic II, according to the following tables:

Acute toxicity

Category: Acute I	
Acute toxicity:	
96 hr LC_{50} (for fish)	≤ 1 mg/l and/or
48 hr EC_{50} (for crustacea)	≤ 1 mg/l and/or
72 or 96hr ErC_{50} (for algae or other aquatic plants)	≤ 1 mg/l

Chronic toxicity

Category: Chronic I	
Acute toxicity:	
96 hr LC_{50} (for fish)	≤ 1 mg/l and/or
48 hr EC_{50} (for crustacea)	≤ 1 mg/l and/or
72 or 96hr ErC_{50} (for algae or other aquatic plants)	≤ 1 mg/l
and the substance is not rapidly degradable and/or the log K_{ow} ≥ 4 (unless the experimentally determined BCF < 500)	

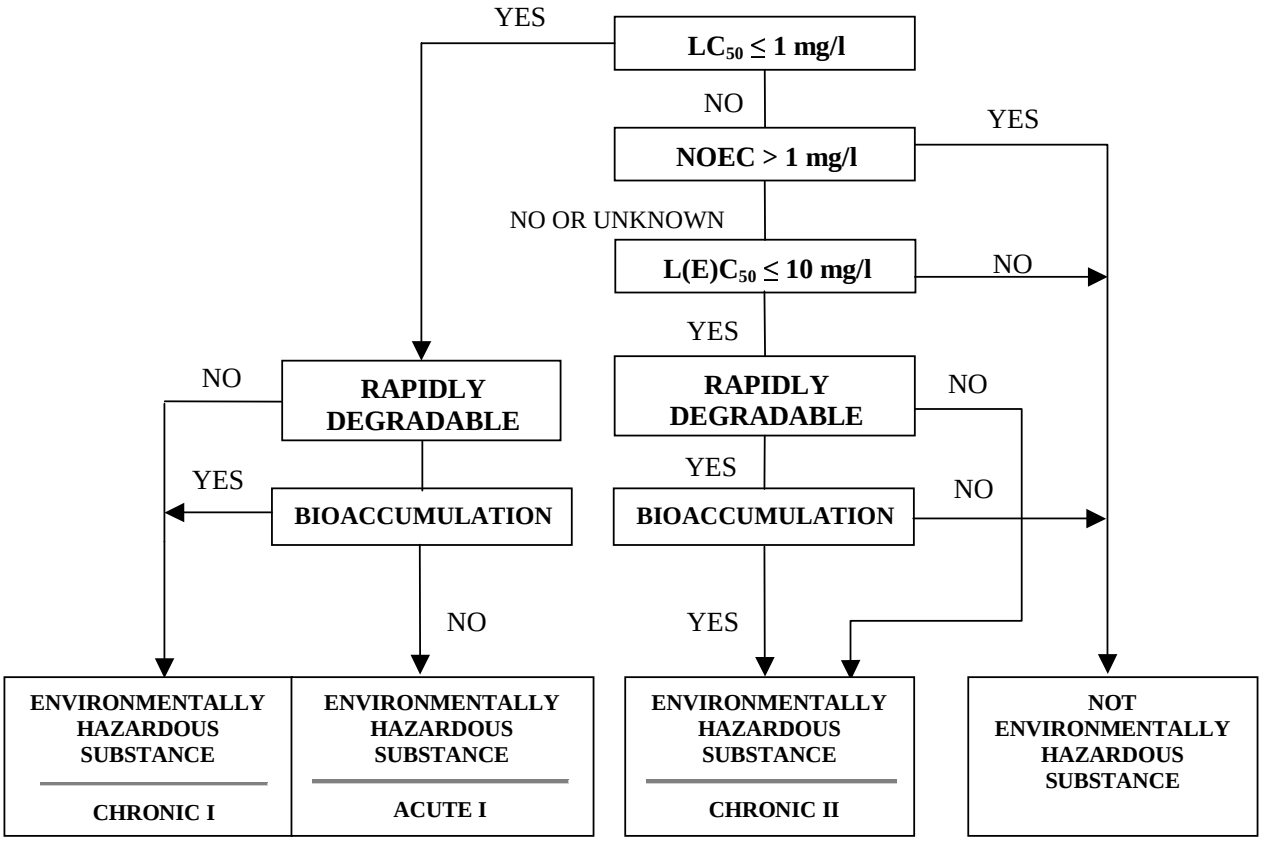
Category: Chronic II

Acute toxicity

96 hr LC_{50} (for fish)	>1 to ≤ 10 mg/l and/or
48 hr EC_{50} (for crustacea)	>1 to ≤ 10 mg/l and/or
72 or 96hr ErC_{50} (for algae or other aquatic plants)	>1 to ≤ 10 mg/l

and the substance is not rapidly degradable and/or the log K_{ow} ≥ 4 (unless the experimentally determined BCF <500), unless the chronic toxicity NOECs are > 1 mg/l

The classification flowchart below outlines the process to be followed.



2.9.3.4 Mixtures classification categories and criteria

2.9.3.4.1 The classification scheme for mixtures covers the classification categories which are used for substances meaning acute category I and chronic categories I and II. In order to make use of all available data for purposes of classifying the aquatic environmental hazards of the mixture, the following assumption is made and is applied where appropriate:

The "relevant components" of a mixture are those which are present in a concentration of 1% (w/w) or greater, unless there is a presumption (e.g. in the case of highly toxic components) that a component present at less than 1% can still be relevant for classifying the mixture for aquatic environmental hazards.

2.9.3.4.2 The approach for classification of aquatic environmental hazards is tiered, and is dependent upon the type of information available for the mixture itself and for its components. Elements of the tiered approach include:

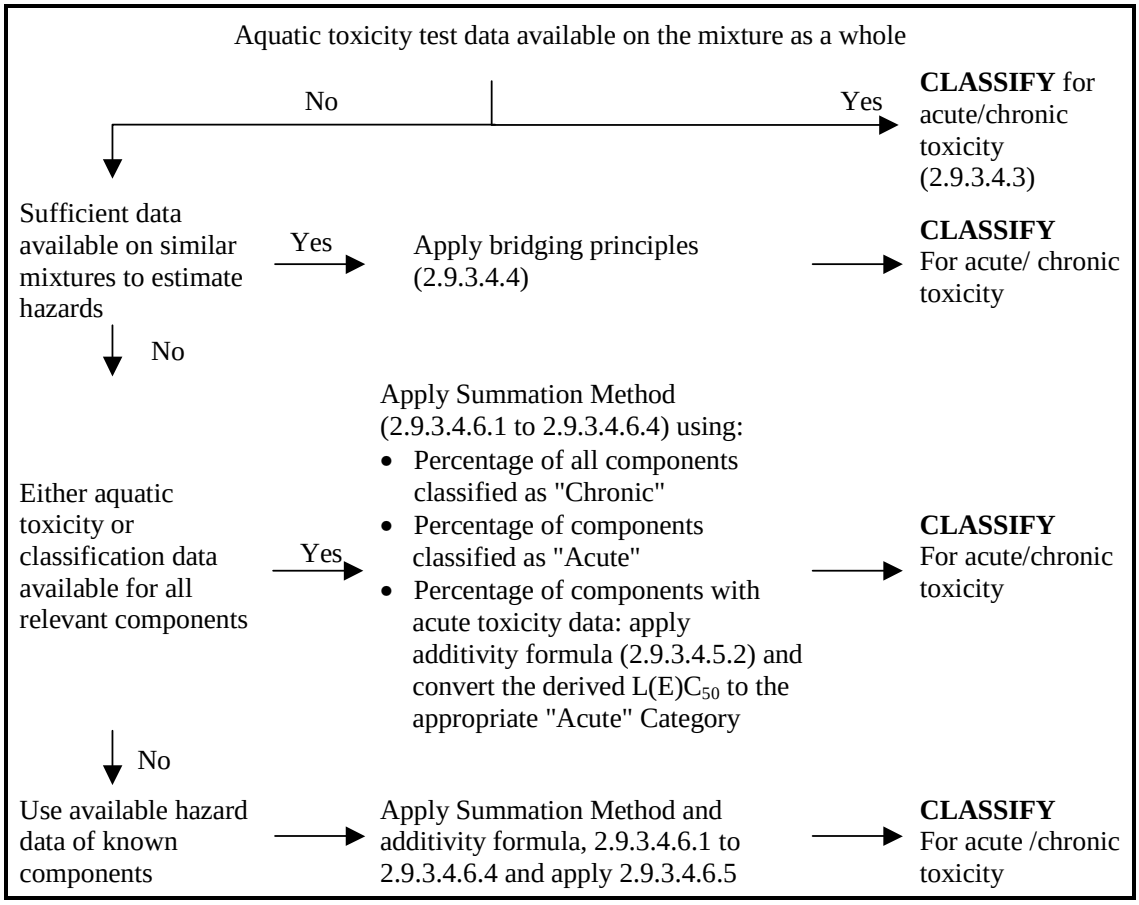
a) classification based on tested mixtures;

b) classification based on bridging principles;

c) the use of "summation of classified components" and /or an "additivity formula".

Figure 2.9.1 below outlines the process to be followed.

Figure 2.9.1: Tiered approach to classification of mixtures for acute and chronic aquatic environmental hazards



2.9.3.4.3 *Classification of mixtures when data are available for the complete mixture*

2.9.3.4.3.1 When the mixture as a whole has been tested to determine its aquatic toxicity, it shall be classified according to the criteria that have been agreed for substances in 2.9.3.3, but only for acute toxicity. The classification is based on the data for fish, crustacea and algae/plants. Classification of mixtures by using LC_{50} or EC_{50} data for the mixture as a whole is not possible for chronic categories.

2.9.3.4.3.2 When there is acute toxicity test data (LC_{50} or EC_{50}) available for the mixture as a whole, this data as well as information with respect to the classification of components for chronic toxicity shall be used to complete the classification for tested mixtures as follows. When chronic (long term) toxicity data (NOEC) is also available, this shall be used in addition.

(a) $L(E)C_{50}$ (LC_{50} or EC_{50}) of the tested mixture ≤ 1mg/l and NOEC of the tested mixture ≤ 1.0 mg/l or unknown:

- classify mixture as category acute I;

- apply summation of classified components approach (see 2.9.3.4.6.3 and 2.9.3.4.6.4) for chronic classification (chronic I, II, or no need of chronic classification).

(b) $L(E)C_{50}$ of the tested mixture ≤ 1 mg/l and NOEC of the tested mixture > 1.0 mg/l:

- classify mixture as category acute I;

- apply summation of classified components approach (see 2.9.3.4.6.3 and 2.9.3.4.6.4) for classification as Category Chronic I. If the mixture is not classified as Category Chronic I, then there is no need for chronic classification.

(c) $L(E)C_{50}$ of the tested mixture >1mg/l, or above the water solubility, and NOEC of the tested mixture ≤ 1.0mg/l or unknown:

- no need to classify for acute toxicity;

- apply summation of classified components approach (see 2.9.3.4.6.3 and 2.9.3.4.6.4) for chronic classification or no need for chronic classification.

(d) $L(E)C_{50}$ of the tested mixture >1mg/l, or above the water solubility, and NOEC of the tested mixture > 1.0 mg/l:

- No need to classify for acute or chronic toxicity.

2.9.3.4.4 *Bridging principles*

2.9.3.4.4.1 Where the mixture itself has not been tested to determine its aquatic environmental hazard, but there are sufficient data on the individual components and similar tested mixtures to adequately characterise the hazards of the mixture, this data shall be used in accordance with the following agreed bridging rules. This ensures that the classification process uses the available data to the greatest extent possible in characterising the hazards of the mixture without the necessity for additional testing in animals.

2.9.3.4.4.2 Dilution

2.9.3.4.4.2.1 If a mixture is formed by diluting another classified mixture or a substance with a diluent which has an equivalent or lower aquatic hazard classification than the least toxic original component and which is not expected to affect the aquatic hazards of other components, then the mixture shall be classified as equivalent to the original mixture or substance.

2.9.3.4.4.2.2 If a mixture is formed by diluting another classified mixture or a substance with water or other totally non-toxic material, the toxicity of the mixture shall be calculated from the original mixture or substance.

2.9.3.4.4.3 Batching

2.9.3.4.4.3.1 The aquatic hazard classification of one production batch of a complex mixture shall be assumed to be substantially equivalent to that of another production batch of the same commercial product and produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the aquatic hazard classification of the batch has changed. If the latter occurs, new classification is necessary.

2.9.3.4.4.4 Concentration of mixtures which are classified with the most severe classification categories (chronic I and acute I)

2.9.3.4.4.4.1 If a mixture is classified as chronic I and/or acute I, and components of the mixture which are classified as chronic I and/or acute I are further concentrated, the more concentrated mixture shall be classified with the same classification category as the original mixture without additional testing.

2.9.3.4.4.5 Interpolation within one toxicity category

2.9.3.4.4.5.1 If mixtures A and B are in the same classification category and mixture C is made in which the toxicologically active components have concentrations intermediate to those in mixtures A and B, then mixture C shall be in the same category as A and B. Note that the identity of the components is the same in all three mixtures.

2.9.3.4.4.6 Substantially similar mixtures

2.9.3.4.4.6.1 Given the following:

(a) Two mixtures:

i) A + B
ii) C + B

(b) The concentration of component B is the same in both mixtures;

(c) The concentration of component A in mixture (i) equals that of component C in mixture (ii);

(d) Classification for A and C are available and are the same, i.e. they are in the same hazard category and are not expected to affect the aquatic toxicity of B,

then there shall be no need to test mixture (ii) if mixture (i) is already characterised by testing and both mixtures are classified in the same category.

2.9.3.4.5 *Classification of mixtures when data are available for all components or only for some components of the mixture*

2.9.3.4.5.1 The classification of a mixture shall be based on summation of the classification of its components. The percentage of components classified as "Acute" or "Chronic" will feed straight into the summation method. Details of the summation method are described in 2.9.3.4.6.1 to 2.9.3.4.6.4.1.

2.9.3.4.5.2 Mixtures are often made of a combination of both components that are classified (as Acute I and/or Chronic I, II) and those for which adequate test data is available. When adequate toxicity data is available for more than one component in the mixture, the combined toxicity of those components shall be calculated using the following additivity

formula, and the calculated toxicity shall be used to assign that portion of the mixture an acute toxicity category which is then subsequently used in applying the summation method.

$$\frac{\sum Ci}{L(E)C_{50m}} = \sum_{n} \frac{Ci}{L(E)C_{50i}}$$

where:

C_i = concentration of component i (weight percentage);
$L(E)C_{50i}$ = (mg/L) LC_{50} or EC_{50} for component i;
n = number of components;
$L(E)C_m$ = $L(E)C_{50}$ of the part of the mixture with test data

2.9.3.4.5.3 When applying the additivity formula for part of the mixture, it is preferable to calculate the toxicity of this part of the mixture using for each substance toxicity values that relate to the same species (i.e. fish, daphnia or algae) and then to use the highest toxicity (lowest value) obtained (i.e. use the most sensitive of the three species). However, when toxicity data for each component are not available in the same species, the toxicity value of each component shall be selected in the same manner that toxicity values are selected for the classification of substances, i.e. the higher toxicity (from the most sensitive test organism) is used. The calculated acute toxicity shall then be used to classify this part of the mixture as Acute I, if appropriate, using the same criteria described for substances in 2.9.3.3.

2.9.3.4.5.4 If a mixture is classified in more than one way, the method yielding the more conservative result shall be used.

2.9.3.4.6 *Summation method*

2.9.3.4.6.1 Classification procedure

2.9.3.4.6.1.1 In general a more severe classification for mixtures overrides a less severe classification, e.g. a classification with chronic I overrides a classification with chronic II. As a consequence the classification procedure is already completed if the results of the classification is chronic I. A more severe classification than chronic I is not possible and it is not necessary therefore to undergo the further classification procedure.

2.9.3.4.6.2 Classification for the acute category I

2.9.3.4.6.2.1 All components classified as acute I shall be considered. If the sum of these components is greater than 25% the whole mixture shall be classified as category acute I.

2.9.3.4.6.2.2 The classification of mixtures for acute hazards based on this summation of classified components, is summarised in Table 2.9.1 below.

Table 2.9.1: Classification of a mixture for acute hazards, based on summation of classified components

Sum of components classified as:	Mixture is classified as:
Acute I × M[1] >25%	Acute I

[1] *For explanation of the M factor, see 2.9.3.4.6.4.*

2.9.3.4.6.3 Classification for the chronic categories I, II

2.9.3.4.6.3.1 First, all components classified as chronic I are considered. If the sum of these components is greater than 25% the mixture shall be classified as category chronic I. If the result of the calculation is a classification of the mixture as category chronic I the classification procedure is completed.

2.9.3.4.6.3.2 In cases where the mixture is not classified as chronic I, classification of the mixture as chronic II is considered. A mixture shall be classified as chronic II if 10 times the sum of all components classified as chronic I plus the sum of all components classified as chronic II is greater than 25%. If the result of the calculation is classification of the mixture as chronic II, the classification process is completed.

2.9.3.4.6.3.3 The classification of mixtures for chronic hazards, based on this summation of classified components, is summarised in Table 2.9.2 below.

Table 2.9.2: Classification of a mixture for chronic hazards, based on summation of classified components

Sum of components classified as:		Mixture is classified as:
Chronic I × M[1]	>25%	Chronic I
(M × 10 × Chronic I)+Chronic II	>25%	Chronic II

[1] *For explanation of the M factor, see 2.9.3.4.6.4.*

2.9.3.4.6.4 Mixtures with highly toxic components

2.9.3.4.6.4.1 Acute category 1 components with toxicities well below 1 mg/l may influence the toxicity of the mixture and are given increased weight in applying the summation of classification approach. When a mixture contains components classified as acute or chronic category I, the tiered approach described in 2.9.3.4.6.2 and 2.9.3.4.6.3 shall be applied using a weighted sum by multiplying the concentrations of acute category 1 components by a factor, instead of merely adding up the percentages. This means that the concentration of "Acute I" in the left column of Table 2.9.1 and the concentration of "Chronic I" in the left column of Table 2.9.2 are multiplied by the appropriate multiplying factor. The multiplying factors to be applied to these components are defined using the toxicity value, as summarised in Table 2.9.3 below. Therefore, in order to classify a mixture containing acute I and/or chronic I components, the classifier needs to be informed of the value of the M factor in order to apply the summation method. Alternatively, the additivity formula (2.9.3.4.5.2) may be used when toxicity data are available for all highly toxic components in the mixture and there is convincing evidence that all other components, including those for which specific acute toxicity data are not available, are of low or no toxicity and do not significantly contribute to the environmental hazard of the mixture.

Table 2.9.3: Multiplying factors for highly toxic components of mixtures

$L(E)C_{50}$ value	Multiplying factor (M)
$0.1 < L(E)C_{50} \leq 1$	1
$0.01 < L(E)C_{50} \leq 0.1$	10
$0.001 < L(E)C_{50} \leq 0.01$	100
$0.0001 < L(E)C_{50} \leq 0.001$	1000
$0.00001 < L(E)C_{50} \leq 0.0001$	10000
(continue in factor 10 intervals)	

2.9.3.4.6.5 Classification of mixtures with components without any useable information

2.9.3.4.6.5.1 In the event that no useable information on acute and/or chronic aquatic toxicity is available for one or more relevant components, it is concluded that the mixture cannot be attributed (a) definitive hazard category(ies). In this situation the mixture shall be classified based on the known components only.

2.9.3.5 *Substances or mixtures dangerous to the aquatic environment not otherwise classified under these Regulations*

2.9.3.5.1 Substances or mixtures dangerous to the aquatic environment not otherwise classified under these Regulations shall be designated:

UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. or

UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

They shall be assigned to Packing Group III.".

PART 3

Chapter 3.1

3.1.2.2 (b) Replace the existing text with the following:

"UN 2793 FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS in a form liable to self-heating. The proper shipping name is the most appropriate of the following combinations:

FERROUS METAL BORINGS
FERROUS METAL SHAVINGS
FERROUS METAL TURNINGS
FERROUS METAL CUTTINGS"

3.1.2.4 Replace the existing paragraph with the following text:

"3.1.2.4 Many substances have an entry for both the liquid and solid state (see definitions for liquid and solid in 1.2.1), or for the solid and solution. These are allocated separate UN numbers which are not necessarily adjacent to each other. Details are provided in the alphabetical index, e.g.:

NITROXYLENES, LIQUID	6.1	1665
NITROXYLENES, SOLID	6.1	3447"

3.1.2.7 Replace "included" with "transported".

3.1.2.8.1 Replace "their technical" with "the technical" in the first sentence.

Chapter 3.2

3.2.1 Column 2 Add the following sentence at the end of the existing text:
"Unless otherwise indicated for an entry in the dangerous goods list, the word "solution" in a proper shipping name means one or more named dangerous goods dissolved in a liquid that is not otherwise subject to these Regulations.".

Column 10 Add the following sentence at the end of the existing text:
"Bulk container code - a code including the letters "BK" refers to types of bulk containers used for the transport of bulk goods described in Chapter 6.8."

Dangerous Goods List

Amend the heading applicable to columns 10 and 11 to read: "Portable tanks and bulk containers". Amend the heading of column 10, to read "Instructions" and the heading of column 11 to read "Special provisions".

In the Dangerous Goods List, assign "TP5" in column 11 to each refrigerated liquid gas that is assigned "T75" in column 10. (Apply to UN Nos. 1003, 1038, 1073, 1913, 1951, 1961, 1963, 1966, 1970, 1972, 1977, 2187, 2201, 2591, 3136, 3138, 3158, 3311 and 3312).

For UN Nos. 0331, 0332 and 3375, insert "T1" in column 10 and "TP1", "TP17" and "TP32" in column 11.

For UN Nos. 1334, 1350, 1438, 1454, 1474, 1486, 1495, 1498, 1499, 1942, 2067, 2213, 2950, 2969, 3170 (PG II and III), 3175, 3243 and 3244 insert "BK1, BK2" in column 10 and for UN Nos. 1376 and 1408, insert "BK2" in the same column.

For UN Nos. 1583, 2810, 2927, 2929, 3122, 3123, 3275, 3276, 3278 (liquid entry), 3279, 3280 (liquid entry), 3281(liquid entry), 3287 and 3289 insert "315" in column 6.

For all the UN Nos. containing the words "fissile-excepted" in lower case in column 2, insert "317" in column 6. (*Apply to UN Nos.: 2912, 2913, 2915, 2916, 2917, 2919, 2978, 3321, 3322, 3323 and 3332*).

UN 1010 Add the following text at the end of the existing name in column 2:
"or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 40% butadienes".

UN 1057 Replace "P003" with "P002" in column 8 and add "PP84" in column 9.

UN 1389 Add ", LIQUID" in column 2 and delete "P403" in column 8.

UN 1392 Add ", LIQUID" in column 2 and delete "P403" in column 8.

UN 1408 Insert "B6" in column 9.

UN 1420 Add ", LIQUID" in column 2 and replace "P403" with "P402" in column 8.

UN 1422 Add ", LIQUID" in column 2 and replace "P403" with "P402" in column 8.

UN 1445 Add ", SOLID" in column 2.

UN 1447 Add ", SOLID" in column 2 and delete "T4" and "TP1" in columns 10 and 11 respectively.

UN 1459	Add ", SOLID" in column 2 and delete "T4" and "TP1" in columns 10 and 11, respectively, for packing groups II and III.
UN 1470	Add ", SOLID" in column 2 and delete "T4" and "TP1" in columns 10 and 11 respectively.
UN 1578	Add ", SOLID" in column 2, replace "II" with "III" in column 5 and delete "T7" and "TP2" in columns 10 and 11 respectively.
UN 1579	Add ", SOLID" in column 2 and delete "T4" and "TP1" in columns 10 and 11 respectively.
UN 1605	Replace "P601" with "P602" in column 8.
UN 1650	Add ", SOLID" in column 2 and delete "T7" and "TP2" in columns 10 and 11 respectively.
UN 1656	Amend the name in column 2 to read as follows: "NICOTINE HYDROCHLORIDE, LIQUID or SOLUTION".
UN 1680	Add ", SOLID" in column 2 and delete "T14" and "TP2, TP13" in columns 10 and 11 respectively.
UN 1689	Add ", SOLID" in column 2 and delete "B1" in column 9, and "T14" and "TP2, TP13" in columns 10 and 11 respectively.
UN 1690	Add ", SOLID" in column 2 and delete "T4" and "TP1" in columns 10 and 11 respectively.
UN 1693	Delete the entries for the liquid and solid state, packing group I.
UN 1697	Add ", SOLID" in column 2 and delete "T7" and "TP2, TP13" in columns 10 and 11 respectively.
UN 1701	Add ", LIQUID" in column 2.
UN 1709	Add ", SOLID" in column 2 and delete "T4" and "TP1" in columns 10 and 11 respectively.
UN 1742	Add ", LIQUID" in column 2.
UN 1743	Add ", LIQUID" in column 2.
UN 1805	In column 2, replace ""PHOSPHORIC ACID, LIQUID" with "PHOSPHORIC ACID, SOLUTION" and add "223" in column 6.
UN 1811	Amend the name in column 2 to read "POTASSIUM HYDROGEN DIFLUORIDE SOLUTION" and delete "T7" and "TP2" in columns 10 and 11 respectively.
UN 1812	Add ", SOLID" in column 2 and delete "T4" and "TP1" in columns 10 and 11 respectively.
UN 1843	Add ", SOLID" in column 2 and delete "T7" and "TP2" in columns 10 and 11 respectively.
UN 2074	Add ", SOLID" in column 2 and delete "T4" and "TP1" in columns 10 and 11 respectively.
UN 2208	Insert "313" and "314" in column 6 and "PP85" and "B13" in column 9.
UN 2235	Add ", LIQUID" in column 2.
UN 2236	Add ", LIQUID" in column 2.

UN 2239 Add ", SOLID" in column 2 and delete "T4" and "TP1" in columns 10 and 11 respectively.

UN 2261 Add ", SOLID" in column 2 and delete "T7" and "TP2" in columns 10 and 11 respectively.

UN 2306 Add ", LIQUID" in column 2.

UN 2315 Add ", LIQUID" in column 2.

UN 2445 Add ", LIQUID" in column 2.

UN 2446 Add ", SOLID" in column 2.

UN 2511 Delete the entry for "CHLOROPROPIONIC ACID, SOLID"

UN 2552 Add ", LIQUID" in column 2.

UN 2662 Add ", SOLID" in column 2 and delete "T4" and "TP1" in columns 10 and 11 respectively.

UN 2813 For packing groups I, II and III, add "PP83" in column 9.

UN 2814 Add "318" in column 6.

UN 2857 Amend the name in column 2 to read as follows: "REFRIGERATING MACHINES containing non-flammable, non-toxic gases or ammonia solutions (UN 2672)".

UN 2900 Add "318" in column 6.

UN 2937 Add ", LIQUID" in column 2.

UN 2956 Delete "181" in column 6.

UN 3052 Add "TP9" in column 11.

UN 3166 Add "312" in column 6.

UN 3203 Amend the name in column 2 to read as follows: "PYROPHORIC ORGANOMETALLIC COMPOUND LIQUID, WATER-REACTIVE, N.O.S".

UN 3207 Insert ", LIQUID" after "ORGANOMETALLIC COMPOUND" in the name in column 2.

UN 3245 Delete.

UN 3276 Amend the name in column 2 to read as follows: "NITRILES, TOXIC, LIQUID, N.O.S".

UN 3278 For the liquid entry, amend the name in column 2 to read as follows: "ORGANOPHOSPHORUS COMPOUND, TOXIC, LIQUID, N.O.S".

UN 3280 Amend the name in column 2 to read as follows: "ORGANOARSENIC COMPOUND, LIQUID, N.O.S".

UN 3281 Amend the name in column 2 to read as follows: "METAL CARBONYLS, LIQUID, N.O.S".

UN 3282 Amend the name in column 2 to read as follows: "ORGANOMETALLIC COMPOUND, TOXIC, LIQUID, N.O.S".

UN 3283 Amend the name in column 2 to read as follows: "SELENIUM COMPOUNDS, SOLID, N.O.S".

UN 3315 In column 2, delete ", liquid or solid".

UN 3373 In the name in column 2, insert "or CLINICAL" before "SPECIMENS" and add "319" in column 6.

UN 3375 Delete "306" in column 6.

Amend the following entries to read as follows:

UN No.	Name and description	Class or division	Subsidiary Risks	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provisions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1597	DINITROBENZENES SOLUTION	6.1		II		100 ml	P001 IBC02		T7	TP2
		6.1		III	223	5 L	P001 IBC02		T7	TP2
1658	NICOTINE SULPHATE SOLUTION	6.1		II		100 ml	P001 IBC02		T7	TP2
		6.1		III	223	5 L	P001 IBC02		T7	TP2
1748	CALCIUM HYPOCHLORITE, DRY or CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 39% available chlorine (8.8% available oxygen)	5.1		II	313 314	1 kg	P002 IBC08	PP85 B2, B4, B13		
		5.1		III	316	5 kg	P002 IBC08	B4		
1835	TETRAMETHYL-AMMONIUM HYDROXIDE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC02		T7	TP2
1938	BROMOACETIC ACID SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC02		T7	TP2
2669	CHLOROCRESOLS SOLUTION	6.1		II		100 ml	P001 IBC02		T7	TP2
		6.1		III	223	5 L	P001 IBC02		T7	TP2
2880	CALCIUM HYPOCHLORITE, HYDRATED or CALCIUM HYPOCHLORITE HYDRATED MIXTURE, with not less than 5.5% but not more than 16% water	5.1		II	313 314	1 kg	P002 IBC08	PP85 B2, B4 B13		
		5.1		III	316	5 kg	P002 IBC08	B4		

Add the following new entries:

UN No.	Name and description	Class or division	Subsidiary Risks	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3377	SODIUM PERBORATE MONOHYDRATE	5.1		III		5 kg	P002 IBC08 LP02	B3	T1 BK1 BK2	
3378	SODIUM CARBONATE PEROXYHYDRATE	5.1		II		1 kg	P002 IBC08	B2, B4	T3 BK1 BK2	
		5.1		III		5 kg	P002 IBC08 LP02	PP84 B3, B13	T1	
3379	DESENSITIZED EXPLOSIVE, LIQUID, N.O.S.	3		I	274 311	NONE	P099			
3380	DESENSITIZED EXPLOSIVE, SOLID, N.O.S.	4.1		I	274 311	NONE	P099			
3381	TOXIC BY INHALATION LIQUID, N.O.S. with an inhalation toxicity of 200 ml/m^3 or less and saturated vapour concentration ≥ 500 LC_{50}	6.1		I	274	NONE	P601		T22	TP2, TP13
3382	TOXIC BY INHALATION LIQUID, N.O.S. with an inhalation toxicity of 1000 ml/m^3 or less and saturated vapour concentration ≥ 10 LC_{50}	6.1		I	274	NONE	P602		T20	TP2, TP13
3383	TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an inhalation toxicity of 200 ml/m^3 or less and saturated vapour concentration ≥ 500 LC_{50}	6.1	3	I	274	NONE	P601		T22	TP2, TP13
3384	TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an inhalation toxicity of 1000 ml/m^3 or less and saturated vapour concentration ≥ 10 LC_{50}	6.1	3	I	274	NONE	P602		T20	TP2, TP13

UN No.	Name and description	Class or division	Subsidiary Risks	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3385	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an inhalation toxicity of 200 ml/m^3 or less and saturated vapour concentration ≥ 500 LC_{50}	6.1	4.3	I	274	NONE	P601		T22	TP2, TP13
3386	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an inhalation toxicity of 1000 ml/m^3 or less and saturated vapour concentration ≥ 10 LC_{50}	6.1	4.3	I	274	NONE	P602		T20	TP2, TP13
3387	TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an inhalation toxicity of 200 ml/m^3 or less and saturated vapour concentration ≥ 500 LC_{50}	6.1	5.1	I	274	NONE	P601		T22	TP2, TP13
3388	TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an inhalation toxicity of 1000 ml/m^3 or less and saturated vapour concentration ≥ 10 LC_{50}	6.1	5.1	I	274	NONE	P602		T20	TP2, TP13
3389	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an inhalation toxicity of 200 ml/m^3 or less and saturated vapour concentration ≥ 500 LC_{50}	6.1	8	I	274	NONE	P601		T22	TP2, TP13
3390	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an inhalation toxicity of 1000 ml/m^3 or less and saturated vapour concentration ≥ 10 LC_{50}	6.1	8	I	274	NONE	P602		T20	TP2, TP13
3391	ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC	4.2		I	274	NONE	P404 IBC04	PP86 B14		
3392	ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC	4.2		I	274	NONE	P400	PP86	T21	TP2 TP7

UN No.	Name and description	Class or division	Subsidiary Risks	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3393	ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC, WATER REACTIVE	4.2	4.3	I	274	NONE	P404 IBC04	PP86 B14		
3394	ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER REACTIVE	4.2	4.3	I	274	NONE	P400	PP86	T21	TP2 TP7
3395	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE	4.3		I	274	NONE	P403 IBC04			
		4.3		II	274	500 g	P410 IBC04			
		4.3		III	223 274	1 kg	P410 IBC06			
3396	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER REACTIVE	4.3		I	274	NONE	P402		T13	TP2 TP7
		4.3		II	274	500 g	P001 IBC01		T7	TP2 TP7
		4.3		III	223 274	1 kg	P001 IBC02		T7	TP2 TP7
3397	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE, FLAMMABLE	4.3	4.1	I	274	NONE	P403 IBC04			
		4.3	4.1	II	274	500 g	P410 IBC04			
		4.3	4.1	III	223 274	1 kg	P410 IBC06			
3398	ORGANOMETALLIC SUBSTANCE, SOLID, WATER REACTIVE, SELF-HEATING	4.3	4.2	I	274	NONE	P403 IBC04			
		4.3	4.2	II	274	500 g	P410 IBC04			
		4.3	4.2	III	223 274	1 kg	P410 IBC06			
3399	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER REACTIVE, FLAMMABLE	4.3	3	I	274	NONE	P402		T13	TP2 TP7
		4.3	3	II	274	500 g	P001 IBC01		T7	TP2 TP7
		4.3	3	III	223 274	1 kg	P001 IBC02		T7	TP2 TP7
3400	ORGANOMETALLIC SUBSTANCE, SOLID, SELF-HEATING	4.2		II	274	500 g	P410 IBC06			
		4.2		III	223 274	1 kg	P002 IBC08			
3401	ALKALI METAL AMALGAM, SOLID	4.3		I	182	NONE	P403			
3402	ALKALINE EARTH METAL AMALGAM, SOLID	4.3		I	183	NONE	P403			
3403	POTASSIUM METAL ALLOYS, SOLID	4.3		I		NONE	P403			

UN No.	Name and description	Class or division	Subsidiary Risks	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3404	POTASSIUM SODIUM ALLOYS, SOLID	4.3		I		NONE	P403			
3405	BARIUM CHLORATE SOLUTION	5.1	6.1	II		500 ml	P504 IBC02		T4	TP1
		5.1	6.1	III	223	1 L	P001 IBC02		T4	TP1
3406	BARIUM PERCHLORATE SOLUTION	5.1	6.1	II		500 ml	P504 IBC02		T4	TP1
		5.1	6.1	III	223	1 L	P001 IBC02		T4	TP1
3407	CHLORATE AND MAGNESIUM CHLORIDE MIXTURE SOLUTION	5.1		II		500 ml	P504 IBC01		T4	TP1
		5.1		III	223	1 L	P504 IBC01		T4	TP1
3408	LEAD PERCHLORATE SOLUTION	5.1	6.1	II		500 ml	P504 IBC02		T4	TP1
		5.1	6.1	III	223	1 L	P001 IBC02		T4	TP1
3409	CHLORONITRO-BENZENES, LIQUID	6.1		II	279	100 ml	P001 IBC02		T7	TP2
3410	4-CHLORO-ortho-TOLUIDINE HYDROCHLORIDE SOLUTION	6.1		III	223	5 L	P001 IBC03		T4	TP1
3411	Beta-NAPHTHYLAMINE SOLUTION	6.1		II		100 ml	P001 IBC02		T7	TP2
		6.1		III	223	5 L	P001 IBC02		T7	TP2
3412	NICOTINE HYDROCHLORIDE SOLUTION	6.1		III	43 223	5 L	P001 IBC02			
3413	POTASSIUM CYANIDE SOLUTION	6.1		I		NONE	P001		T14	TP2 TP13
		6.1		II		100 ml	P001 IBC02		T11	TP2, TP13, TP27
		6.1		III	223	5 L	P001 IBC03 LP01		T7	TP2, TP13, TP28
3414	SODIUM CYANIDE SOLUTION	6.1		I		NONE	P001		T14	TP2 TP13
		6.1		II		100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	223	5 L	P001 IBC03 LP01		T7	TP2 TP13 TP28
3415	SODIUM FLUORIDE SOLUTION	6.1		III	223	5 L	P001 IBC03 LP01		T4	TP1

UN No.	Name and description	Class or division	Subsidiary Risks	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3416	CHLOROACETOPHENONE, LIQUID	6.1		II		NONE	P001 IBC02		T7	TP2 TP13
3417	XYLYL BROMIDE, SOLID	6.1		II		NONE	P002 IBC08	B2, B4		
3418	2,4-TOLUYLENEDIAMINE SOLUTION	6.1		III		500 ml	P001 IBC03 LP01		T4	TP1
3419	BORON TRIFLUORIDE ACETIC ACID COMPLEX, SOLID	8		II		1 kg	P002 IBC08	B2, B4		
3420	BORON TRIFLUORIDE PROPIONIC ACID COMPLEX, SOLID	8		II		1 kg	P002 IBC08	B2, B4		
3421	POTASSIUM HYDROGEN DIFLUORIDE SOLUTION	8	6.1	II		1 l	P001 IBC02		T7	TP2
		8	6.1	III	223	5 L	P001 IBC03		T4	TP1
3422	POTASSIUM FLUORIDE SOLUTION	6.1		III		5 l	P001 IBC03 LP01		T4	TP1
3423	TETRAMETHYLAMMONIUM HYDROXIDE, SOLID	8		II		1 kg	P002 IBC08	B2, B4		
3424	AMMONIUM DINITRO-o-CRESOLATE, SOLUTION	6.1		II		100 ml	P001 IBC02		T7	TP2
		6.1		III	223	5 L	P001 IBC02		T7	TP2
3425	BROMOACETIC ACID, SOLID	8		II		1 kg	P002 IBC08	B2, B4		
3426	ACRYLAMIDE SOLUTION	6.1		III	223	5 l	P001 IBC03 LP01		T4	TP1
3427	CHLOROBENZYL CHLORIDES, SOLID	6.1		III		5 kg	P002 IBC08 LP02	B3		
3428	3-CHLORO-4-METHYLPHENYL ISOCYANATE, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
3429	CHLOROTOLUIDINES, LIQUID	6.1		III		5 l	P001 IBC03 LP01		T4	TP1
3430	XYLENOLS, LIQUID	6.1		II		100 ml	P001 IBC02		T7	TP2
3431	NITROBENZOTRIFLUORIDES, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
3432	POLYCHLORINATED BIPHENYLS, SOLID	9		II	305	1 kg	P906 IBC08			
3433	LITHIUM ALKYLS, SOLID	4.2	4.3	I		NONE	P400			

UN No.	Name and description	Class or division	Subsidiary Risks	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3434	NITROCRESOLS, LIQUID	6.1		III		5 l	P001 IBC03 LP01		T4	TP1
3435	HYDROQUINONE SOLUTION	6.1		III	223	5 l	P001 IBC03 LP01		T4	TP1
3436	HEXAFLUORO-ACETONE HYDRATE, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
3437	CHLOROCRESOLS, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
3438	alpha-METHYLBENZYL ALCOHOL, SOLID	6.1		III		5 kg	P002 IBC08 LP02	B3		
3439	NITRILES, TOXIC, SOLID, N.O.S.	6.1		I	274	NONE	P002 IBC07	B1		
		6.1		II	274	500 g	P002 IBC08	B2, B4		
		6.1		III	223 274	5 kg	P002 IBC08 LP02	B3		
3440	SELENIUM COMPOUNDS , LIQUID, N.O.S.	6.1		I		NONE	P001		T14	TP2 TP9 TP27
		6.1		II		500 ml	P001 IBC02		T11	TP2 TP27
		6.1		III	223	5 l	P001 IBC03		T7	TP1 TP28

Assign a new UN No. to the entries listed hereafter as indicated. (***Note**: The new UN No. is shown in bold characters, the former one, in italics).*

UN No.	Name and description	Class or division	Subsidiary Risks	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3441 *1577*	CHLORODINITRO-BENZENES, SOLID	6.1		II	279	500 g	P002 IBC08	B2, B4		
3442 *1590*	DICHLOROANILINES, SOLID	6.1		II	279	500 g	P002 IBC08	B2, B4		
3443 *1597*	DINITROBENZENES, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
3444 *1656*	NICOTINE HYDROCHLORIDE, SOLID	6.1		II	43	500 g	P002 IBC08	B2, B4		
3445 *1658*	NICOTINE SULPHATE, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		

UN No.	Name and description	Class or division	Subsidiary Risks	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3446 *1664*	NITROTOLUENES, SOLID	6.1		II		500g	P002 IBC08	B2, B4		
3447 *1665*	NITROXYLENES, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
3448 *1693*	TEAR GAS SUBSTANCE, SOLID, N.O.S.	6.1		II	274	NONE	P002 IBC08	B2, B4		
3449 *1694*	BROMOBENZYL CYANIDES, SOLID	6.1		I	138	NONE	P002			
3450 *1699*	DIPHENYL-CHLOROARSINE, SOLID	6.1		I		NONE	P002 IBC07	B1		
3451 *1708*	TOLUIDINES, SOLID	6.1		II	279	500 g	P002 IBC08	B2, B4	[T7]	[TP2]
3452 *1711*	XYLIDINES, SOLID	6.1		II		500g	P002 IBC08	B2, B4	[T7]	[TP2]
3453 *1805*	PHOSPHORIC ACID, SOLID	8		III		5 kg	P002 IBC08 LP02	B3		
3454 *2038*	DINITROTOLUENES, SOLID	6.1		II		500 g	P002 IBC08	B2, B4	[T7]	[TP2]
3455 *2076*	CRESOLS, SOLID	6.1	8	II		500 g	P002 IBC08	B2, B4	[T7]	[TP2]
3456 *2308*	NITROSYL-SULPHURIC ACID, SOLID	8		II		1 kg	P002 IBC08	B2, B4	[T8]	[TP2, TP12]
3457 *2433*	CHLORONITRO-TOLUENES, SOLID	6.1		III		5 kg	P002 IBC08 LP02	B3		
3458 *2730*	NITROANISOLES, SOLID	6.1		III	279	5 kg	P002 IBC08 LP02	B3	[T4]	[TP1]
3459 *2732*	NITROBROMO-BENZENES, SOLID	6.1		III		5 kg	P002 IBC08 LP02	B3	[T4]	[TP1]
3460 *2753*	N-ETHYLBENZYL-TOLUIDINES, SOLID	6.1		III		5 kg	P002 IBC08 LP02	B3	[T7]	[TP1]
3461 *3052*	ALUMINIUM ALKYL HALIDES, SOLID	4.2	4.3	I		NONE	P404			
3462 *3172*	TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	6.1		I	210 274	NONE	P002 IBC07	B1		
		6.1		II	210 274	500 g	P002 IBC08	B2, B4		
		6.1		III	210 223 274	5 kg	P002 IBC08	B3		
3463 *3203*	PYROPHORIC ORGANOMETALLIC COMPOUND, SOLID, WATER-REACTIVE, N.O.S.	4.2	4.3	I	274	NONE	P404		T21	TP2 TP7 TP9

UN No.	Name and description	Class or division	Subsidiary Risks	UN packing group	Special provisions	Limited quantities	Packagings and IBCs		Portable tanks and bulk containers	
							Packing instruction	Special provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3464 *3278*	ORGANOPHOSPHOROUS COMPOUND, TOXIC, SOLID, N.O.S.	6.1		I	43 274	NONE	P002 IBC07	B1	T14	TP2 TP9 TP27
		6.1		II	43 274	500 g	P002 IBC08	B2, B4	T11	TP2 TP27
		6.1		III	43 223 274	5 kg	P002 IBC08 LP02	B3	T7	TP1 TP28
3465 *3280*	ORGANOARSENIC COMPOUND, SOLID, N.O.S.	6.1		I	274	NONE	P002 IBC07	B1	[T14]	[TP2 TP9 TP27]
		6.1		II	274	500 g	P002 IBC08	B2, B4	[T11]	[TP2 TP27]
		6.1		III	223 274	5 kg	P002 IBC08 LP02	B3	[T7]	[TP1 TP28]
3466 *3281*	METAL CARBONYLS, SOLID, N.O.S.	6.1		I	274	NONE	P002 IBC07	B1	[T14]	[TP2 TP9 TP27]
		6.1		II	274	500 g	P002 IBC08	B2, B4	[T11]	[TP2 TP27]
		6.1		III	223 274	5 kg	P002 IBC08 LP02	B3	[T7]	[TP1 TP28]
3467 *3282*	ORGANOMETALIC COMPOUND, TOXIC, SOLID, N.O.S.	6.1		I	274	NONE	P002 IBC07	B1	[T14]	[TP2 TP9 TP27]
		6.1		II	274	500 g	P002 IBC08	B2, B4	[T11]	[TP2 TP27]
		6.1		III	223 274	5 kg	P002 IBC08 LP02	B3	[T7]	[TP1 TP28]

Chapter 3.3

SP63 Replace (a) and (b) with the following:

"(a) Division 2.1 applies if the contents include 85% by mass or more flammable components and the chemical heat of combustion is 30 kJ/g or more;

(b) Division 2.2 applies if the contents contain 1% by mass or less flammable components and the heat of combustion is less than 20 kJ/g."

Insert a new (c) as follows:

"(c) Otherwise the product shall be classified as tested by the tests described in the *Manual of Tests and Criteria*, Part III, section 31. Extremely flammable and flammable aerosols shall be classified in Division 2.1; non-flammable in Division 2.2;".

The existing subparagraphs (c), (d), (e) and (f) become (d), (e), (f) and (g) respectively.

Add at the end a new paragraph to read as follows:

"Flammable components are flammable liquids, flammable solids or flammable gases and gas mixtures as defined in Notes 1 to 3 of sub-section 31.1.3 of Part III of the *Manual of Tests and Criteria*. This designation does not cover pyrophoric, self-heating or water-reactive substances. The chemical heat of combustion shall be determined by one of the following methods ASTM D 240, ISO/FDIS 13943: 1999 (E/F) 86.1 to 86.3 or NFPA 30B."

SP 133 Amend the existing special provision to read:

"If over-confined in packagings, this substance may exhibit explosive behaviour. Packagings authorized under packing instruction P409 are intended to prevent over-confinement. When a packaging other than those prescribed under packing instruction P409 is authorized by the competent authority of the country of origin in accordance with 4.1.3.7, the package shall bear an "EXPLOSIVE" subsidiary risk label unless the competent authority of the country of origin has permitted this label to be dispensed with for the specific packaging employed because test data have proved that the substance in this packaging does not exhibit explosive behaviour (see 5.4.1.5.5.1). The provisions of 7.1.3.1 shall also be then considered.".

SP 179 Amend special provision 179 to read:

"This designation shall be used for substances and mixtures which are dangerous to the aquatic environment or which are marine pollutants that do not meet the classification criteria of any other class or another substance within Class 9. This designation may also be used for wastes not otherwise subject to these Regulations but which are covered under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal and for substances designated to be environmentally hazardous substances by the competent authority of the country of origin, transit or destination which do not meet the criteria for an environmentally hazardous substance according to these Regulations or for any other hazard Class.".

SP 215 Add the following text at the end:

"Homogeneous mixtures containing not more than 35 % by mass of azocarbonamide and at least 65 % of inert substance are not subject to these Regulations unless criteria of other classes or divisions are met.".

SP219 Amend to read as follows:

"Genetically modified micro-organisms and genetically modified organisms which meet the definition of an infectious substance and the criteria for inclusion in Division 6.2 in accordance with Chapter 2.6 shall be transported as UN 2814, UN 2900 or UN 3373, as appropriate.".

SP240 Add the following at the end of the existing special provision 240:

"Hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries or lithium batteries, transported with the battery(ies) installed shall be consigned under the entries UN 3166 "Vehicle, flammable gas powered" or UN 3166 "Vehicle, flammable liquid powered, as appropriate."

SP 247 Delete: "deviating for the requirements of Chapter 6.1," in the first paragraph.

SP296 Replace the existing text with the following:

"These entries apply for life-saving appliances such as life rafts, personal flotation devices and self-inflating slides. UN 2990 applies for self-inflating appliances and UN 3072 applies for life-saving appliances that are not self-inflating. Life-saving appliances may contain:

(a) Signal devices (Class 1) which may include smoke and illumination signal flares packed in packagings that prevent them from be inadvertently activated;

(b) For UN 2990 only, cartridges, power device of Division 1.4, compatibility group S, may be contained for purposes of the self-inflating mechanism and provided that the quantity of explosives per appliance does not exceed 3.2 g;

(c) Division 2.2 compressed gases;

(d) Electric storage batteries (Class 8) and lithium batteries (Class 9);

(e) First aid kits or repair kits containing small quantities of dangerous goods (e.g.: Class 3, Division 4.1, Division 5.2, Class 8 or Class 9 substances); or

(f) "Strike anywhere" matches packed in packagings that prevent them from being inadvertently activated.".

SP 309 Amend last sentence to read as follows:

"Substances shall satisfactorily pass Test Series 8 of the *Manual of Tests and Criteria*, Part I, Section 18."

Add the following new special provisions:

"**311** Substances shall not be transported under this entry unless approved by the competent authority on the basis of the results of appropriate tests according to Part I of the *Manual of Tests and Criteria*. Packaging shall ensure that the percentage of diluent does not fall below that stated in the competent authority approval at any time during transport.

312 Vehicles that contain an internal combustion engine shall be consigned under the entries "Vehicle, flammable gas powered" or "Vehicle, flammable liquid powered", as appropriate. These entries include hybrid electric vehicles powered by both an internal

combustion engine and wet batteries, sodium batteries or lithium batteries, transported with the battery(ies) installed.

313 Substances and mixtures meeting the criteria for Class 8 shall be labelled with a "CORROSIVE" subsidiary risk label.

314 a) These substances are liable to exothermic decomposition at elevated temperatures. Decomposition can be initiated by heat or by impurities (e.g. powdered metals (iron, manganese, cobalt, magnesium) and their compounds).

b) During the course of transport, these substances shall be shaded from direct sunlight and all sources of heat and be placed in adequately ventilated areas.

315 This entry shall not be used for Division 6.1 substances that meet the inhalation toxicity criteria for packing group I described in 2.6.2.2.4.3.

316 This entry applies only to calcium hypochlorite, dry or hydrated, when transported in non friable tablet form.

317 "Fissile-excepted" applies only to those packages complying with 6.4.11.2.

318 When there is an outbreak of a disease or a disease investigation is being conducted and the pathogen causing the disease is unknown, the technical name required by special provision 274 need not be shown on the transport document, on the outer packaging or on the document inside the outer packaging if the substance is assigned to UN 2814 or UN 2900 as appropriate and the words "Outbreak/Disease Investigation" are shown, in parentheses, following the proper shipping name on the transport document, on the outer packaging and on the document inside the outer packaging.

319 This entry applies to human or animal material including, but not limited to, excreta, secreta, blood and its components, tissue and tissue fluids, and body parts being transported for purposes such as research, diagnosis, investigational activities, disease treatment or prevention. Infectious substances packed and marked in accordance with part 1 of packing instruction P650 are not subject to any other requirements in these Regulations.".

PART 4

Chapter 4.1

4.1.1.8 Amend to read as follows:

"4.1.1.8 Liquids may only be filled into inner packagings which have an appropriate resistance to internal pressure that may be developed under normal conditions of transport. Where pressure may develop in a package by the emission of gas from the contents (as a result of temperature increase or other causes), the packaging, including IBC, may be fitted with a vent. A venting device shall be fitted if dangerous overpressure may develop due to normal decomposition of substances. However, the gas emitted shall not cause danger on account of its toxicity, its flammability, the quantity released, etc**.** The vent shall be so designed that, when the packaging, including IBC, is in the attitude in which it is intended to be transported, leakages of liquid and the penetration of foreign matter are prevented under normal conditions of transport. Venting of the package is not permitted for air transport."

4.1.1.9 Insert the words "or routinely maintained" after "repaired", in the first and last sentences.

4.1.1.15 Add a new paragraph 4.1.1.15 as follows:

"4.1.1.15 For plastics drums and jerricans, rigid plastics IBCs and composite IBCs with plastics inner receptacles, unless otherwise approved by the competent authority, the period of use permitted for the transport of dangerous substances shall be five years from the date of manufacture of the receptacles, except where a shorter period of use is prescribed because of the nature of the substance to be transported".

Renumber subsequent paragraphs and sub-paragraphs accordingly.

4.1.2.3 Delete this paragraph and renumber the remaining paragraphs accordingly.

4.1.2.4 (Former 4.1.2.5) Replace "rigid plastics and composite IBCs" with " rigid plastics, composite and flexible IBCs" in the first sentence.

4.1.3.4 Add a new line for large packagings, immediately before the line for IBCs, as follows:
"Large packagings
Flexible plastics: 51H (outer packaging)"

4.1.3.5 In the first sentence, delete "outer" (twice) and "in a combination packaging" and add ";1A2" after "4G" and ";1A2V, 1A2U or 1A2W" after "4GW" in the examples between brackets.

4.1.3.6 Replace "Cylinders, bundles of cylinders, pressure drums and tubes" with "All cylinders, tubes, pressure drums and bundles of cylinders".

4.1.4.1 **P001** Delete "(2C1 and 2C2)" for special packing provision PP2.

P002 Extend the application of note "5" to steel, aluminium and solid plastics boxes.

Under "Special packing provisions":

In special packing provision **PP9,** add a new sentence at the end to read as follows:
"For UN 3175 the leakproofness test is not required when the liquids are fully absorbed in solid material contained in sealed bags.".

Add the following two new special provisions:

"**PP84** For UN 1057, rigid outer packagings meeting the packing group II performance level shall be used. The packagings shall be designed and constructed and arranged to prevent movement, inadvertent ignition of the devices or inadvertent release of flammable gas or liquid.

PP85 For UN Nos. 1748, 2208 and 2880 if bags are used as single packagings they should be adequately separated to allow for the dissipation of heat.".

P200 In table 2, for UN 1010 (third entry):

Under "Name and description", replace "BUTADIENE, STABILIZED (mixtures of 1,3-butadiene and hydrocarbons)" with "BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 40% butadienes".

Under "Test pressure, bar" and "Filling ratio", delete "10" and "0.50" respectively;

Under "Special packing provisions", add "v,".

P400 In paragraph (1), at the end of the second sentence, replace "in strong wood, fibreboard or plastics boxes" with "in strong rigid outer packagings", and in the third sentence, replace "box" with "outer packaging".

At the end of the table, add a new row with the heading "Special packing provisions" and a new special packing provision PP86, as follows:

"**Special packing provisions**
PP86: For UN Nos. 3392 and 3394, air shall be eliminated from the vapour space by nitrogen or other means.".

P403 Under "Inner packagings", replace "and have threaded closures" with " (e.g. by taping or by threaded closures).".

At the end of the table, add a new row with the heading "Special packing provisions" and a new special packing provision PP83, as follows:

"Special packing provisions

PP83 For UN No. 2813, waterproof bags containing not more than 20 g of substance for the purposes of heat formation may be packaged for transport. Each waterproof bag shall be sealed in a plastics bag and placed within an intermediate packaging. No outer packaging shall contain more than 400 g of substance. Water or liquid that may react with the water reactive substance shall not be included in the packaging.".

P404 In the list of pyrophoric solids, add UN Nos. 3391 to 3400.

At the end of the table, add a new row with the heading "Special packing provisions" and a new special packing provision PP86, as follows:

"Special packing provisions

PP86 For UN Nos. 3391 and 3393, air shall be eliminated from the vapour space by nitrogen or other means."

P407 In the text before "Additional requirement", amend the beginning of the second sentence to read "The maximum gross mass of the package shall not exceed…".

P410 Under "Single packagings", apply note "3" to steel, aluminium and solid plastics boxes.

Under "Special packing provisions", add PP83 (same wording as in P403).

P520 In column OP8, replace "200^{2}" with "400^{2}" and amend note 2 to read:

"[2] 60 kg for jerricans/200 kg for boxes and, for solids, 400 kg in combination packagings with outer packagings comprising boxes (4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2) and with inner packagings of plastics or fibre with a maximum net mass of 25 kg.".

P601 In (3), replace "Combination packagings" with "Packagings consisting of:" and amend the first paragraph to read as follows:

"Outer packagings: Steel or plastic drums, removable head (1A2 or 1H2), tested in accordance with the test requirements in 6.1.5 at a mass corresponding to the mass of the assembled package either as a packaging intended to contain inner packagings, or as a single packaging intended to contain solids or liquids, and marked accordingly.".

At the end of the table, add a new row with the heading "Special packing provisions" and a new special packing provision PP82, as follows:

"**Special packing provision**

PP82 For UN No.1744, glass inner packagings with a capacity of not more than 1.3 litres may be used in a permitted outer packaging with a maximum gross mass of 25 kg.".

P620 In (a)(iii), Insert "either" before "individually" and "or separated" after "wrapped" at the end. In (b), replace "An outer packaging" with "A rigid packaging" in the first sentence and replace "at least" with "not less than" in the second sentence.

Under 2, replace existing "(a), (b), (i), (ii), (iii)" with the following:

"(a) Substances consigned at ambient temperatures or at a higher temperature. Primary receptacles shall be of glass, metal or plastics. Positive means of ensuring a leakproof seal shall be provided, e.g. a heat seal, a skirted stopper or a metal crimp seal. If screw caps are used, they shall be secured by positive means, e.g., tape, paraffin sealing tape or manufactured locking closure;

(b) Substances consigned refrigerated or frozen. Ice, dry ice or other refrigerant shall be placed around the secondary packaging(s) or alternatively in an overpack with one or more complete packages marked in accordance with 6.3.1.1. Interior supports shall be provided to secure secondary packaging(s) or packages in position after the ice or dry ice has dissipated. If ice is used, the outer packaging or overpack shall be leakproof. If dry ice is used, the outer packaging or overpack shall permit the release of carbon dioxide gas. The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used;

(c) Substances consigned in liquid nitrogen. Plastics primary receptacles capable of withstanding very low temperature shall be used. The secondary packaging shall also be capable of withstanding very low temperatures, and in most cases will need to be fitted over the primary receptacle individually. Provisions for the consignment of liquid nitrogen shall also be fulfilled. The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the liquid nitrogen.

(d) Lyophilized substances may also be transported in primary receptacles that are flame-sealed glass ampoules or rubber-stoppered glass vials fitted with metal seals;".

P650 Replace the existing P650 with the following :

P650	**PACKING INSTRUCTION**	**P650**

This packing instruction applies to UN 3373

Part 1: Provisions for primary receptacles that do not exceed 500 ml or 500 g

(1) The packaging shall be of good quality, strong enough to withstand the shocks and loadings normally encountered during transport, including transhipment between transport units and between transport units and warehouses as well as any removal from a pallet or overpack for subsequent manual or mechanical handling. Packagings shall be constructed and closed to prevent any loss of contents that might be caused under normal conditions of transport by vibration or by changes in temperature, humidity or pressure.

(2) The packaging shall consist of three components:

(a) a primary receptacle,

(b) a secondary packaging, and

(c) an outer packaging.

(3) Primary receptacles shall be packed in secondary packagings in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packagings shall be secured in outer packagings with suitable cushioning material. Any leakage of the contents shall not compromise the integrity of the cushioning material or of the outer packaging.

(4) For transport, the mark illustrated below shall be displayed on the external surface of the outer packaging on a background of a contrasting colour and shall be clearly visible and legible. The width of the line shall be at least 2 mm; the letters and numbers shall be at least 6 mm high.

The completed package shall be capable of successfully passing the drop test in 6.3.2.5 as specified in 6.3.2.3 and 6.3.2.4 except that the height of the drop shall not be less than 1.2 m.

P650	PACKING INSTRUCTION *(cont'd)*	P650

Liquid substances

(1) The primary receptacle(s) shall be leakproof and shall not contain more than 500 ml of the liquid substance.

(2) The secondary packaging shall be leakproof.

(3) If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them.

(4) Absorbent material shall be placed between the primary receptacle(s) and the secondary packaging. The absorbent material shall be in quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging.

(5) The primary receptacle or the secondary packaging shall be capable of withstanding, without leakage, an internal pressure of 95 kPa (0.95 bar).

(6) The outer packaging shall not contain more than 4 litres of the liquid substance.

Solid substances

(1) The primary receptacle(s) shall be siftproof and shall not contain more than 500 g of the solid substance.

(2) The secondary packaging shall be siftproof.

(3) If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them.

(4) The outer packaging shall not contain more than 4 kg of the solid substance.

Dry ice and liquid nitrogen

(a) When UN 1845, Carbon Dioxide, Solid, (dry ice) is used as a refrigerant, the packaging shall be designed and constructed to permit the release of the gaseous carbon dioxide to prevent the build up of pressure that could rupture the packaging.

(b) Substances consigned in liquid nitrogen or dry ice shall be packed in primary receptacles that are capable of withstanding very low temperatures. The secondary packaging shall also be capable of withstanding very low temperatures and, in most cases, will need to be fitted over the primary receptacle individually.

Infectious substances in Category B which are packed and marked in accordance with Part 1 of this packing instruction are not subject to any other requirement in these Regulations.

P650 **PACKING INSTRUCTION *(cont'd)*** **P650**

Part 2: Provisions for primary receptacles that exceed 500 ml or 500 g (liquid and solid) or outer packagings that exceed 4 l or 4 kg.

(1) When the primary receptacle(s) contain substances in excess of 500 ml or 500 g, the following packagings shall be used and shall meet the general provisions of 4.1.1 and 4.1.3 and the requirements of Chapter 6.1 at the packing group II performance level.

(2) The packaging shall consist of three components:

(a) a primary receptacle,

(b) a secondary packaging, and

(c) a rigid outer packaging.

(3) For liquids

(a) the primary receptacle and the secondary packaging shall be watertight,

(b) an absorbent material shall be placed between the primary receptacle(s) and the secondary packaging in a quantity sufficient to absorb the entire liquid content of the primary receptacle(s);

(c) if multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them;

(d) The primary receptacle or the secondary packaging shall be capable of withstanding, without leakage, an internal pressure producing a pressure differential of not less than 95 kPa (0.95 bar).

(4) For solids, the primary receptacle and the secondary packaging shall be siftproof.

(5) Outer packagings constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use shall be used. The smallest external dimension shall be not less than 100 mm.

Infectious substances in Category B which are packed in accordance with Part 2 of this packing instruction are subject to all the other requirements in these Regulations. The UN number and proper shipping name are UN 3373, DIAGNOSTIC SPECIMENS or CLINICAL SPECIMENS. The label for Division 6.2 is required.

P903 Add the following paragraph after the sentence "Packaging conforming to the packing group II performance level.":

"In addition, batteries employing a strong, impact resistant outer casing of a gross mass of 12 kg or more, and assemblies of such batteries, may be packed in strong outer packagings, in protective enclosures (e.g., in fully enclosed or wooden slatted crates) unpackaged or on pallets. Batteries shall be secured to prevent inadvertent movement, and the terminals shall not support the weight of other superimposed elements.".

P904 Amend to read as follows:

P904	**PACKING INSTRUCTION**	**P904**

This packing instruction applies to UN3245.

The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:

(1) Packagings according to P001 or P002 conforming to the packing group III performance level.

(2) Outer packagings, which need not conform to the packaging test requirements of Part 6, but conforming to the following:

(a) an inner packaging comprising:

(i) a watertight primary receptacle(s);

(ii) a watertight secondary packaging which is leakproof;

(iii) absorbent material placed between the primary receptacle(s) and the secondary packaging. The absorbent material shall be in a quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;

(iv) if multiple fragile primary receptacles are placed in a single secondary packaging they shall be individually wrapped or separated to prevent contact between them.

(b) an outer packaging shall be strong enough for its capacity, mass and intended use and the smallest external dimension shall be at least 100 mm.

Additional requirement

Dry Ice and Liquid Nitrogen

When UN1845, Carbon Dioxide, Solid, (dry ice) is used as a refrigerant, the packaging shall be designed and constructed to permit the release of the gaseous carbon dioxide to prevent the build up of pressure that could rupture the packaging.

Substances consigned in liquid nitrogen or dry ice shall be packed in primary receptacles that are capable of withstanding very low temperatures. The secondary packaging shall also be capable of withstanding very low temperatures and, in most cases, will need to be fitted over the primary receptacle individually.

P906(1) and (2) After "PCBs", insert "or polyhalogenated biphenyls or terphenyls" in (1) and ", polyhalogenated biphenyls or terphenyls" in (2).

4.1.4.2 **IBC04** Insert a new special packing provision B14 to read as follows.
"**B14**For UN Nos. 3391 and 3393, air shall be eliminated from the vapour space by nitrogen or other means."

IBC08 In special provision B6, insert "1408," after "1386,".

Add a new special packing provision B13, to read as follows:
"**B13** For UN Nos. 1748, 2208 and 2880, transport by sea in IBCs is prohibited.".

IBC520 Insert the following new entries:

UN No.	Organic peroxide	Type of IBC	Maximum quantity (litres)	Control temperature	Emergency temperature
3119	Dicyclohexylperoxydicarbonate, not more than 42% as a stable dispersion, in water	31A	1250	+ 10 °C	+ 15 °C
3110	**ORGANIC PEROXIDE, TYPE F, SOLID** Dicumyl peroxide	31A 31H 31HA1	2000		
3120	**ORGANIC PEROXIDE, TYPE F, SOLID, TEMPERATURE CONTROLLED**				

4.1.4.3 **LP02** Insert "Flexible plastics (51H)[3]" in the column for "Large outer packagings", and a note 3 under the table, as follows: "[3] To be used with flexible inner packagings only.".

4.1.7.2.1 Amend to read: "The currently assigned organic peroxides specifically listed in packing instruction IBC520 may be transported in IBCs in accordance with this packing instruction.".

4.1.9.1.4 Replace "and intermediate bulk containers" with "intermediate bulk containers and conveyances".

4.1.9.2.1 Replace "Industrial package Type 1 (Type IP-1), Industrial package Type 2 (Type IP-2), Industrial package Type 3 (Type IP-31)" with " Type IP-1 package, Type IP-2 package, Type IP-3 package,".

Chapter 4.2

4.2.1 Insert "Class 1 and" before "Classes 3 to 9".

4.2.1.1 Amend the end of the first sentence to read: "… transport of substances of Classes 1, 3, 4, 5, 6, 7, 8 and 9.".

4.2.5.2.1 Replace "2" with "1" at the end of the first sentence.

4.2.5.2.2 Insert "Class 1 and" before "Classes 3 to 9" at the beginning of the first sentence.

4.2.5.2.5 For portable tank instructions T2 and T4, delete "T6" under "Portable tank instructions also permitted".

4.2.5.2.6 Insert the following paragraph after the title:

"Portable tank instructions specify the requirements applicable to a portable tank when used for the transport of specific substances. Portable tank instructions T1 to T22 specify the applicable minimum test pressure, the minimum shell thickness (in mm reference steel), and the pressure-relief and bottom-opening requirements.".

In the table for portable tank instruction "T1-T22" add a reference "[a]" to a footnote at the end of the heading "Pressure-relief requirements". The footnote will read as follows:

"[a] *When the word "Normal" is indicated, all the requirements of 6.7.2.8 apply except for 6.7.2.8.3.".*

T23 For UN 3109, in the entry for Pinanyl hydroperoxyde, replace "50%" with "56%".

T50 In the table for portable tank instruction "T50":

- In the heading "Max. allowable working pressure (bar) Small, Bare; Sunshield; Insulated", add at the end "respectively[a]" and a footnote to read as follows:

  "[a] *"Small" means tanks having a shell with a diameter of 1.5 metres or less; "Bare" means tanks having a shell with a diameter of more than 1.5 metres without insulation or sun shield (see 6.7.3.2.12); "Sunshield" means tanks having a shell with a diameter of more than 1.5 metres with sun shield (see 6.7.3.2.12); "Insulated" means tanks having a shell with a diameter of more than 1.5 metres with insulation (see 6.7.3.2.12); (See definition of "Design reference temperature" in 6.7.3.1)."*

- Add a reference "[b]" to a footnote at the end of the heading "Pressure-relief requirements", and a footnote to read as follows:

  "[b] *The word "Normal" in the pressure relief requirements column indicates that a frangible disc as specified in 6.7.3.7.3 is not required.".*

- Add a new row as follows:

UN No.	Non-refrigerated liquefied gases	Max. allowable working pressure (bar) Small; Bare; Sunshield; Insulated	Openings below liquid level	Pressure-relief requirements (see 6.7.3.7)	Maximum filling ratio
1010	Butadienes and hydrocarbon mixture, stabilized	See MAWP definition in 6.7.3.1	Allowed	Normal	See 4.2.2.7

4.2.5.3 Amend TP5 to read as follows: "The degree of filling prescribed in 4.2.3.6 shall be met.".

Add a new portable tank instruction TP32 to read as follows:

"**TP32** For UN Nos. 0331, 0332 and 3375, portable tanks may be used subject to the following conditions:

(a) To avoid unnecessary confinement, each portable tank constructed of metal shall be fitted with a pressure-relief device that may be of the reclosing spring loaded type, a frangible disc or a fusible element. The set to discharge or burst pressure, as applicable, shall not be greater than 2.65 bar for portable tanks with minimum test pressures greater than 4 bar;

(b) The suitability for transport in tanks shall be demonstrated. One method to evaluate this suitability is test 8 (d) in Test Series 8 (see "*Manual of Tests and Criteria*", Part 1, Sub-section 18.7).

(c) Substances shall not be allowed to remain in the portable tank for any period that could result in caking. Appropriate measures shall be taken to avoid accumulation and packing of substances in the tank (e.g. cleaning, etc).".

Chapter 4.3

Insert a new chapter as follows:

"**CHAPTER 4.3**

USE OF BULK CONTAINERS

4.3.1 General provisions

4.3.1.1 This section contains general provisions applicable to the transport of solid substances in bulk containers. Substances shall be transported in bulk containers conforming to the applicable bulk container code in the Dangerous Goods List. The bulk container shall conform to the design requirements of Chapter 6.8.

New wording proposed by the secretariat:

[4.3.1.1 This section provides general requirements applicable to the use of containers for the transport of solid substances in bulk. Substances shall be transported in bulk containers conforming to the applicable bulk container instruction identified by the letters BK in column 10 of the Dangerous Goods List, with the following meaning:

BK1: the transport in sheeted bulk containers is permitted
BK2: the transport in closed bulk containers is permitted

The bulk container used shall conform to the requirements of Chapter 6.8.]

4.3.1.2 Except as provided in 4.3.1.3, bulk containers shall only be used when a substance is assigned to a bulk container code in Column 10 of the Dangerous Goods List in Chapter 3.2.

4.3.1.3 When a substance is not assigned a bulk container code in Column 10 of the Dangerous Goods List in Chapter 3.2, interim approval for transport may be issued by the competent authority of the country of origin. The approval shall be included in the documentation of the consignment and contain, as a minimum, the information normally provided in the bulk container instruction and the conditions under which the substance shall be transported. Appropriate measures should be initiated by the competent authority to include the assignment in the Dangerous Goods List.

4.3.1.4 Substances which may become liquid at temperatures likely to be encountered during transport, are not permitted in bulk containers.

4.3.1.5 Bulk containers shall be siftproof and shall be so closed that none of the contents can escape under normal conditions of transport including the effect of vibration, or by changes of temperature, humidity or pressure.

4.3.1.6 Bulk solids shall be loaded into bulk containers and evenly distributed in a manner that minimises movement that could result in damage to the container or leakage of the dangerous goods.

4.3.1.7 Where venting devices are fitted they shall be kept clear and operable.

4.3.1.8 Bulk solids shall not react dangerously with the material of the bulk container, gaskets, equipment including lids and tarpaulins and with protective coatings which are in contact with the contents or significantly weaken them. Bulk containers shall be so constructed or adapted that the goods can not penetrate between wooden floor coverings or

come into contact with those parts of the bulk containers that may be affected by the materials or residues thereof.

4.3.1.9 Before being filled and offered for transport each bulk container shall be inspected and cleaned to ensure that it does not contain any residue on the interior or exterior of the bulk container that could

- cause a dangerous reaction with the substance intended for transport;
- detrimentally affect the structural integrity of the bulk container; or
- affect the dangerous goods retention capabilities of the bulk container.

4.3.1.10 During transport, no dangerous residues shall adhere to the outer surfaces of bulk containers.

4.3.1.11 If several closure systems are fitted in series, the system which is located nearest to the substance to be transported shall be closed first before filling.

4.3.1.12 Empty bulk containers that have contained a dangerous substance shall be treated in the same manner as is required by these Regulations for a filled bulk container, unless adequate measures have been taken to nullify any hazard.

4.3.1.13 If bulk containers are used for the carriage of bulk goods liable to cause a dust explosion, or evolve flammable vapours (e. g. for certain wastes) measures shall be taken to exclude sources of ignition and prevent dangerous electrostatic discharge during transport filling or discharge of the substance.

4.3.1.14 Substances, for example wastes, which may react dangerously with one another and substances of different classes and goods not subject to these Regulations, which are liable to react dangerously with one another shall not be mixed together in the same bulk container. Dangerous reactions are:

(a) combustion and/or evolution of considerable heat;

(b) emission of flammable and/or toxic gases;

(c) formation of corrosive liquids; or

(d) formation of unstable substances.

4.3.1.15 Before a bulk container is filled it shall be visually examined to ensure it is structurally serviceable, its interior walls, ceiling and floors are free from protrusions or damage and that any inner liners or substance retaining equipment are free from rips, tears or any damage that would compromise its cargo retention capabilities. Structurally serviceable means the bulk container does not have major defects in its structural components, such as top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts, and corner fittings in a freight container. Major defects include:

(a) Bends, cracks or breaks in the structural or supporting members that affect the integrity of the container.

(b) More than one splice or an improper splice (such as a lapped splice) in top or bottom end rails or door headers;

(c) More than two splices in any one top or bottom side rail;

(d) Any splice in a door sill or corner post;

(e) Door hinges and hardware that are seized, twisted, broken, missing, or otherwise inoperative;

(f) Gaskets and seals that do not seal;

(g) Any distortion of the overall configuration great enough to prevent proper alignment of handling equipment, mounting and securing chassis or vehicle, or insertion into ships' cells;

(h) Any damage to lifting attachments or handling equipment interface features; or.

(i) Any damage to service or operational equipment.

4.3.2 Additional provisions applicable to bulk goods of Divisions 4.2, 4.3, 5.1 and Classes 7 and 8

4.3.2.1 Bulk goods of Division 4.2

Only Closed bulk containers (code BK2) shall be used . The total mass carried in a bulk container shall be such that its spontaneous ignition temperature is greater than 55 °C

4.3.2.2 Bulk goods of Division 4.3

Only Closed bulk containers (code BK2) shall be used. These goods shall be transported in bulk containers which are watertight.

4.3.2.3 Bulk goods of Division 5.1

Bulk containers shall be so constructed or adapted that the goods can not come into contact with wood or any other incompatible material.

4.3.2.4 Bulk goods of Class 7

For the transport of unpackaged radioactive material, see 4.1.9.2.3.

4.3.2.5 Bulk goods of Class 8

Only Closed bulk containers (code BK2) shall be used . These goods shall be transported in bulk containers which are watertight.".

PART 5

Chapter 5.1

5.1.2.1 Insert "with the word "OVERPACK", " after "shall be marked".

5.1.2.2 Insert the following sentence after "these Regulations.": "The "overpack" marking is an indication of compliance with this requirement.".

5.1.5.1.2 (f) Delete "special form" before "approval".

Chapter 5.2

5.2.1.5.4 (a) Replace "an Industrial package Type 1 ", " an Industrial package Type 2" and " an Industrial package Type 3" with " a Type IP-1 package", " a Type IP-2 package" and " a Type IP-3 package" respectively.

(c) Replace "an Industrial package Type 2, an Industrial package Type 3" with " a Type IP-2 package, a Type IP-3 package".

5.2.2.1.6 Amend the beginning of this paragraph to read:
"Except as provided in 5.2.2.2.1.2, each label shall:"

5.2.2.2.1.2 Add the following text at the end of the existing paragraph:
"Labels may overlap to the extent provided for by ISO 7225:1994 "Gas cylinders - Precautionary labels", however, in all cases, the labels representing the primary hazard and the numbers appearing on any label shall remain fully visible and the symbols recognisable.".

Chapter 5.3

5.3.1.1.4 Add "or empty uncleaned bulk containers" after "unpurged tanks" in the first sentence.

5.3.2.1.1 Insert a new (b) as follows: "(b) Solids in bulk containers;" and rename existing (b) to (d) accordingly.

Chapter 5.4

5.4.1.4.3 (b) Add ", bulk containers" in the title after "packagings", and in the text between brackets after "IBCs".

5.4.1.5.7.1 (h) Amend to read as follows:

" (h) For consignments of more than one package, the information contained in 5.4.1.4.1 (a) to (c) and 5.4.1.5.7.1 (a) to (g) shall be given for each package. For packages in an overpack, freight container, or conveyance, a detailed statement of the contents of each package within the overpack, freight container, or conveyance and, where appropriate, of each overpack, freight container, or conveyance shall be included. If packages are to be removed from the overpack, freight container, or conveyance at a point of intermediate unloading, appropriate transport documents shall be made available;".

5.4.1.5.8 Add a new paragraph to read as follows:

"5.4.1.5.8 *Transport of solids in bulk containers*

For bulk containers other than freight containers, the following statement shall be shown on the transport document (see 6.8.4.6):

"**Bulk container BK(x) approved by the competent authority of…**"

Chapter 5.5

5.5.1.2 Delete the whole paragraph.

PART 6

Chapter 6.1

6.1.2.5 Replace "Wooden barrel" with "Reserved".

6.1.2.7 In the table, replace the existing row 2 ("2. Barrels C. Wooden…. 6.1.4.6") with the following: "2. Reserved" and under the heading "Paragraph" replace:

6.1.4.7	with	6.1.4.6
6.1.4.8	with	6.1.4.7 (twice)
6.1.4.14	with	6.1.4.13
6.1.4.9	with	6.1.4.8
6.1.4.10	with	6.1.4.9
6.1.4.11	with	6.1.4.10
6.1.4.12	with	6.1.4.11
6.1.4.13	with	6.1.4.12
6.1.4.16	with	6.1.4.15
6.1.4.17	with	6.1.4.16
6.1.4.15	with	6.1.4.14
6.1.4.18	with	6.1.4.17
6.1.4.19	with	6.1.4.18 (11^{th} times)
6.1.4.20	with	6.1.4.19 (11^{th} times)

6.1.3.6 The last paragraph in 6.1.3.6 becomes new 6.1.3.6.2.

Insert a new paragraph 6.1.3.6.1 to read as follows:

"6.1.3.6.1 Packagings manufactured with recycled plastics material as defined in 1.2.1 shall be marked "REC". This mark shall be placed near the mark prescribed in 6.1.3.1."

Note by the secretariat: *As 6.1.3.6.1 and 6.1.3.6.2 do not address the same subject, it would seem preferable to insert the new paragraph as 6.1.3.6 and to renumber the existing 6.1.3.6 to 6.1.3.11 accordingly.*

6.1.3.9 In the examples, replace:

"4G/Y145/S/83"	with	"4G/Y145/S/02"
"lAl/Y1.4/150/83"	with	"lAl/Y1.4/150/98"
"1A2/Y150/S/83"	with	"1A2/Y150/S/01"
"4HW/Y136/S/83"	with	"4HW/Y136/S/98"
"1A2/Y/100/91"	with	"1A2/Y/100/01"

6.1.3.10 In the examples, replace:

"1A1/Y1.4/150/83 NL/RB/85 RL"	with	"1A1/Y1.4/150/97 NL/RB/01 RL"
"1A2/Y150/S/83 USA/RB/85 R"	with	"1A2/Y150/S/99 USA/RB/00 R"

6.1.3.11 In the example, replace:

"1A2T/Y300/S/94" with "1A2T/Y300/S/01"

6.1.4.1.1 Add a Note to read as follows:

*"**NOTE**: In the case of carbon steel drums, "suitable" steels are identified in ISO 3573:1999 "Hot rolled carbon steel sheet of commercial and drawing qualities" and ISO 3574:1999 "Cold-reduced carbon steel sheet of commercial and drawing qualities".*
For carbon steel drums below 100 litres "suitable" steels in addition to the above standards are also identified in ISO 11949:1995 "Cold-reduced electrolytic tinplate", ISO 11950:1995 "Cold-reduced electrolytic chromium/chromium oxide-coated steel" and ISO 11951:1995 "Cold-reduced blackplate in coil form for the production of tinplate or electrolytic chromium/chromium-oxide coated steel.".

6.1.4.6 Delete this paragraph.
Existing paragraphs 6.1.4.7 to 6.1.4.7.6 become 6.1.4.6 to 6.1.4.6.6 and 6.1.4.8 and 6.1.4.8.1 become 6.1.4.7 and 6.1.4.7.1, respectively.

6.1.4.8.2 (former) Delete this paragraph and renumber the remaining paragraphs and sub-paragraphs accordingly. (Existing 6.1.4.8.3 becomes 6.1.4.7.2, etc).

6.1.4.18.1.1(new numbering) Replace "6.1.4.8.1", "6.1.4.8.4" and "6.1.4.8.7" with "6.1.4.7.1", "6.1.4.7.4" and "6.1.4.7.7".

6.1.4.18.2.2, 6.1.4.19.2.2 and
6.1.4.19.2.4 (new numbering) Replace "6.1.4.14" with "6.1.4.13".

6.1.4.18.2.3 and
6.1.4.19.2.5 (new numbering) Replace "6.1.4.9" with "6.1.4.8".

6.1.4.18.2.5 (new numbering) Replace "6.1.4.10" with "6.1.4.9".

6.1.4.18.2.6 and
6.1.4.19.2.8 (new numbering) Replace "6.1.4.7.1 to 6.1.4.7.4" with "6.1.4.6.1 to 6.1.4.6.4".

6.1.4.18.2.7 and
6.1.4.19.2.9 (new numbering) Replace "6.1.4.12" with "6.1.4.11".

6.1.4.18.2.8 (new numbering) Replace "6.1.4.8.1", "6.1.4.8.3" and "6.1.4.8.7" with "6.1.4.7.1", "6.1.4.7.3" and "6.1.4.7.7", respectively.

6.1.4.18.2.9 (new numbering) Replace "6.1.4.13.1 and 6.1.4.13.4 to 6.1.4.13.6" with "6.1.4.12.1 and 6.1.4.12.4 to 6.1.4.12.6".

6.1.4.19.2.10 (new numbering) Replace "6.1.4.13" with "6.1.4.12".

6.1.5.1.11 (b) Replace "6.1.5.8" with "6.1.5.7".

6.1.5.2.1 In the second sentence, insert "other than bags" after "packagings".

Insert the following new third sentence: "Bags shall be filled to the maximum mass at which they may be used.".

6.1.5.2.2 Replace "6.1.5.3.4" with "6.1.5.3.5".

6.1.5.2.5 Replace "6.1.4.8.1 and 6.1.4.8.4" with "6.1.4.7.1 and 6.1.4.7.4".

6.1.5.3.2 In (a) and (b), replace "6.1.4.8" with "6.1.4.7" and in (c) and (d), replace "6.1.4.13" and "6.1.4.19" with "6.1.4.12" and "6.1.4.18", respectively.

6.1.5.3.3 Add a new 6.1.5.3.3 to read as follows:

"6.1.5.3.3 Removable head packagings for liquids shall not be dropped until at least 24 hours after filling and closing to allow for any possible gasket relaxation."

Renumber subsequent paragraphs and subparagraphs accordingly.

6.1.5.3.5 (former 6.1.5.3.4) Replace the sentence: "For liquids if the test is performed with water:" with "For liquids in single packagings and for inner packagings of combination packagings, if the test is performed with water:"

Add the following note at the end of this paragraph as follows:

"***NOTE**: The term water includes water/antifreeze solutions with a minimum specific gravity of 0.95 for testing at - 18 °C.*".

6.1.5.3.6.2 (former 6.1.5.3.5.2) Insert the words "while retaining its containment function," after "closure".

6.1.5.7 Delete this paragraph and renumber subsequent paragraphs and subparagraphs accordingly.

Chapter 6.2

Delete "certified" in relation to "UN certified" in paragraphs: 6.2.2, 6.2.2.1.1, 6.2.2.1.2, 6.2.2.1.3, 6.2.2.4, 6.2.2.6, 6.2.2.6.1, 6.2.2.7 and 6.2.3.

6.2.2.7.2 In the NOTE, delete "(see 5.2.2.2.1.2)".

Chapter 6.3

6.3.1.2 In the example, replace:

"4G/CLASS 6.2/92" with "4G/CLASS 6.2/01"

Chapter 6.4

Replace "Industrial package Type 1 (Type IP-1)", "Industrial package Type 2 (Type IP-2)" and "Industrial package Type 3 (Type IP-3)" with " Type IP-1 package", "Type IP-2 package" and "Type IP-3 package" respectively, all throughout this chapter.

6.4.3.3 Amend to read as follows:

"6.4.3.3 Packages containing radioactive material, to be transported by air, shall be capable of withstanding, without leakage, an internal pressure which produces a pressure differential of not less than maximum normal operating pressure plus 95 kPa.".

6.4.6.1 Add the following new first sentence: "Packages designed to contain uranium hexafluoride shall meet the requirements prescribed elsewhere in these Regulations which pertain to the radioactive and fissile properties of the material.".

Amend the beginning of the second sentence to read as follows: "Except as allowed in 6.4.6.4, uranium hexafluoride in quantities of 0.1 kg or more shall also be packaged…".

6.4.6.2 In (b), insert "free drop" before "test" and in (c), insert "thermal" before "test".

6.4.6.4 Amend (a) to read as follows:

"(a) the packages are designed to international or national standards other than ISO 7195:1993 provided an equivalent level of safety is maintained;"

In (b), insert "of" after "test pressure".

Add the following sentence after the subparagraphs (a) to (c): "In all other respects the requirements specified in 6.4.6.1 to 6.4.6.3 shall be satisfied.".

6.4.7.16 Replace "6.4.7.14" with "6.4.7.14 (a)".

6.4.8.5 Replace the existing table with the following one:

Case	Form and location of surface	Insolation for 12 hours per day (W/m^2)
1	Flat surfaces transported horizontally-downward facing	0
2	Flat surfaces transported horizontally-upward facing	800
3	Surfaces transported vertically	200[a]
4	Other downward facing (not horizontal) surfaces	200[a]
5	All other surfaces	400[a]

Note "a" under the table remains unchanged.

6.4.11.1 (b)(i) Amend to read as follows: "of 6.4.7.2 for packages containing fissile material;".

6.4.11.2 (a) Amend the sentence after subparagraphs (i) to (iii) to read as follows: "Neither beryllium nor deuterium in hydrogenous material enriched in deuterium shall be present in quantities exceeding 1% of the applicable consignment mass limits provided in Table 6.4.11.2".

6.4.11.5 Replace "packaging" with "package".

6.4.11.10 Amend (a) as follows: "…conditions consistent with the Type C package tests specified in 6.4.20.1…".

In (b), amend the beginning to read: "In the assessment of 6.4.11.9 allowance…"; insert "Type C package" before "tests specified" and "the water in-leakage test of" before "6.4.19.3".

6.4.14 Replace "6.4.17.2, 6.4.20.2, and 6.4.20.4" with "6.4.17.2 and 6.4.20.2".

6.4.17.2 (b) In the last but one sentence, replace "edges" with "edge".

6.4.20.2 (a) Amend the end of the last but one sentence to read: "…at the top with its edge rounded off to a radius of not more than 6 mm".

6.4.20.4 Amend the end of the last sentence to read: "… as defined in 6.4.14, except that the target surface may be at any orientation as long as the surface is normal to the specimen path.".

Chapter 6.5

6.5.2.1.1 Assign paragraph number "6.5.2.1.2" to the list of examples under the heading "Examples of markings for various types of IBC in accordance with (a) to (h) above:" and in the examples, replace:

"11A/Y/02 89"	with	"11A/Y/02 99"
"13H3/Z/03 89"	with	"13H3/Z/03 01"
"31H1/Y/04 89"	with	"31H1/Y/04 99"
"31HA1/Y/05 19"	with	"31HA1/Y/05 01"
"11C/X/01 93"	with	"11C/X/01 02"

Chapter 6.6

6.6.3.2 In the examples, replace:

"96/N/PQRS"	with	"01/N/PQRS"
"95/D/ABCD 987"	with	"02/D/ABCD 987"
"06 97/S/1999"	with	"06/01/S/1999"

Chapter 6.7

6.7.2 Insert "Class 1 and" before "Classes 3 to 9".

6.7.2.1 In the definition of "portable tank" insert "Class 1 and" before "Classes 3 to 9" and delete the words "having a capacity of more than 450 litres" in the first sentence.

Insert the following definitions in alphabetical order:

"*Fine grain steel* means steel which has a ferritic grain size of 6 or finer when determined in accordance with ASTM E 112-96 or as defined in EN 10028-3, Part 3.

Fusible element means a non-reclosable pressure relief device that is thermally actuated.

Offshore portable tank means a portable tank specially designed for repeated use for transport of dangerous goods to, from and between offshore facilities. An offshore portable tank is designed and constructed in accordance with the Guidelines for the Approval of Containers Handled in Open Seas specified by the International Maritime Organization in document MSC/Circ.860.".

6.7.2.12.2 Amend the beginning of the first sentence to read as follows:

"The combined delivery capacity of the pressure relief system (taking into account the reduction of the flow when the portable tank is fitted with frangible-discs preceding spring-loaded pressure-relief devices or when the spring-loaded pressure-relief devices are provided with a device to prevent the passage of the flame), in condition of complete fire engulfment…" .

6.7.2.13.1 (e) Replace "of the device" with "of the spring-loaded pressure relief devices, frangible discs or fusible elements".

6.7.2.13.2 Insert the words "spring-loaded" before "pressure-relief devices".

Chapter 6.8

Add a new chapter 6.8 as follows:

"**CHAPTER 6.8**
REQUIREMENTS FOR THE DESIGN, CONSTRUCTION, INSPECTION AND TESTING OF BULK CONTAINERS

6.8.1 Definitions

For the purposes of this section:

Closed bulk container means a totally closed bulk container having a rigid roof, sidewalls, end walls and floor (including hopper-type bottoms). The term includes bulk containers with an opening roof, side or end wall that can be closed during transport. Closed bulk containers may be equipped with openings to allow for the exchange of vapours and gases with air and which prevent under normal conditions of transport the release of solid contents as well as the penetration of rain and splash water.

Sheeted bulk container means an open top bulk container with rigid bottom (including hopper-type bottom), side and end walls and a non-rigid covering;

6.8.2 Application and general requirements

6.8.2.1 Bulk containers and their service and structural equipment shall be designed and constructed to withstand, without loss of contents, the internal pressure of the contents and the stresses of normal handling and transport.

6.8.2.2 Where a discharge valve is fitted, it shall be capable of being made secure in the closed position and the whole discharge system shall be suitably protected from damage. Valves having lever closures shall be able to be secured against unintended opening and the open or closed position shall be readily apparent.

6.8.2.3 *Code for designating types of bulk container*

The following table indicates the codes to be used for designating types of bulk containers:

Types of bulk containers	Code
Sheeted bulk container	BK1
Closed bulk container	BK2

6.8.2.4 In order to take account of progress in science and technology, the use of alternative arrangements which offer at least equivalent safety as provided by the requirements of this Chapter may be considered by the competent authority.

6.8.3 Requirements for the design, construction, inspection and testing of freight containers used as bulk containers

6.8.3.1 ***Design and construction requirements***

6.8.3.1.1 The general design and construction requirements of this section are deemed to be met if the bulk container complies with the requirements of ISO 1496-4:1991 "Series 1 Freight containers- Specification and testing - Part 4: Non pressurized containers for dry bulk" and the container is siftproof.

6.8.3.1.2 Freight containers designed and tested in accordance with ISO 1496-1:1990 "Series 1 Freight containers- Specification and testing - Part 1: General cargo containers for general purposes" shall be equipped with operational equipment which is, including its connection to the freight container, designed to strengthen the end walls and to improve the longitudinal restraint as necessary to comply with the test requirements of ISO 1496-4:1991 as relevant.

6.8.3.1.3 Bulk containers shall be siftproof .Where a liner is used to make the container siftproof it shall be made of a suitable material. The strength of material used for, and the construction of, the liner shall be appropriate to the capacity of the container and its intended use. Joins and closures of the liner shall withstand pressures and impacts liable to occur under normal conditions of handling and transport. For ventilated bulk containers any liner shall not impair the operation of ventilating devices.

6.8.3.1.4 The operational equipment of bulk containers designed to be emptied by tilting shall be capable of withstanding the total filling mass in the tilted orientation.

6.8.3.1.5 Any movable roof or side or end wall or roof section shall be fitted with locking devices with securing devices designed to show the locked state to an observer at ground level.

6.8.3.2 *Service equipment*

6.8.3.2.1 Filling and discharge devices shall be so constructed and arranged as to be protected against the risk of being wrenched off or damaged during transport and handling. The filling and discharge devices shall be capable of being secured against unintended opening. The open and closed position and direction of closure shall be clearly indicated.

6.8.3.2.2 Seals of openings shall be so arranged as to avoid any damage by the operation, filling and emptying of the bulk container.

6.8.3.2.3 Where ventilation is required bulk containers shall be equipped with means of air exchange, either by natural convection, e.g. by openings, or active elements, e.g. fans. The ventilation shall be designed to prevent negative pressures in the container at all times. Ventilating elements of bulk containers for the transport of flammable substances or substances emitting flammable gases or vapours shall be designed so as not to be a source of ignition.

6.8.3.3 *Inspection and testing*

6.8.3.3.1 Freight containers used maintained and qualified as bulk containers in accordance with the requirements of this section shall be tested and approved in accordance with the Convention for Safe Containers (CSC), 1972, as amended.

6.8.3.3.2 Freight containers used and qualified as bulk containers shall be inspected periodically according to the CSC.

6.8.3.4 *Marking*

6.8.3.4.1 Freight containers used as bulk containers shall be marked with a Safety Approval Plate in accordance with the CSC.

6.8.4 Requirements for the design, construction and approval of bulk containers other than freight containers

6.8.4.1 Bulk containers covered in this section include skips, offshore bulk containers, bulk bins, swap bodies, trough shaped containers, roller containers, and load compartments of vehicles.

6.8.4.2 These bulk containers shall be designed and constructed so as to be strong enough to withstand the shocks and loadings normally encountered during transport including, as applicable, transhipment between modes of transport.

6.8.4.3 Vehicles shall comply with the requirements of, and be acceptable to, the competent authority responsible for land transport of the materials to be transported in bulk.

6.8.4.4 These bulk containers shall be approved by the competent authority and the approval shall include the code for designating types of bulk containers in accordance with 6.8.2.3 and the requirements for inspection and testing as appropriate.

6.8.4.5 Where it is necessary to use a liner in order to retain the dangerous goods it shall meet the provisions of 6.8.3.1.2.

6.8.4.6 The following statement shall be shown on the transport document.

"Bulk container BK(x) approved by the competent authority of ……"."

Chapter 7.1

7.1.7.1.1 (b) Amend the end of this sub-paragraph to read: "…to the critical group, taking account of the exposures expected to be delivered by all other relevant sources and practices under control.".

7.1.7.3.3 (c) Amend the end to read: "…of the conveyance, except for consignments transported under exclusive use by road or rail, for which the radiation limits around the vehicle are set forth in 7.2.3.1.2 (b) and (c)".

7.1.7.4.1 Amend to read as follows:

"7.1.7.4.1 Any group of packages, overpacks, and freight containers containing fissile material stored in transit in any one storage area shall be so limited that the total sum of the criticality safety indexes in the group does not exceed 50. Each group shall be stored so as to maintain a spacing of at least 6 m from other such groups.".

7.1.7.5.5 Amend the beginning to read as follows: "A freight container, tank, intermediate bulk container or conveyance dedicated to the transport of unpackaged radioactive material under exclusive use…".

APPENDIX A and APLHABETICAL INDEX

Amend Appendix A and the alphabetical index in accordance with the amendments adopted for Chapter 3.2.

The corrections concerning "Ligroïne" and "Morpholine" do not apply to the English version.

ANNEX 2

DRAFT AMENDMENTS TO THE MANUAL OF TEST AND CRITERIA

Amend the general table of contents and the table of contents of Parts I and III in accordance with the amendments to Sections 18, 31 and 37.

Section 1

1.2.2 In Table 1.1, replace "1-7" with "1-8" in the first row under "Test series".

1.6 In Table 1.2, add the following:

Test series	Test type	Test code	Test name
8	(a)	8(a)	Thermal stability test for ANE
8	(b)	8(b)	ANE gap test
8	(c)	8(c)	Koenen test
8	(d)	8(d)	Vented pipe test */

*/ *This test is intended for evaluating the suitability for transport in tanks.*

Section 10

10.1.1 Amend the last sentence to read as follows: "…in figures 10.1, 10.2, 10.3 and 10.4, the general….in sections 11 to 18 of this test manual.".

Figure 10.2 Amend this figure as shown in page 63 of this document.

Figure 10.4 Insert a new figure 10.4, as shown in page 64 of this document, immediately after the existing Figure 10.3 and renumber the Figures 10.4 to 10.8 consequently.

Figure 10.2: PROCEDURE FOR PROVISIONAL ACCEPTANCE OF A SUBSTANCE OR ARTICLE IN CLASS 1

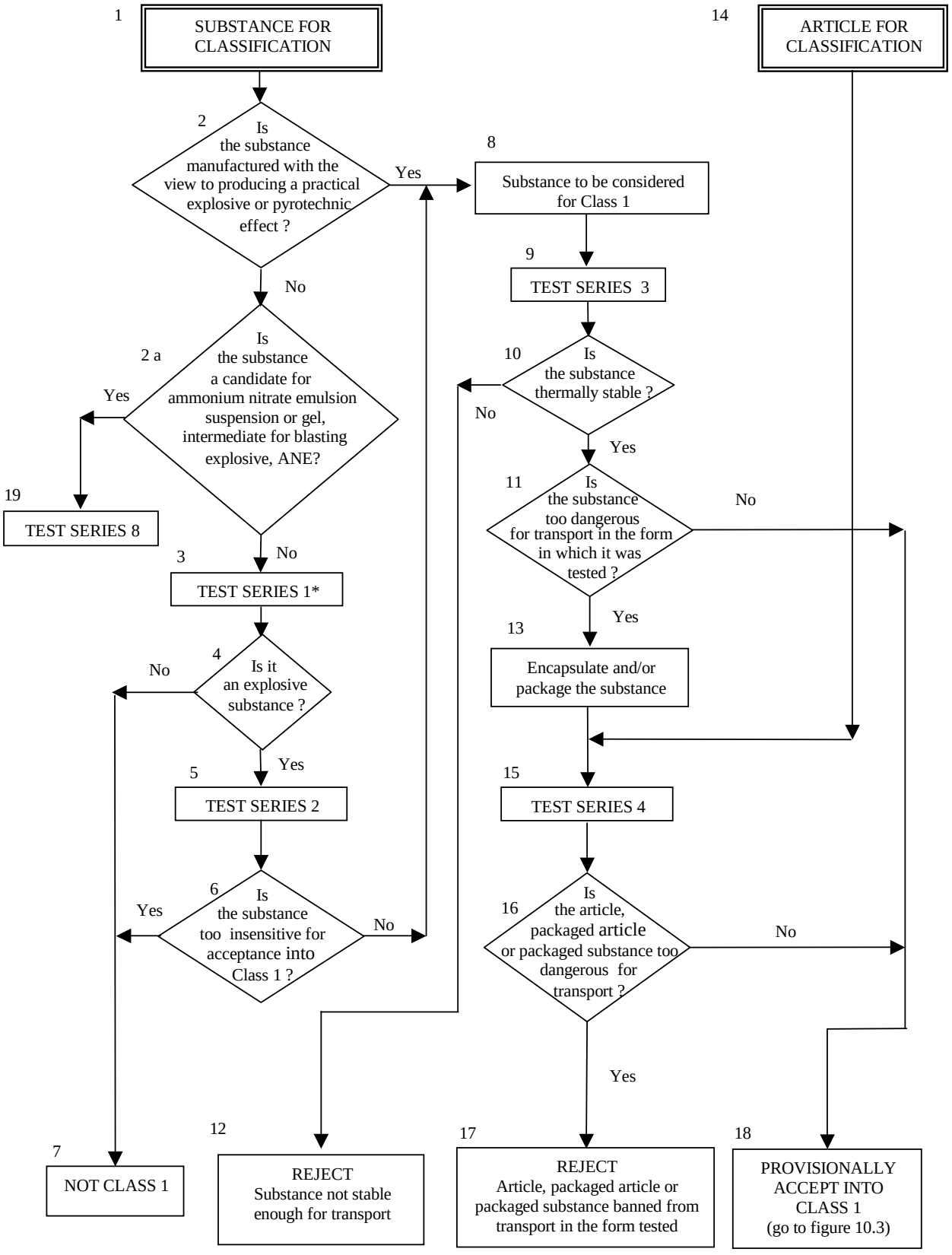
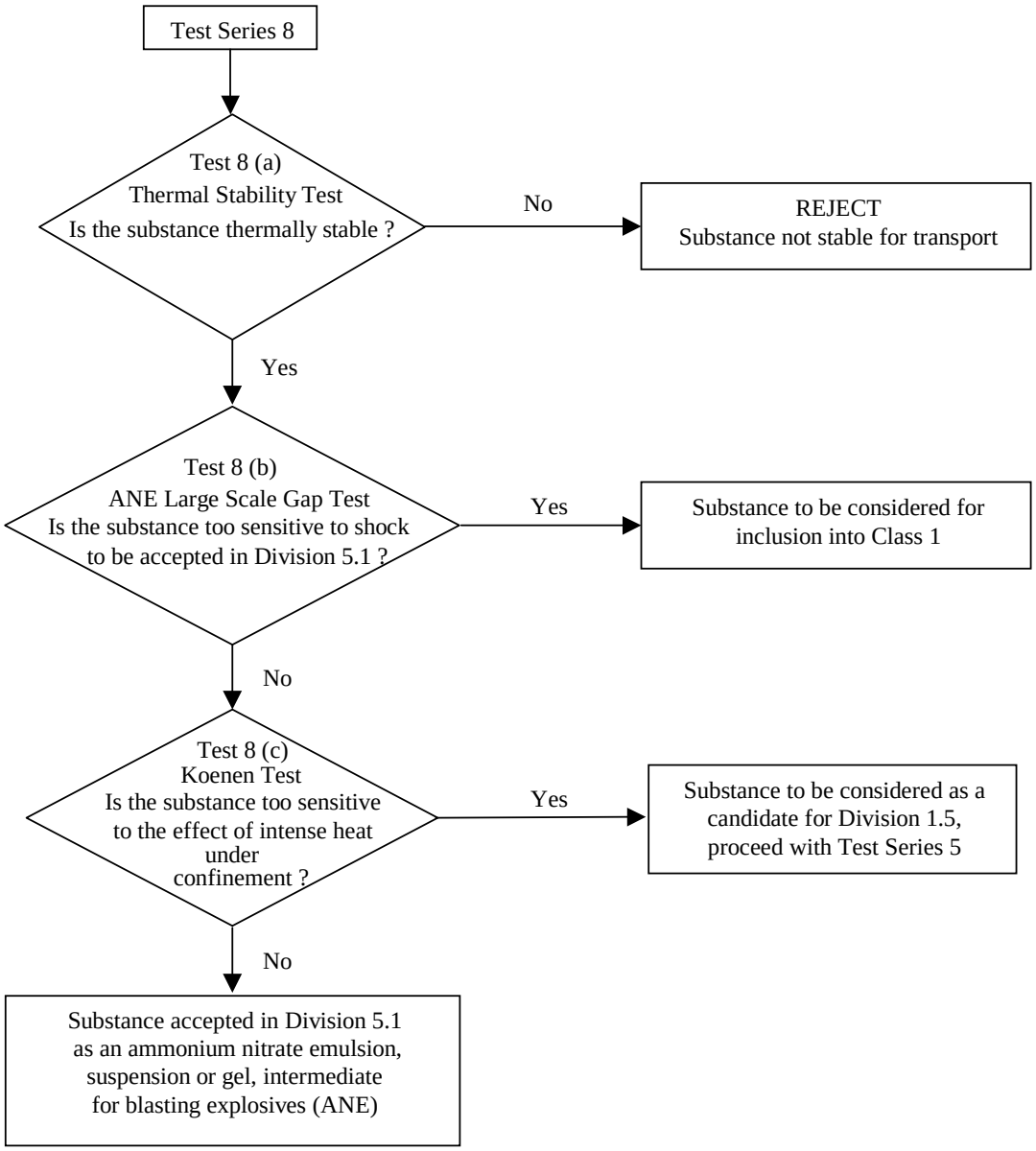


Figure 10.4


Test Series 8
Test 8 (a)
Thermal Stability Test
Is the substance thermally stable ?
No
REJECT
Substance not stable for transport
Yes
Test 8 (b)
ANE Large Scale Gap Test
Is the substance too sensitive to shock to be accepted in Division 5.1 ?
Yes
Substance to be considered for inclusion into Class 1
No
Test 8 (c)
Koenen Test
Is the substance too sensitive to the effect of intense heat under confinement ?
Yes
Substance to be considered as a candidate for Division 1.5, proceed with Test Series 5
No
Substance accepted in Division 5.1 as an ammonium nitrate emulsion, suspension or gel, intermediate for blasting explosives (ANE)

10.4.2.5 Add a new section to read as follows:

"10.4.2.5 The question "Is the substance a candidate for "ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives (ANE)?" (box 2(a), figure 10.2) is answered by series 8 tests and any candidate should pass each of the three tests comprising the series. The three test types are:

Type 8 (a) - a test to determine the thermal stability;

Type 8 (b) - a shock test to determine sensitivity to intense shock;

Type 8 (c) - a test to determine the effect of heating under confinement;

Test series 8 (d) has been included in this section as one method to evaluate the suitability for the transport in tanks."

10.4.3.7 Insert a new 10.4.3.7 to read as follows:

"10.4.3.7 Test types 8 (a) to 8 (c) should be used to establish whether an ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives (ANE) may be assigned to Class 5.1. Substances failing any of the tests may be considered as a candidate for Class 1 in accordance with figure 10.4."

Renumber the existing 10.4.3.7 as new 10.4.3.8.

10.5.1 Amend the end of the paragraph to read: "…figures 10.5 to 10.8.".

10.5.2 Replace "figure 10.8" with "figure 10.9.".

Section 18 Insert a new Section 18, as follows:

"SECTION 18

TEST SERIES 8

18.1 Introduction

The assessment whether a candidate for "ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives (ANE)" is insensitive enough for inclusion in Division 5.1 is answered by series 8 tests and any such candidate for inclusion in Division 5.1 should pass each of the three types of tests comprising the series. The three test types are:

Type 8 (a) : a test to determine the thermal stability;
Type 8 (b) : a shock test to determine sensitivity to intense shock;
Type 8 (c) : a test to determine the effect of heating under confinement;

Test series 8 (d) has been included in this section as one method to evaluate the suitability for the transport in tanks.

18.2 Test methods

The test methods currently used are listed in table 18.1.

Table 18.1: TEST METHODS FOR TEST SERIES 8

Test code	Name of Test	Section
8 (a)	Thermal Stability Test for ANE */	18.4
8 (b)	ANE Gap Test */	18.5
8 (c)	Koenen test */	18.6
8 (d)	Vented pipe test **/	18.7

*/ *This test is intended for classification.*
**/ *This test is intended for evaluating the suitability for transport in tanks.*

18.3 Test conditions

18.3.1 The substance should be tested as offered for transport, at the highest transport temperature (see 1.5.4 of this Manual).

18.4 Series 8 Type (a) test prescription

18.4.1 ***Test 8(a) : Thermal stability test for ammonium nitrate emulsions, suspension or gels***

18.4.1.1 *Introduction*

18.4.1.1.1 This test is used to measure the stability of a candidate for "ammonium nitrate emulsion, suspension or gel, intermediate for blasting explosives" when subjected to elevated thermal conditions to determine if the emulsion is too dangerous to transport.

18.4.1.1.2 This test is used to determine whether the emulsion, suspension or gel is stable at temperatures encountered during transport. In the way this type of test is normally carried out (see 28.4.4), the 0.5 litre Dewar vessel is only representative for packagings, IBC's and small tanks. For the transport of ammonium nitrate emulsions, suspensions or gels the test can be used to measure its stability during tank transport if the test is carried out at a temperature 20 °C higher than the maximum temperature which may occur during transport, including the temperature at the time of loading.

18.4.1.2 *Apparatus and materials*

18.4.1.2.1 The experimental equipment consists of a suitable test chamber, appropriate Dewar vessels with closures, temperature probes and measuring equipment.

18.4.1.2.2 ***The test should be performed in a test cell capable of withstanding fire and overpressure and, preferably, should be fitted with a pressure relief system e.g. a blow out panel.*** The recording system should be housed in a separate observation area.

18.4.1.2.3 A thermostatically controlled drying oven (which may be fan-assisted) large enough to allow air circulation on all sides of the Dewar vessel may be used. The air temperature in the oven should be controlled so that the desired temperature for a liquid inert sample in the Dewar vessel can be maintained with a deviation of not more than ± 1 °C for up to 10 days. The air temperature in the oven should be measured and recorded. It is recommended that the door of the oven be fitted with a magnetic catch or replaced by a

loosely fitting insulated cover. The oven may be protected by an appropriate steel liner and the Dewar vessel housed in a wire mesh cage.

18.4.1.2.4 Dewar vessels with a volume of 500 ml with a closure system are used. The closure of the Dewar vessel should be inert. A closure system is illustrated in figure 18.4.1.1.

18.4.1.2.5 The heat loss characteristics of the system used, i.e. Dewar vessel and closure, should be established prior to performance of the test. Since the closure system has a significant effect on the heat loss characteristics, these can be adjusted to some extent by varying the closure system. The heat loss characteristics can be determined by measuring the half time of cooling of the vessel filled with an inert substance having similar physical properties. The heat loss per unit of mass, L (W/kg.K) can be calculated from the half time of cooling, $t_{1/2}$ (s), and the specific heat, Cp (J/K), of the substance using the formula:

$$L = \ln 2 \times C_p / t_{1/2}$$

18.4.1.2.6 Dewar vessels filled with 400 ml of substance, with a heat loss of 80 to 100 mW/kg.K are suitable.

18.4.1.2.7 The Dewar vessel shall be filled to about 80% of its capacity. In case of a sample with very high viscosity it may be required to have the sample provided with a shape which just fits into the Dewar vessel. The diameter of such a preshaed sample shall be just under the inner diameter of the Dewar vessel. The hollow lower end of the Dewar vessel may be filled with an inert solid substance prior to loading the sample into the vessel to facilitate the use of cylindrically shaped sample substances.

18.4.1.3 *Procedure*

18.4.1.3.1 Set the test chamber at a temperature which is 20 °C higher than the maximum temperature which may occur during transport or, if higher, the temperature at the time of loading. Fill the Dewar vessel with the substance under test and note the mass of the sample. Make sure the sample is filled to about 80% of its height. Insert the temperature probe into the centre of the sample. Seal the lid of the Dewar in place and insert the Dewar vessel in the test chamber, connect the temperature recording system and close the test chamber.

18.4.1.3.2 The sample is heated and the temperature of the sample and test chamber continuously monitored. The time is noted at which the sample temperature reaches a temperature 2 °C below the test chamber temperature. The test is then continued for a further seven days or until the sample temperature rises to 6°C or more above the test chamber temperature if this occurs sooner. Note the time taken for the sample to rise from 2 °C below the test chamber temperature to its maximum temperature.

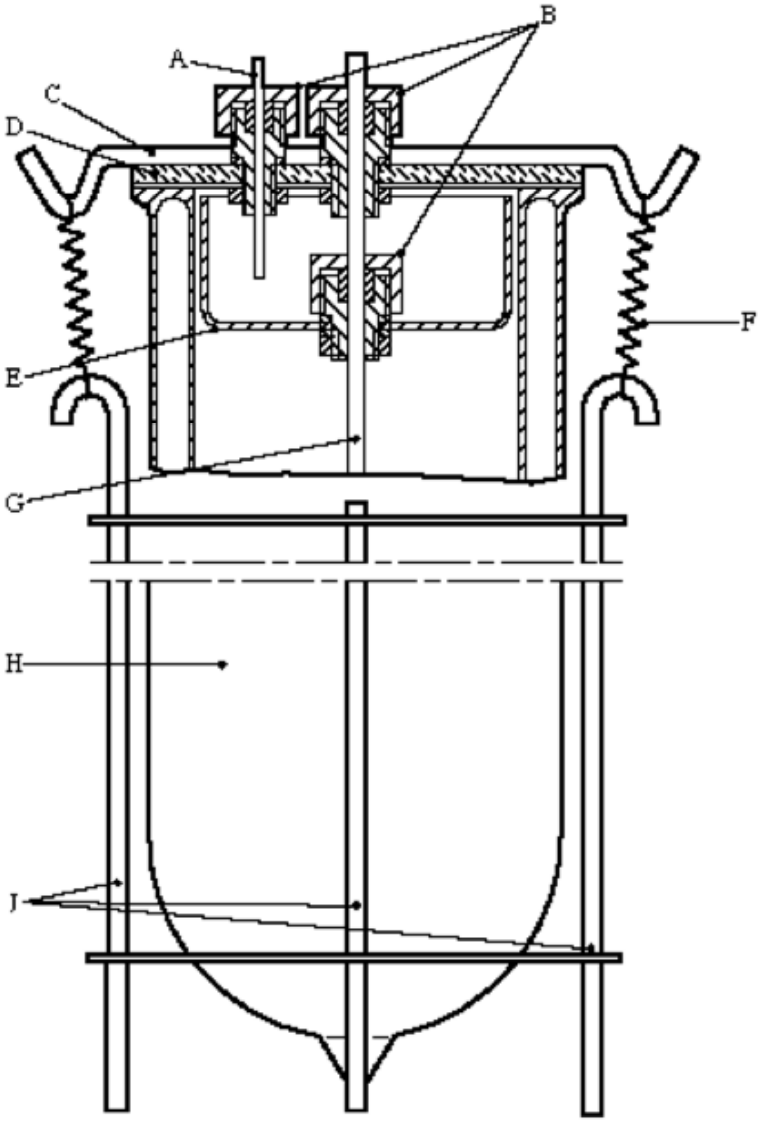
18.4.1.3.3 If the sample survives, cool and remove it from the test chamber and carefully dispose of it as soon as possible. The percentage mass loss and change in composition may be determined.

18.4.1.4 *Test criteria and method of assessing results*

18.4.1.4.1 If the sample temperature does not exceed the test chamber temperature by 6 °C or more in any test, the ammonium nitrate emulsion, suspension or gel is considered to be thermally stable and can be further tested as a candidate for "ammonium nitrate emulsion, suspension or gel, intermediate for blasting explosives".

18.4.1.5 *Examples of results*

Substances	**Sample mass (g)**	**Test T (°C)**	**Result**	**Comments**
Ammonium nitrate	408	102	-	slight discolouration, hardened into lump Mass loss 0.5%
ANE-1 Ammonium nitrate 76%, Water 17%, Fuel/emulsifier 7%	551	102	-	separation of oil and crystallized salts. Mass loss 0.8%
ANE-2 (sensitized) Ammonium nitrate 75%, Water 17%, Fuel/emulsifier 7%	501	102	-	Some discolouration Mass loss 0.8%
ANE-Y Ammonium nitrate 77%, Water 17%, Fuel/emulsifier 7%	500	85	-	Mass loss 0.1%
ANE-Z Ammonium nitrate 75%, Water 20%, Fuel/emulsifier 5%	510	95	-	Mass loss 0.2%
ANE-G1 Ammonium nitrate 74%, Sodium nitrate 1%, Water 16%, Fuel/emulsifier 9%	553	85	-	no rise in temperature
ANE-G2 Ammonium nitrate 74%, Sodium nitrate 3%, Water 16%, Fuel/emulsifier 7%	540	85	-	no rise in temperature
ANE-J1 Ammonium nitrate 80%, Water 13%, Fuel/emulsifier 7%	613	80	-	Mass loss 0.1%
ANE-J2 Ammonium nitrate 76%, Water 17%, Fuel/emulsifier 7%	605	80	-	Mass loss 0.3%
ANE-J4 Ammonium nitrate 71%, Sodium nitrate 11%, Water 12%, Fuel/emulsifier 6%	602	80	-	Mass loss 0.1%



(A)	PTFE capillary tube	(B)	Special screw fittings (PTFE or Al) with O-ring seal
(C)	Metal strip	(D)	Glass lid
(E)	Glass beaker base	(F)	Spring
(G)	Glass protective tube	(H)	Dewar vessel
(J)	Steel retaining device		

Figure 18.4.1.1: DEWAR VESSEL WITH CLOSURE

18.5 Series 8 Type (b) Test prescription

18.5.1 ***Test 8 (b): ANE Gap Test***

18.5.1.1 *Introduction*

This test is used to measure the sensitivity of a candidate for "ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives" to a specified shock level, i.e. a specified donor charge and gap.

18.5.1.2 *Apparatus and materials*

18.5.1.2.1 The set-up for this test consists of an explosive charge (donor), a barrier (gap), a container holding the test charge (acceptor), and a steel witness plate (target).

The following materials are to be used:

(a) United Nations Standard detonator or equivalent;

(b) 95 mm diameter by 95 mm long pressed 50/50 pentolite or 95/5 RDX/WAX pellet with a density of 1600 kg/m^3 ± 50 kg/m^3;

(c) Tubing, steel, cold drawn seamless, 95 mm outer diameter, 11.1 mm wall thickness ± 10% variations, by 280 mm long having the following mechanical properties:

- tensile strength = 420 MPa (± 20% variation)
- elongation (%) = 22 (± 20% variation)
- Brinell hardness = 125 (± 20% variation)

(d) Sample substances, with a diameter which is just under the inner diameter of the steel tubing. The air gap between the sample and tubing wall should be as small as possible;

(e) Cast polymethyl methacrylate (PMMA) rod, of 95 mm diameter by 70 mm long. A gap length of 70 mm results in a shock pressure applied to the emulsion somewhere between 3.5 and 4 GPa, depending on the type of donor used (see table 18.5.1.1 and figure 18.5.1.2);

(f) Mild steel plate, 200 mm × 200 mm × 20 mm, having the following mechanical properties:

- tensile strength = 580 MPa (± 20% variation)
- elongation (%) = 21 (± 20% variation)
- Brinell hardness = 160 (± 20% variation)

(g) Cardboard tubing, 97 mm inner diameter by 443 mm long;

(h) Wood block, 95 mm diameter and 25 mm thick, with a hole drilled through the centre to hold the detonator.

18.5.1.3 *Procedure*

18.5.1.3.1 As shown in figure 18.5.1.1, the detonator, donor, gap and acceptor charge are coaxially aligned above the centre of the witness plate. Care should be taken to ensure good contact between the detonator and donor, donor and gap and gap and acceptor charge. The test sample and booster should be at ambient temperature for the test.

18.5.1.3.2 To assist in collecting the remains of the witness plate, the whole assembly may be mounted over a container of water with at least a 10 cm air gap between the surface of the water and the bottom surface of the witness plate which should be supported along two edges only.

18.5.1.3.3 Alternative collection methods may be used but it is important to allow sufficient free space below the witness plate so as not to impede plate puncture. The test is performed three times unless a positive result is observed earlier.

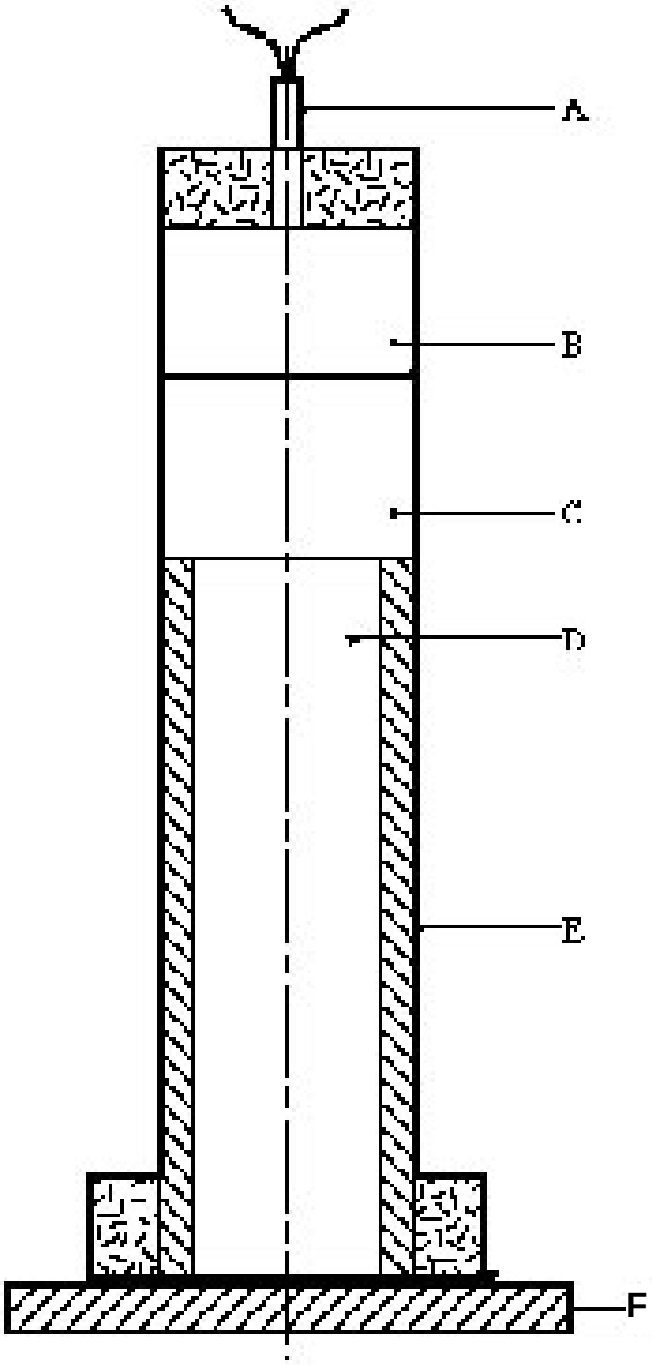
18.5.1.4 *Test criteria and method of assessing results*

A clean hole punched through the plate indicates that a detonation was initiated in the sample. A substance which detonates in any trial at a gap length of 70 mm is not to be classified as "ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives" and the result is noted as "+".

18.5.1.5 *Examples of results*

Substances	**Density g/cm^3**	**Gap mm**	**Result**	**Comments**
Ammonium nitrate (low density)	0.85	35	-	Tube fragmented (large fragments) Plate bent VOD 2.3-2.8 km/s
Ammonium nitrate (low density)	0.85	35	-	Tube fragmented (large fragments) Plate fractured
ANE-FA Ammonium nitrate 69%, Sodium nitrate 12%, Water 10%, Fuel/emulsifier 8%	1.4	50	-	Tube fragmented (large fragments) Plate not perforated
ANE-FA	1.44	70	-	Tube fragmented (large fragments) Plate not perforated
ANE-FB Ammonium nitrate 70%, Sodium nitrate 11%, Water 12%, Fuel/emulsifier 7%	ca 1.40	70	-	Tube fragmented (large fragments) Plate not perforated
ANE-FC (sensitized) Ammonium nitrate 75%, Water 13%, Fuel/emulsifier 10%	1.17	70	+	Tube fragmented (fine fragments) Plate perforated
ANE-FD (sensitized) Ammonium nitrate 76%, Water 17%, Fuel/emulsifier 7%	ca 1.22	70	+	Tube fragmented (fine fragments) Plate perforated
ANE-1 Ammonium nitrate 76%, Water 17%, Fuel/emulsifier 7%	1.4	35	-	Tube fragmented into large pieces. Plate dented VOD: 3.1 km/s
ANE-2 (sensitized) Ammonium nitrate 76%, Water 17%, Fuel/emulsifier 7%	1.3	35	+	Tube fragmented into small pieces. Plate perforated. VOD: 6.7 km/s

Substances	Density g/cm^3	Gap mm	Result	Comments
ANE-2 (sensitized) Ammonium nitrate 76%, Water 17%, Fuel/emulsifier 7%	1.3	70	+	Tube fragmented into small pieces. Plate perforated. VOD: 6.2 km/s
ANE-G1 Ammonium nitrate 74%, Sodium nitrate 1%, Water 16%, Fuel/emulsifier 9%	1.29	70	-	Tube fragmented . Plate indented. VOD 1968m/s
ANE-G2 Ammonium nitrate 74%, Sodium nitrate 3%, Water 16%, Fuel/emulsifier 7%	1.32	70	-	Tube fragmented Plate indented.
ANE-G3 (sensitized by gassing) Ammonium nitrate 74%, Sodium nitrate 1%, Water 16%, Fuel/emulsifier 9%	1.17	70	+	Tube fragmented Plate punctured.
ANE-G4 (sensitized by microballoons) Ammonium nitrate 74%, Sodium nitrate 3%, Water 16%, Fuel/emulsifier 7%	1.23	70	+	Tube fragmented Plate punctured.
ANE-G5 Ammonium nitrate 70%, Calcium nitrate 8%, Water 16%, Fuel/emulsifier 7%	1.41	70	-	Tube fragmented Plate indented. VOD 2061m/s
ANE-J1 Ammonium nitrate 80%, Water 13%, Fuel/emulsifier 7%	1.39	70	-	Tube fragmented. Plate indented.
ANE-J2 Ammonium nitrate 76%, Water 17%, Fuel/emulsifier 7%	1.42	70	-	Tube fragmented. Plate indented.
ANE-J4 Ammonium nitrate 71%, Sodium nitrate 11%, Water 12%, Fuel/emulsifier 6%	1.40	70	-	Tube fragmented. Plate indented.
ANE-J5 (sensitized by microballoons) Ammonium nitrate 71%, Sodium nitrate 5%, Water 18%, Fuel/emulsifier 6%	1.20	70	+	Tube fragmented. Plate perforated. VOD 5.7 km/s
ANE-J6 (sensitized by microballoons) Ammonium nitrate 80%, Water 13%, Fuel/emulsifier 7%	1.26	70	+	Tube fragmented. Plate perforated. VOD 6.3 km/s



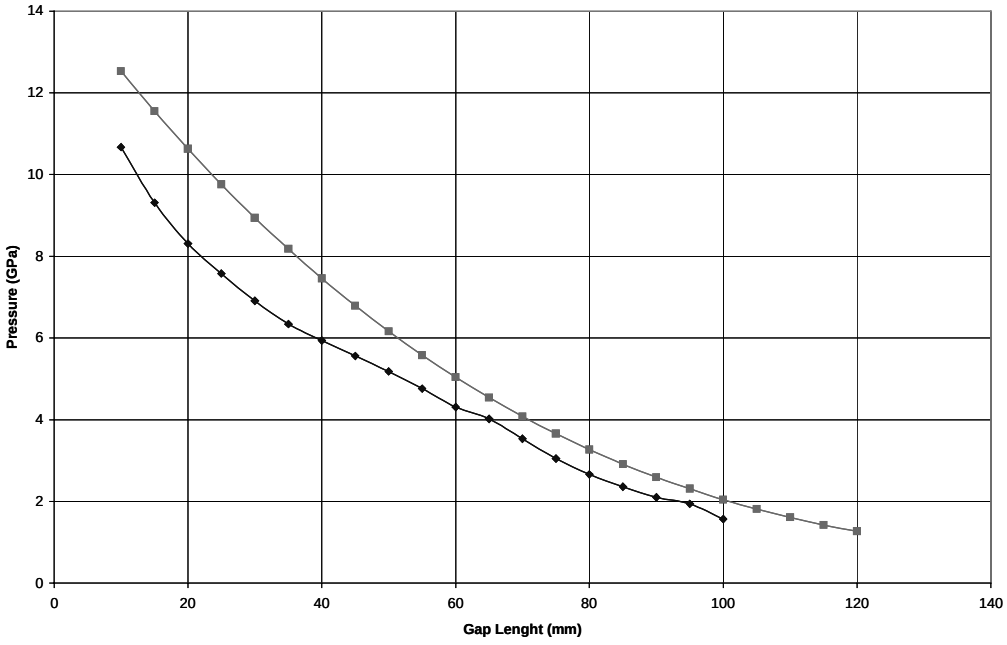
(A)	Detonator	(B)	Booster charge
(C)	PMMA gap	(D)	Substance under test
(E)	Steel tube	(F)	Witness plate

Figure 18.5.1.1: ANE GAP TEST

Table 18.5.1.1 ANE GAP TEST CALIBRATION DATA

PENTOLITE 50/50 DONOR		RDX/WAX/GRAPHITE DONOR	
Gap length (mm)	Barrier pressure (GPa)	Gap length (mm)	Barrier pressure (GPa)
10	10.67	10	12.53
15	9.31	15	11.55
20	8.31	20	10.63
25	7.58	25	9.76
30	6.91	30	8.94
35	6.34	35	8.18
40	5.94	40	7.46
45	5.56	45	6.79
50	5.18	50	6.16
55	4.76	55	5.58
60	4.31	60	5.04
65	4.02	65	4.54
70	3.53	70	4.08
75	3.05	75	3.66
80	2.66	80	3.27
85	2.36	85	2.91
90	2.10	90	2.59
95	1.94	95	2.31
100	1.57	100	2.04
		105	1.81
		110	1.61
		115	1.42
		120	1.27

Figure 18.5.1.2: ANE Gap Test Calibration Data



18.6 Series 8 Type (c) Test prescription

18.6.1 *Test 8(c): Koenen test*

18.6.1.1 *Introduction*

This test is used to determine the sensitiveness of a candidate ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosive, to the effect of intense heat under high confinement.

18.6.1.2 *Apparatus and materials*

18.6.1.2.1 The apparatus consists of a non-reusable steel tube, with its re-usable closing device, installed in a heating and protective device. The tube is deep drawn from sheet steel of suitable quality. The mass of the tube is 25.5 ± 1.0 g. The dimensions are given in figure 18.6.1.1. The open end of the tube is flanged. The closing plate with an orifice, through which the gases from the decomposition of the test substance escape, is made from heat-resisting chrome steel and is available with the following diameter holes: 1.0 - 1.5 - 2.0 - 2.5 - 3.0 - 5.0 - 8.0 - 12.0 - 20.0 mm. The dimensions of the threaded collar and the nut (closing device) are given in figure 18.6.1.1.

18.6.1.2.2 Heating is provided by propane, from an industrial cylinder fitted with a pressure regulator, via a flow meter and distributed by a manifold to the four burners. Other fuel gases may be used providing the specified heating rate is obtained. The gas pressure is regulated to give a heating rate of 3.3 ± 0.3 K/s when measured by the calibration procedure. Calibration involves heating a tube (fitted with a 1.5 mm orifice plate) filled with 27 cm^3 of dibutyl phthalate. The time taken for the temperature of the liquid (measured with a 1 mm diameter thermocouple centrally placed 43 mm below the rim of the tube) to rise from 50 °C to 250 °C is recorded and the heating rate calculated.

18.6.1.2.3 Because the tube is likely to be destroyed in the test, heating is undertaken in a protective welded box, the construction and dimensions of which are given in figure 18.6.1.2. The tube is suspended between two rods placed through holes drilled in opposite walls of the box. The arrangement of the burners is given in figure 18.6.1.2. The burners are lit simultaneously by a pilot flame or an electrical ignition device. ***The test apparatus is placed in a protective area***. Measures should be taken to ensure that any draughts does not affect the burner flames. Provision should be made for extracting any gases or smoke resulting from the test.

18.6.1.3 *Procedure*

18.6.1.3.1 The substance is loaded into the tube to a height of 60 mm taking particular care to prevent the formation of voids. The threaded collar is slipped onto the tube from below, the appropriate orifice plate is inserted and the nut tightened by hand after applying some molybdenum disulphide based lubricant. It is essential to check that none of the substance is trapped between the flange and the plate, or in the threads.

18.6.1.3.2 With orifice plates from 1.0 mm to 8.0 mm diameter, nuts with an orifice of 10.0 mm diameter should be used; if the diameter of the orifice is above 8.0 mm, that of the nut should be 20.0 mm. Each tube is used for one trial only. The orifice plates, threaded collars and nuts may be used again provided they are undamaged.

18.6.1.3.3 The tube is placed in a rigidly mounted vice and the nut tightened with a spanner. The tube is then suspended between the two rods in the protective box. The test area is vacated, the gas supply turned on and the burners lit. The time to reaction and duration of reaction can provide additional information useful in interpreting the results. If rupture of the

tube does not occur, heating is to be continued for at least five minutes before the trial is finished. After each trial the fragments of the tube, if any, should be collected and weighed.

18.6.1.3.4 The following effects are differentiated:

"O": Tube unchanged;
"A": Bottom of tube bulged out;
"B": Bottom and wall of the tube bulged out;
"C": Bottom of tube split;
"D": Wall of tube split;
"E": Tube split into two[1] fragments;
"F": Tube fragmented into three[1] or more mainly large pieces which in some cases may be connected with each other by a narrow strip;
"G": Tube fragmented into many mainly small pieces, closing device undamaged; and
"H": Tube fragmented into many very small pieces, closing device bulged out or fragmented.

Examples for the effect types "D", "E" and "F" are shown in figure 18.6.1.3. If a trial results in any of the effects "O" to "E", the result is regarded as "no explosion". If a trial gives the effect "F", "G" or "H", the result is evaluated as "explosion".

18.6.1.3.5 The series of trials is started with a single trial using an orifice plate of 20.0 mm. If, in this trial, the result "explosion" is observed, the series is continued with trials using tubes without orifice plates and nuts but with threaded collars (orifice 24.0 mm). If at 20.0 mm "no explosion" occurs, the series is continued with single trials using plates with the following orifices 12.0 - 8.0 - 5.0 - 3.0 - 2.0 - 1.5 and finally 1.0 mm until, at one of these diameters, the result "explosion" is obtained. Subsequently, trials are carried out at increasing diameters, according to the sequence given in 18.6.1.2.1, until only negative results in three tests at the same level are obtained. The limiting diameter of a substance is the largest diameter of the orifice at which the result "explosion" is obtained. If no "explosion" is obtained with a diameter of 1.0 mm, the limiting diameter is recorded as being less than 1.0 mm.

18.6.1.4 *Test criteria and method of assessing results*

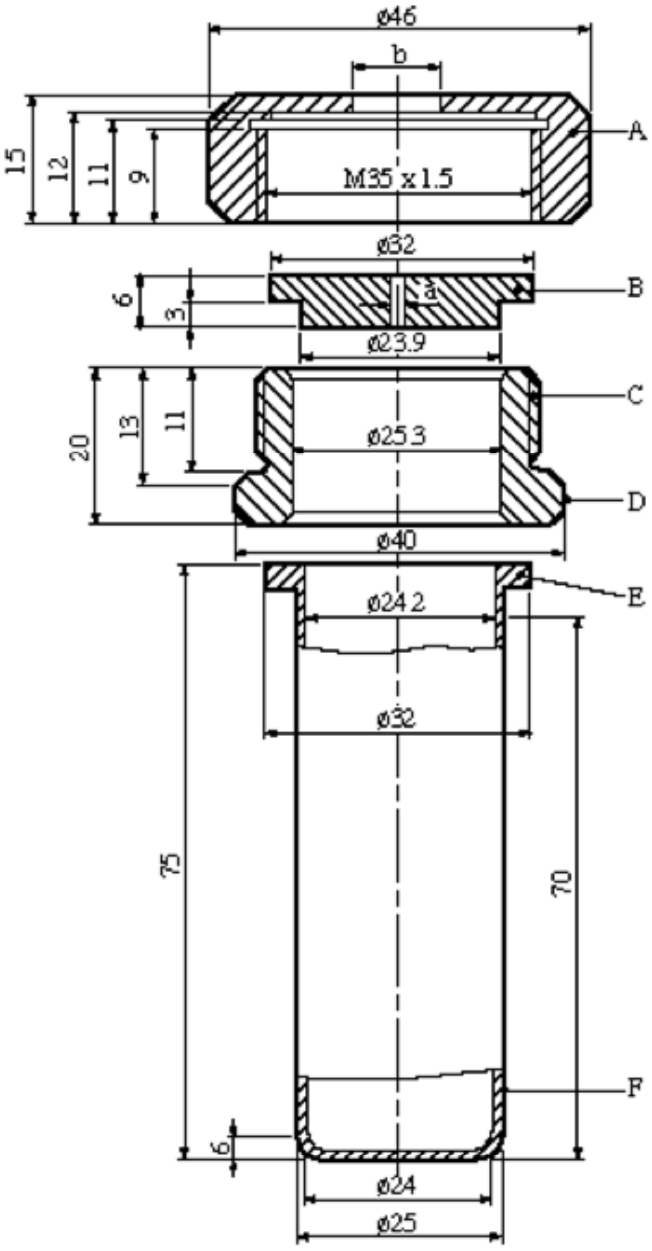
The result is considered "+" and the substance should not be classified in Division 5.1 if the limiting diameter is 2.0 mm or more. The result is considered "—" if the limiting diameter is less than 2.0 mm.

18.6.1.5 *Examples of results*

Substances	**Result**	**Comments**
Ammonium nitrate (low density)	-	Limiting diameter: <1 mm
ANE-F1 Ammonium nitrate 71%, Water 21%, Fuel/emulsifier 7%	-	
ANE-F2 Ammonium nitrate 77%, Water 17%, Fuel/emulsifier 7%	-	
ANE-F3 Ammonium nitrate 70%, Sodium nitrate 11%, Water 12%, Fuel/emulsifier 7%	-	
ANE-F4 Ammonium nitrate 42%, Calcium nitrate 35%, Water 16%, Fuel/emulsifier 7%	-	
ANE-F5 Ammonium nitrate 69%, Sodium nitrate 13%, Water 10%, Fuel/emulsifier 8%	-	

[1] *The upper part of the tube remaining in the closing device is counted as one fragment.*

Substances	Result	Comments
ANE-F6 Ammonium nitrate 72%, Sodium nitrate 11%, Water 10%, Fuel/emulsifier 6%	-	
ANE-F7 Ammonium nitrate 76%, Water 13%, Fuel/emulsifier 10%	-	
ANE-F8 Ammonium nitrate 77%, Water 16%, Fuel/emulsifier 6%	-	
ANE-1 Ammonium nitrate 76%, Water 17%, Fuel/emulsifier 7%	-	Limiting diameter: 1.5 mm
ANE-2 (sensitized by microballoons) Ammonium nitrate 75%, Water 17%, Fuel/emulsifier 7%	+	Limiting diameter: 2 mm
ANE-4 (sensitized by microballoons) Ammonium nitrate 70%, Sodium nitrate 11%, Water 9%, Fuel/emulsifier 5.5%	+	Limiting diameter: 2 mm
ANE-G1 Ammonium nitrate 74%, Sodium nitrate 1%, Water 16%, Fuel/emulsifier 9%	-	
ANE-G2 Ammonium nitrate 74%, Sodium nitrate 3%, Water 16%, Fuel/emulsifier 7%	-	
ANE-J1 Ammonium nitrate 80%, Water 13%, Fuel/emulsifier 7%	-	Effect type "O"
ANE-J2 Ammonium nitrate 76%, Water 17%, Fuel/emulsifier 7%	-	Effect type "O"
ANE-J4 Ammonium nitrate 71%, Sodium nitrate 11%, Water 12%, Fuel/emulsifier 6%	-	Effect type "A"



(A)	Nut (b =10.0 or 20.0 mm) with flats for size 41 spanner	(B)	Orifice plate (a = 1.0 →20.0 mm diameter)
(C)	Threaded collar	(D)	Flats for size 36 spanner
(E)	Flange	(F)	Tube

Figure 18.6.1.1: TEST TUBE ASSEMBLY

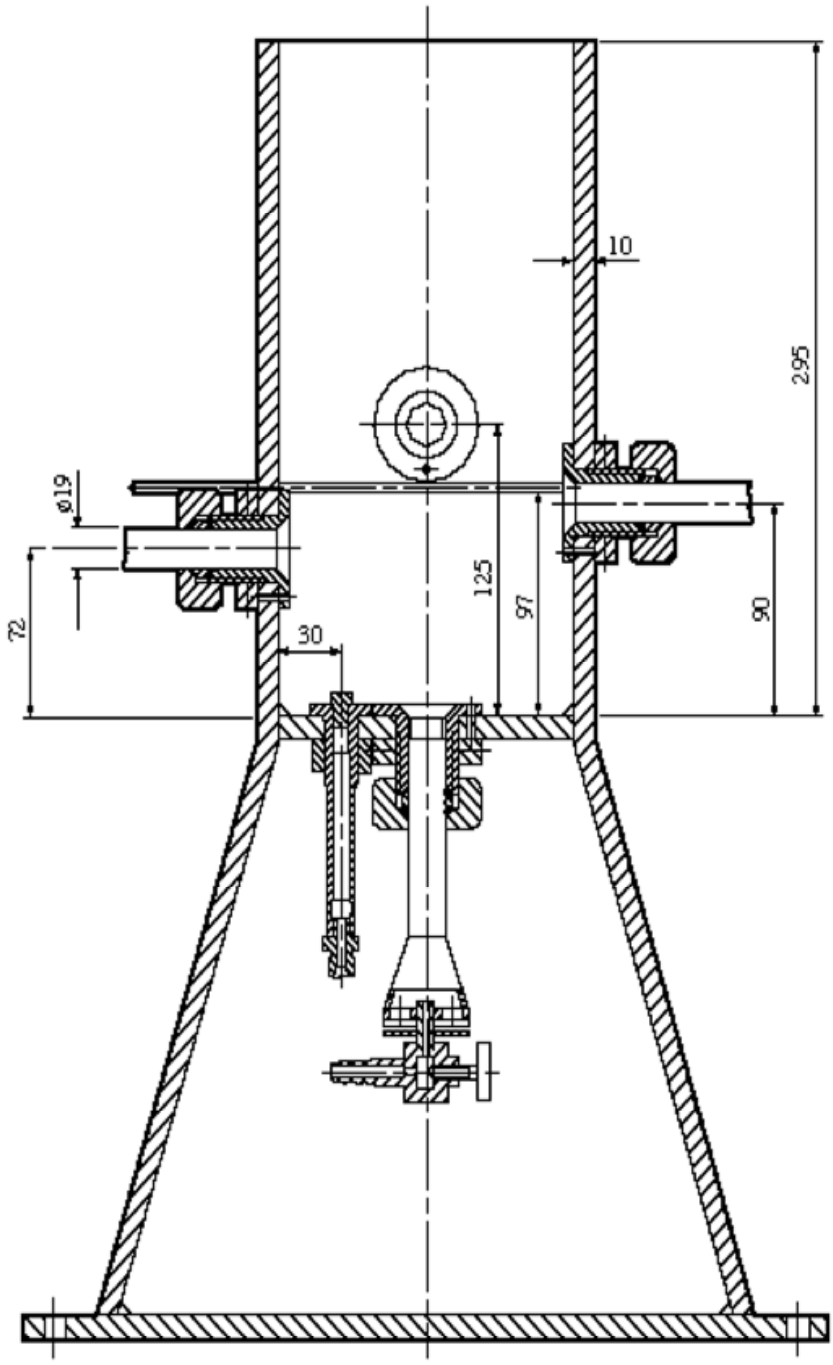


Figure 18.6.1.2: HEATING AND PROTECTIVE DEVICE

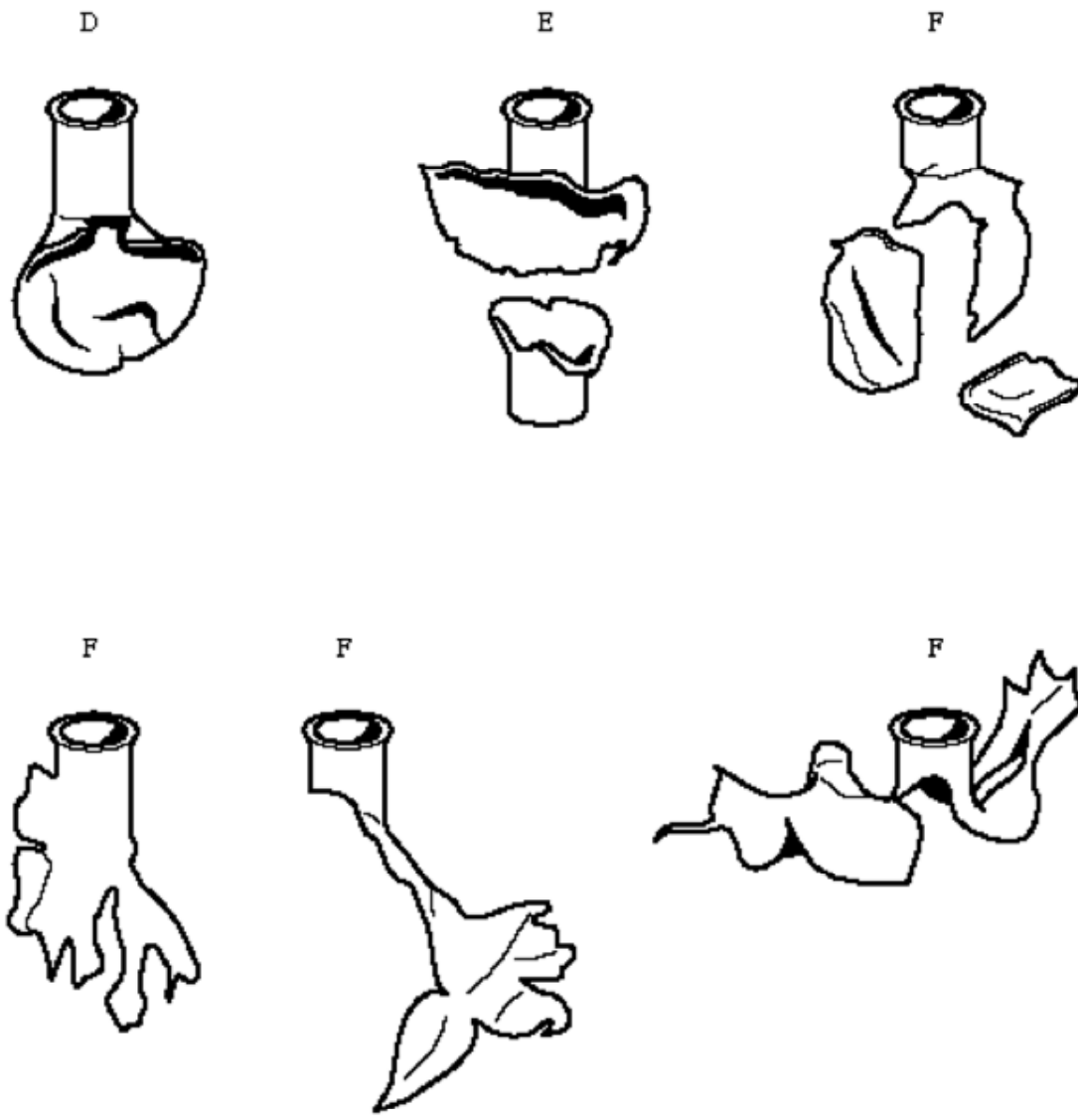


Figure 18.6.1.3 EXAMPLES OF EFFECT TYPES D, E AND F

18.7 Series 8 Type (d) Test prescription

18.7.1 *Test 8 (d): Vented pipe test*

18.7.1.1 *Introduction*

This test is not intended for classification but is included in this Manual for evaluating the suitability for transport in tanks.

The vented pipe test is used to assess the effect of exposure of a candidate for "ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives" to a large fire under confined, vented conditions.

18.7.1.2 *Apparatus and materials*

The following items are needed:

(a) A steel pipe 31 ± 1 cm diameter and 61 ± 1 cm long, welded close at the bottom with a 38 cm square, 10 ± 0.5 mm thick mild steel plate. The top of the pipe is welded to a 38 cm square, 10 ± 0.5 mm thick mild steel plate that contains a 78 mm diameter vent hole centrally located in the plate to which a 152 mm long steel pipe nipple of 78 mm internal diameter is welded. (See figure 18.7.1.1).

(b) A metal grid to support the filled pipe above the fuel and allow adequate heating. If a wooden crib fire is used, the grid should be 1.0 m above the ground and if a liquid hydrocarbon pool fire is used then the grid shall be 0.5 m above the ground;

(c) Enough fuel to keep a fire burning for at least 30 minutes or, if necessary, until the substance has clearly had enough time to react to the fire;

(d) Suitable means of ignition to ignite the fuel from two sides e.g. for a wood fire, kerosene to soak the wood and pyrotechnic igniters with wood wool;

(e) Cine or video cameras, preferably high speed and normal speed, to record events in colour;

(f) Blast gauges, radiometers and associated recording equipment may also be used.

18.7.1.3 *Procedure*

18.7.1.3.1 The pipe is filled with the substance under test without tamping during loading. The substance is carefully packed to prevent adding voids. The steel pipe is placed vertically on the grid and secured from tipping over. Fuel is placed beneath the grid so that the fire will engulf the pipe. Precautions against side winds may be required to avoid dissipation of the heat. Suitable methods of heating include a wood fire using a lattice of wooden laths, a liquid or gas fuel fire that produces a flame temperature of at least 800 °C.

18.7.1.3.2 One method is to use a wood fire which has a balanced air/fuel ratio, thereby avoiding too much smoke which would obscure the events, and which burns with sufficient intensity and duration to bring the substance to a possible reaction. A suitable method involves using air-dried pieces of wood (approximately 50 mm square section), stacked to form a lattice beneath the grid (1 m off the ground), and up to the base of the grid supporting the pipe. The wood should extend beyond the pipe to a distance of at least 1.0 m in every direction and the lateral distance between the laths should be about 100 mm.

18.7.1.3.3 A receptacle filled with suitable liquid fuel, a combination of both wood and liquid fuel fire may be used as an alternative to the wood fire providing it is as severe. If a liquid pool fire is used, the receptacle should extend beyond the pipe to a distance of at least 1.0 m in every direction. The distance between the grid platform and the receptacle should be approximately 0.5 m. Before using this method, consideration should be given to whether any quenching action or adverse interaction between the substance and the liquid fuel can occur such as might bring the results into question.

18.7.1.3.4 If gas is to be used as a fuel, the burning area must extend beyond the pipe to a distance of 1.0 m in every direction. The gas must be supplied in such a manner to ensure that the fire is evenly distributed around the pipe. The gas reservoir should be large enough to keep the fire burning for at least 30 minutes. Ignition of the gas may be accomplished either by remotely ignited pyrotechnics or by remote release of the gas adjacent to a pre-existing source of ignition.

18.7.1.3.5 The ignition system should be put into place and the fuel ignited on two sides, one up wind, simultaneously. The test should not be performed under conditions where the wind speed exceeds 6 m/s. ***The fire shall be started from a safe place. If the pipe does not rupture, the system should be allowed to cool down before carefully dismantling the test set-up and emptying the pipe***.

18.7.1.3.6 Observations are made on the following:

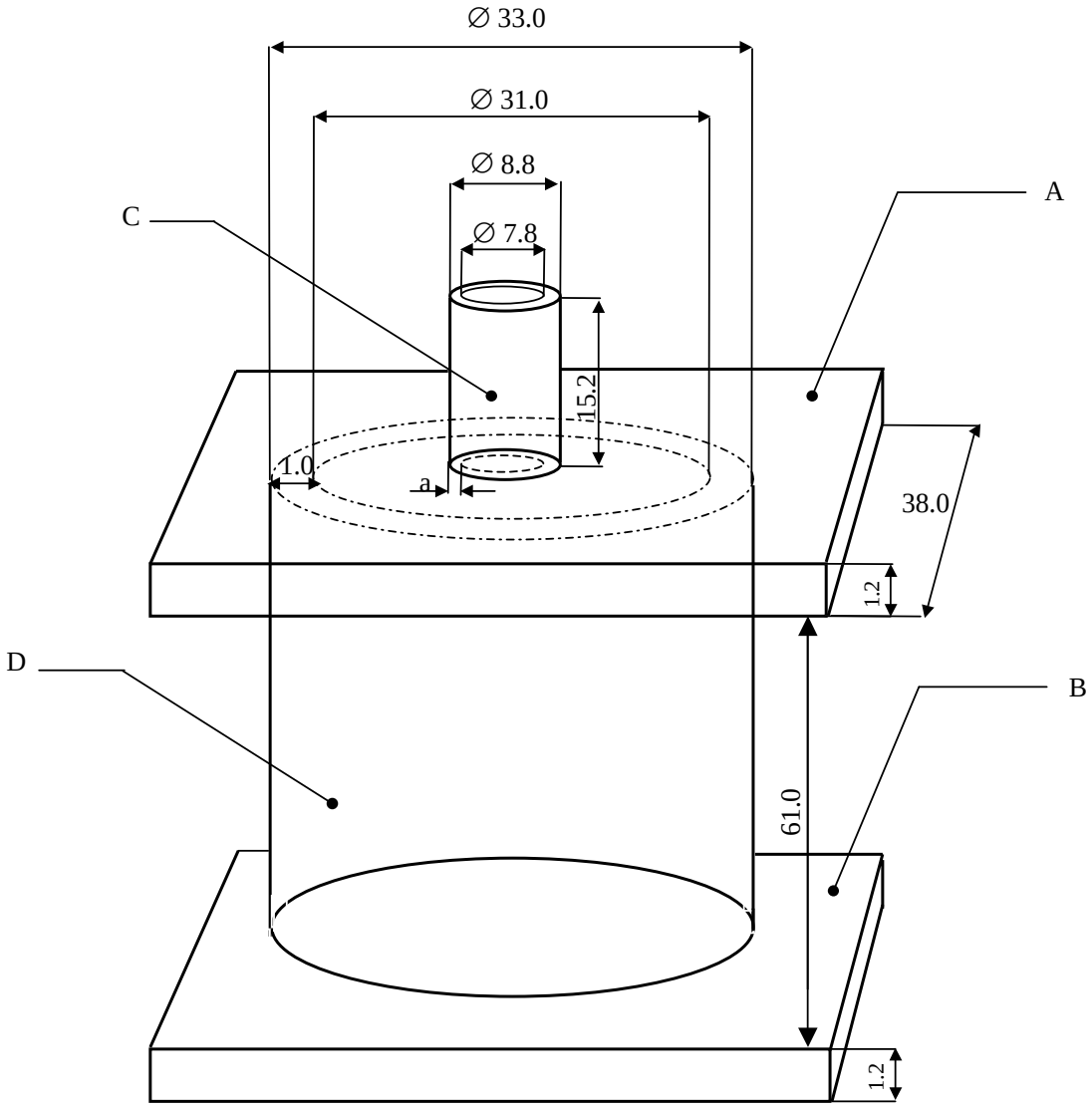
(a) evidence of explosion;
(b) loud noise; and
(c) projection of fragments from the fire area.

18.7.1.4 *Test criteria and method of assessing results*

The test result is considered "+" and the substance should not be transported in tanks if an explosion and/or fragmentation of the pipe is observed. If no explosion and/or fragmentation of the pipe is observed then the result is considered "-".

18.7.1.5 *Examples of results*

Substance	**Result**
to be added	



(A)	Top plate (Schedule 40 carbon (A53 grade B))
(B)	Bottom plate (Schedule 40 carbon (A53 grade B))
(C)	Steel pipe nipple (a = 0.5 cm), Schedule 40 carbon (A53 grade B)
(D)	Steel pipe (Schedule 40 carbon (A53 grade B))

Figure 18.7.1.1: VENTED PIPE TEST

Section 30

30.1.1 Insert the following two new subparagraphs:

"(a) Flammable aerosols (see section 31 of this Manual and special provision 63 of Chapter 3.3 of the Model Regulations);"

Existing (a) to (e) become (b) to (f), respectively.

"(f) Corrosive properties of substances of class 8 (see section 37 of this Manual and Chapter 2.8 of the Model Regulations);".

Existing (f) and (g) become (h) and (i), respectively.

30.1.2 Amend the last sentence as follows: "Sections 35 and 36 are reserved, to allow….for Classes 6 and 7 respectively.".

Section 31

Replace the existing text between brackets in page 307 (English text) with the following:

"SECTION 31

CLASSIFICATION PROCEDURES, TEST METHODS AND CRITERIA RELATING TO FLAMMABLE AEROSOLS OF CLASS 2

31.1 Purpose

31.1.1 This section presents the United Nations scheme for the classification of flammable aerosols. The text should be used in conjunction with the classification principles given in Chapters 2.2 and 3.3 (special provision 63) of the Model Regulations, the flow charts given here in figures 31.1, 31.2 and 31.3 and the tests prescriptions given in sub-sections 31.4, 31.5 and 31.6 of this Manual.

31.1.2 The test procedures outlined here adequately assess the relative hazard of flammable aerosols so that an appropriate classification can be made.

31.1.3 For the purposes of this section the following definitions apply:

Aerosols or aerosol dispensers are non-refillable receptacles meeting the requirements of section 6.2.4 of the Model Regulations, made of metal glass or plastics and containing a gas, compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state.

Flammable components are flammable liquids, flammable solids or flammable gases and gas mixtures. This designation does not cover pyrophoric, self-heating or water-reactive substances.

NOTE 1: *A flammable liquid means a liquid having a flash point of not more than 93 °C. Test methods for determining the flash point are given in sub-section 32.4 of this Manual;*

NOTE 2: *For the definition of flammable solids, see paragraph 2.4.2.2 of the Model Regulations. Classification procedures, test methods and criteria relating to flammable solids of Division 4.1 are given in sub-section 33.2 of this Manual;*

NOTE 3: *A flammable gas is a gas having a flammable range with air at 20 °C and a standard pressure of 101.3 kPa.*

31.2 Scope

31.2.1 Aerosols offered for transport should be subjected to the classification procedures as set out in special provision 63 of Chapter 3.3 of the Model Regulations and, for flammability, in this sub-section. The classification procedure shall be undertaken before a new product is offered for transport.

[***NOTE:*** *Aerosol dispensers not submitted to flammability classification procedures in this sub-section shall be classified as extremely flammable.]*.

31.3 Classification procedure for flammable aerosols

31.3.1 Aerosols shall be classified as flammable or extremely flammable according to their heat of combustion and to their flammable component contents, as follows:

(a) The aerosol product is classified as extremely flammable if the product contains 85% or more flammable components and the chemical heat of combustion exceeds or is equal to 30 kJ/g;

(b) The aerosol product is classified as non-flammable if the product contains 1% or less flammable components and the chemical heat of combustion is less than 20 kJ/g.

31.3.2 In the case of spray aerosols the classification shall be made taking into account the chemical heat of combustion and on the basis of the results of the ignition distance test, as follows:

(a) If the chemical heat of combustion is less than 20 kJ/g:

(i) The aerosol is classified as flammable if ignition occurs at a distance equal or greater than 15 cm but less than 75 cm;

(ii) The aerosol is classified as extremely flammable if ignition occurs at a distance of 75 cm or more;

(iii) If no ignition occurs in the ignition distance test, the enclosed space test shall be performed and in this case, the aerosol is classified as flammable if the time equivalent is less than or equal to 300 s/m^3 or the deflagration density is less than or equal to 300 g/m^3; otherwise the aerosol is classified as non-flammable;

(b) If the chemical heat of combustion is equal to or more than 20 kJ/g, the aerosol is classified as extremely flammable if ignition occurs at a distance of 75 cm or more; otherwise the aerosol is classified as flammable.

31.3.3 The chemical heat of combustion shall be determined following one of the methods described in the following standards: ASTM D 240, ISO/FDIS 13943:1999 (E/F) 86.1 to 86.3 and NFPA 30B.

31.3.4 In the case of foam aerosols, the classification shall be made on the basis of the results of the foam flammability test (see sub-section 31.6 of this Manual).

(a) The aerosol product shall be classified as extremely flammable if:

(i) The flame height is 20 cm or more and the flame duration is 2 s or more; or

(ii) The flame height is 4 cm or more and the flame duration is 7 s or more.

(b) The aerosol product which does not meet the criteria in (a) is classified as flammable if the flame height is 4 cm or more and the flame duration is 2 s or more.

31.3.5 The classification criteria for aerosols, spray aerosols and foam aerosols is summarized in figures 31.1, 31.2 and 31.3 respectively.

FIGURE 31.1: OVERALL PROCEDURE FOR CLASSIFICATION OF FLAMMABLE AEROSOLS

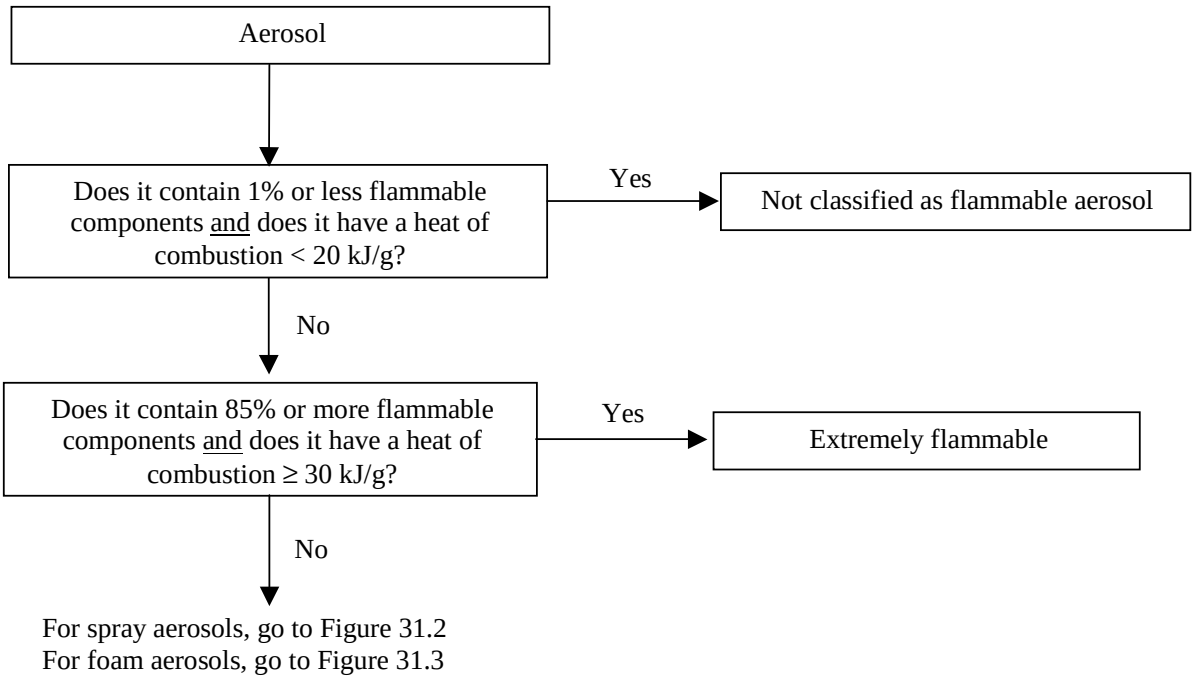


FIGURE 31.2: PROCEDURE FOR CLASSIFICATION OF SPRAY AEROSOLS

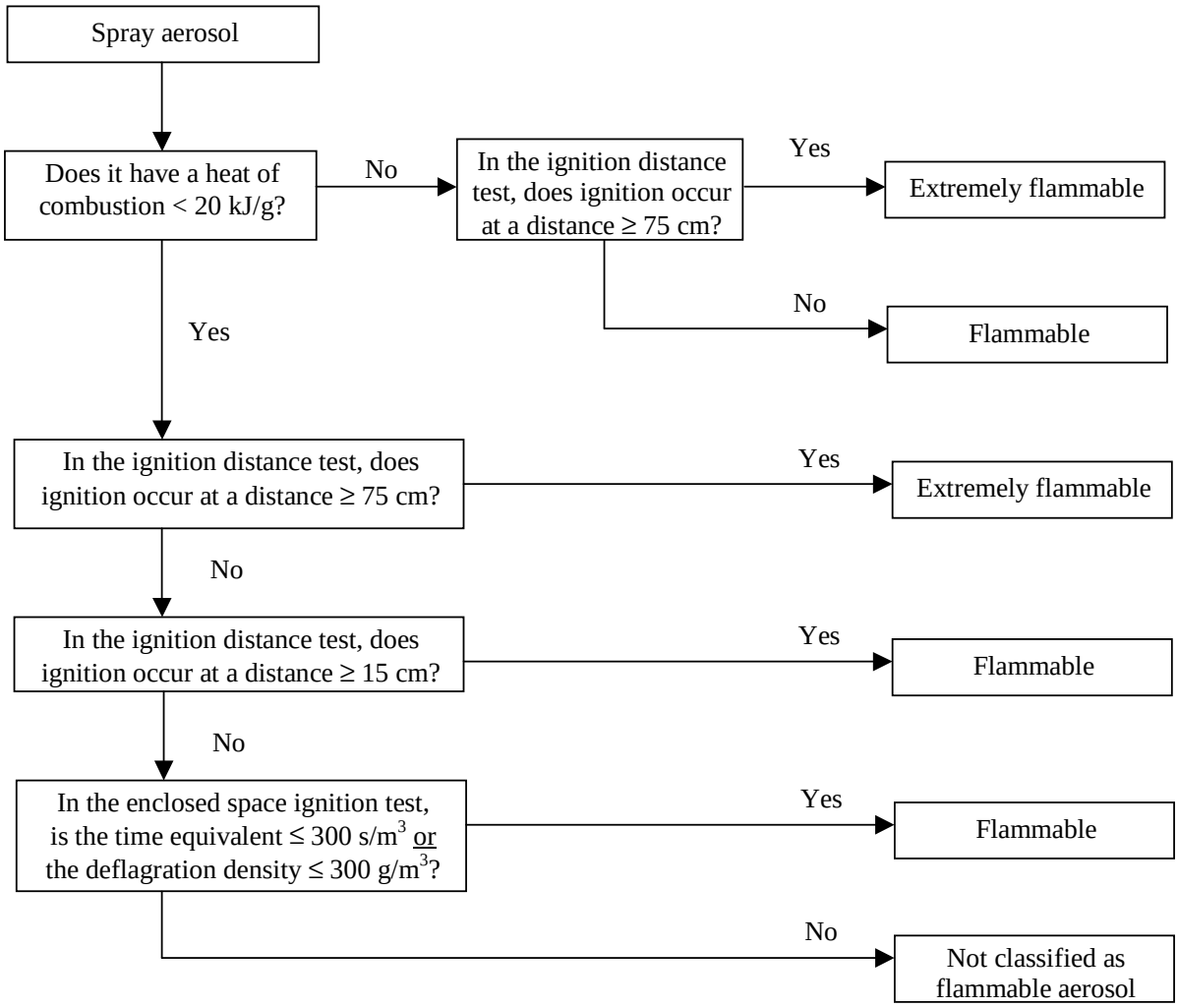
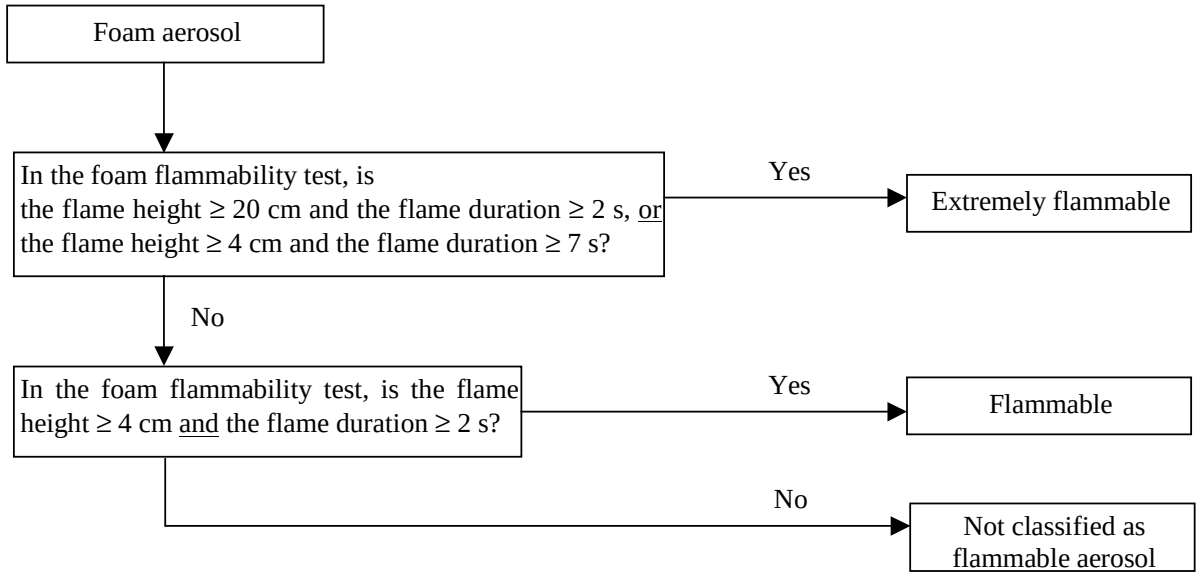


FIGURE 31.3: PROCEDURE FOR CLASSIFICATION OF FOAM AEROSOLS



31.4 Ignition distance test for spray aerosols

31.4.1 *Introduction*

31.4.1.1 This test standard describes the method to determine the ignition distance of an aerosol spray in order to assess the associated flame risk. The aerosol is sprayed in the direction of an ignition source at intervals of 15 cm to observe if ignition and sustained combustion of the spray takes place. Ignition and sustained combustion is defined as when a stable flame is maintained for at least 5 s. The ignition source is defined as a gas burner with a blue, non-luminous flame 4-5 cm in height.

31.4.1.2 This test is applicable to aerosol products with a spray distance of 15 cm or more. Aerosol products with a spray distance of less than 15 cm such as dispensing foams, mousses, gels and pastes or fitted with a metering valve, are excluded from this test. Aerosol products that dispense foams, mousses, gels or pastes are subject to testing under the aerosol foam flammability test.

31.4.2 *Apparatus and material*

31.4.2.1 The following apparatus is required:

Water bath maintained at 20°C	accurate to ± 1 °C
Calibrated laboratory scales (balance)	accurate to ± 0.1 g
Chronometer (stopwatch)	accurate to ± 0.2 s
Graduated scale, support and clamp	graduations in cm
Gas burner with support and clamp	
Thermometer	accurate to ± 1 °C
Hygrometer	accurate to ± 5 %
Pressure gauge	accurate to ± 0.1 bar

31.4.3 *Procedure*

31.4.3.1 *General requirements*

31.4.3.1.1 Before testing, each aerosol dispenser shall be conditioned and then primed by discharging for approximately 1 s. The purpose of this action is to remove non-homogeneous material from the diptube.

31.4.3.1.2 The instructions of use shall be strictly followed, including whether the dispenser is intended to be used in the upright or inverted position. When shaking is required, shake immediately before testing.

31.4.3.1.3 The test shall be carried out in a draught-free environment capable of ventilation, with the temperature controlled at 20 °C ± 5 °C and relative humidity in the range 30 - 80%.

31.4.3.1.4 Each aerosol dispenser is to be tested:

(a) when full according to the complete procedure, with the gas burner in the range of 15 – 90 cm distance from the actuator of the aerosol can;

(b) when 10 - 12% full nominal (% by mass) only one test, either at 15 cm distance from the actuator when the spray from a full can did not ignite at all, or at the flame ignition distance of the spray of a full can plus 15 cm.

31.4.3.1.5 During the test, the can shall be positioned as indicated by label instructions. The ignition source shall be positioned accordingly.

31.4.3.1.6 The following procedure requires testing the spray at intervals of 15 cm between the burner flame and the aerosol actuator, in the range of 15 - 90 cm. It is efficient to start at 60 cm distance between burner flame and aerosol actuator. The distance between burner flame and aerosol actuator shall be increased by 15 cm in the case of an ignition of the spray at 60 cm distance. The distance shall be decreased by 15 cm in the case of no ignition at 60 cm distance between burner flame and aerosol actuator. The aim of the procedure is to determine the maximum distance between aerosol actuator and burner flame that leads to sustained combustion of the spray or to determine that ignition could not be obtained at 15 cm distance between the burner flame and the aerosol's actuator.

31.4.3.2 *Test procedure*

(a) A minimum of 3 full aerosol dispensers per product shall be conditioned to 20 °C ± 1 °C with at least 95% of the dispenser immersed in the water for at least 30 min before each test (if the aerosol is fully immersed, 30 min conditioning is sufficient);

(b) Comply with general requirements. Record the temperature and relative humidity of the environment;

(c) Weigh an aerosol dispenser and note its mass;

(d) Determine the internal pressure and initial discharge rate at 20 °C ± 1 °C (to eliminate faulty or partly filled aerosol dispensers);

(e) Support the gas burner on a flat horizontal surface or fix the burner to a support by means of a clamp;

(f) Ignite the gas burner; the flame shall be non-luminous and approximately 4-5 cm high;

(g) Place the actuator's exit orifice at the required distance from the flame. The aerosol shall be tested in the position it is designed to be used, e.g. upright or inverted;

(h) Level the actuator's orifice and burner flame, ensuring that the orifice is properly directed towards and aligned with the flame (see Figure 31.4.1). The spray shall be expelled through the top half of the flame;

(i) Comply with the general requirements regarding shaking of the dispenser;

(j) Actuate the valve of the aerosol dispenser, to discharge its contents for 5 s, unless ignition occurs. If ignition occurs, continue discharging and time the duration of the flame for 5 s, from the start of ignition;

(k) Note the ignition results for the distance between the gas burner and the aerosol dispenser in the table provided;

(l) If no ignition occurs during step (j), the aerosol shall be tested in alternative orientations, e.g. inverted for upright use products, to check if ignition is obtained;

(m) Repeat steps (g) to (l) twice more (a total of 3) for the same can at the same distance between the gas burner and the aerosol actuator;

(n) Repeat the test procedure for another two aerosol cans of the same product at the same distance between gas burner and aerosol actuator;

(o) Repeat steps (g) to (n) of the test procedure at a distance between 15 and 90 cm between the actuator of the aerosol can and the burner flame depending on the outcome of each test (see also 31.4.3.1.4 and 31.4.3.1.5);

(p) If no ignition occurs at 15 cm, the procedure is finished for initially full cans. The procedure is also finished when ignition and sustained combustion is obtained at a distance of 90 cm. If ignition could not be obtained at 15 cm distance, record that ignition did not occur**.** The maximum distance between burner flame and the aerosol's actuator for which an ignition and sustained combustion was observed is noted as the "ignition distance", in all other circumstances;

(q) One test shall also be conducted on 3 cans of 10 - 12% nominal fill level. These cans shall be tested at a distance between the aerosol's actuator and the burner flame of "the flame ignition distance of full cans + 15 cm";

(r) Discharge an aerosol can to a 10 - 12% nominal fill level (by mass) in bursts of 30 s maximum. Observe a 300 s minimum time period between bursts. During this interim period dispensers shall be placed in the water bath for conditioning;

(s) Repeat steps (g) to (n) for 10 - 12% nominal fill aerosol cans, omitting steps (l) and (m). This test shall only be performed with the aerosol in one position, e.g. upright or inverted, corresponding with that which produced the ignition (if any) for filled cans;

(t) Record all results in the Table 31.4 as shown below.

31.4.3.2.1 All experiments shall be performed in a fume hood in a room that may be well ventilated. Ventilation of the fume hood and room can be applied for at least 3 min after each test. Take all necessary safety precautions to prevent the inhalation of combustion products.

31.4.3.2.2 The cans with a 10 - 12% nominal fill level shall be tested only once. The result tables need only one result per can indicated.

31.4.3.2.3 When the test in the position in which the dispenser is designed to be used gives a negative result, the test shall be repeated in the position of the dispenser most likely to result in a positive result.

31.4.4 ***Test criteria and method of assessing results***

31.4.4.1 All the results shall be recorded. Table 31.4 below shows the model of "result table" to be used.

Table 31.4

Date		Temperature °C Relative humidity %		
Name of product				
Net volume		Can 1	Can 2	Can 3
Initial level of filling		%	%	%
Dispenser distance	Test	1 2 3	1 2 3	1 2 3
15 cm	Ignition? Y or N			
30 cm	Ignition? Y or N			
45 cm	Ignition? Y or N			
60 cm	Ignition? Y or N			
75 cm	Ignition? Y or N			
90 cm	Ignition? Y or N			
Observations – including can position				

31.4.4.2 Spray aerosols shall be classified as flammable, extremely flammable or non flammable according to the following criteria:

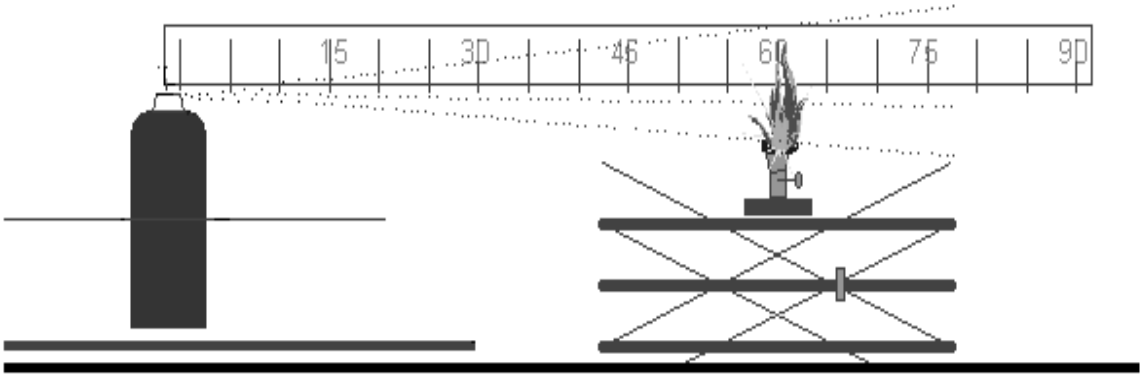
(a) An aerosol with a chemical heat of combustion less than 20 kJ/g is classified as flammable if ignition occurs at a distance equal or greater than 15 cm but less than 75 cm;

(b) An aerosol with a chemical heat of combustion less than 20 kJ/g is classified as extremely flammable if ignition occurs at a distance of 75 cm or more;

(c) If for an aerosol with a chemical heat of combustion less than 20 kJ/g, no ignition occurs in the ignition distance test, the enclosed space ignition test described in sub-section 31.5 of this Manual shall be performed;

(d) An aerosol with a chemical heat of combustion equal to or more than 20 kJ/g is classified as extremely flammable if ignition occurs at a distance of 75 cm or more. Otherwise the aerosol is classified as flammable.

Figure 31.4.1



31.5 Enclosed space ignition test

31.5.1 *Introduction*

31.5.1.1 This test standard describes the method to assess the flammability of products emerging from aerosol dispensers due to their propensity to ignite in an enclosed or confined space. The contents of an aerosol dispenser are sprayed into a cylindrical test vessel containing a burning candle. If an observable ignition occurs, the elapsed time and amount discharged is noted.

31.5.2 *Apparatus and material*

31.5.2.1 The following apparatus is required:

Chronometer (stopwatch)	accurate to ± 0.2 s
Water bath maintained at 20 °C	accurate to ± 1 °C
Calibrated laboratory scales (balance)	accurate to ± 0.1 g
Thermometer	accurate to ± 1 °C
Hygrometer	accurate to ± 5%
Pressure gauge	accurate to ± 0.1 bar
Cylindrical test vessel	as detailed below

31.5.2.2 Preparation of test apparatus

31.5.2.2.1 A cylindrical vessel approximately 200 dm^3 (55 gallons) volume, approximately 600 mm in diameter and approximately 720 mm long and open at one end shall be modified as follows:

(a) A closure system consisting of a hinged cover should be matched to the open end of the receptacle; or

(b) A plastic film 0.01 to 0.02 mm thick may be used as a closure system. If the test is carried out with a plastic film this must be used as described below:

Stretch the film over the open end of the drum and hold it in place with an elastic band. The strength of the band shall be such that when placed around the drum resting on its side, it stretches by only 25 mm when a mass of 0.45 kg is attached to its lowest point. Cut a 25 mm slit in the

film, starting 50 mm from the edge of the drum. Ensure that the film is taut;

(c) At the other end of the drum drill a 50 mm diameter hole 100 mm from the edge in such a way that the orifice is uppermost when the receptacle is laid down and ready for the test (Figure 31.5.1);

(d) On a 200 x 200 mm metal support place a paraffin wax candle 20 to 40 mm in diameter and 100 mm high. The candle shall be replaced when having a height of less than 80 mm. The candle's flame is protected from the action of the spray by a 150 mm wide, 200 mm high deflector. This includes the plane inclined at 45° produced 150 mm from the base of the deflector (Figure 31.5.2);

(e) The candle placed on the metal support shall be positioned midway between the two ends of the drum (Figure 31.5.3);

Figure 31.5.1

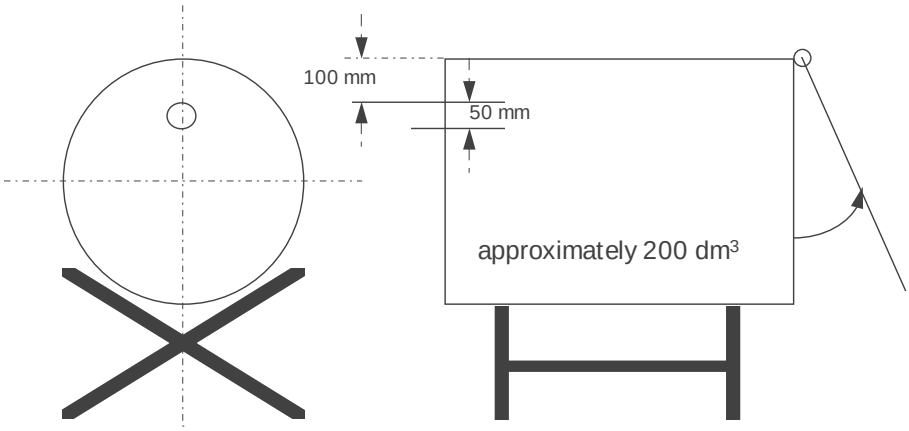


Figure 31.5.2

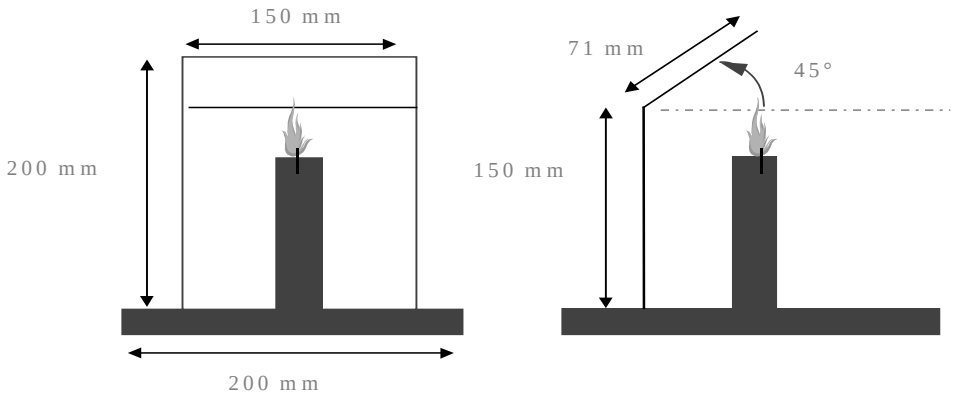
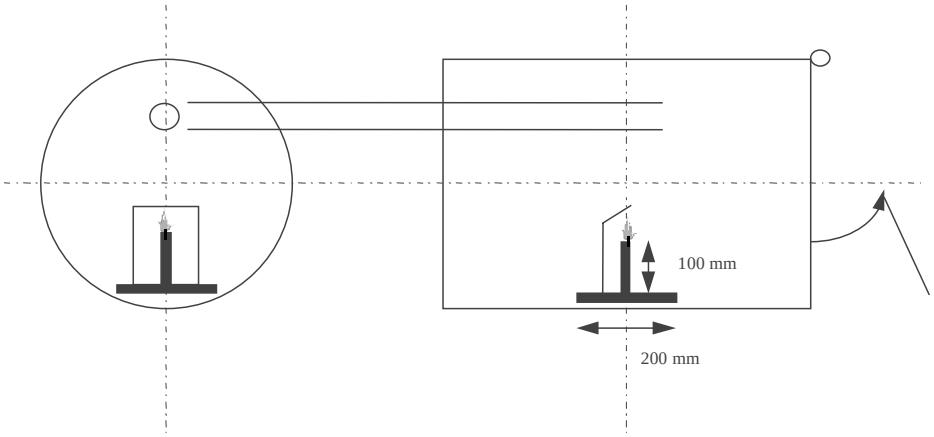


Figure 31.5.3



(f) The drum is laid on the ground or on a support at a spot where the temperature is between 15 °C and 25 °C. The product to be tested will be sprayed within the drum of roughly 200 dm^3 in which there will be a source of ignition.

31.5.2.2.2 Usually, the product leaves the aerosol can at an angle of 90° relevant to the vertical axis of the can. The layout and procedure described refers to this kind of aerosol product. In the case of unusually operating aerosols (e.g. vertical-spray aerosol dispensers) it will be necessary to record changes to equipment and procedures in accordance with good laboratory practice, such as ISO/IEC 17025:1999 General requirements for the competence of testing and calibration laboratories.

31.5.3 *Procedure*

31.5.3.1 *General requirements*

31.5.3.1.1 Before testing, each aerosol dispenser shall be conditioned and then primed by discharging for approximately 1 second. The purpose of this action is to remove non-homogeneous material from the diptube.

31.5.3.1.2 The instructions of use shall be strictly followed, including whether the dispenser is intended to be used in the upright or inverted position. When shaking is required, shake immediately before testing.

31.5.3.1.3 The tests shall be carried out in a draught-free environment capable of ventilation, with the temperature controlled at 20 °C ± 5 °C and relative humidity in the range 30 - 80%.

31.5.3.2 *Test procedure*

(a) A minimum of 3 full aerosol dispensers per product shall be conditioned to 20 °C ± 1 °C in a water bath with at least 95% of the dispenser immersed in the water for at least 30 min (if the aerosol is fully immersed, 30 min conditioning is sufficient);

(b) Measure or calculate the actual volume of the drum in dm^3;

(c) Comply with general requirements. Record the temperature and relative humidity of the environment;

(d) Determine the internal pressure and initial discharge rate at 20 °C ± 1 °C (to eliminate faulty or partly filled aerosol dispensers);

(e) Weigh one of the aerosol dispensers and note its mass;

(f) Light the candle and apply the closure system (cover or plastic film);

(g) Place the aerosol dispenser actuator orifice 35 mm or closer for a wide spray product, from the centre of the entrance hole in the drum. Start the chronometer (stopwatch) and following the instructions for use of the product; direct the spray towards the centre of the opposite extremity (cover or plastic film). The aerosol shall be tested in the position it is designed to be used, e.g. upright or inverted;

(h) Spray until ignition occurs. Stop the chronometer and note the time elapsed. Re-weigh the aerosol dispenser and note its mass;

(i) Ventilate and clean the drum removing any residue likely to affect subsequent tests. Allow the drum to cool if necessary;

(j) Repeat the test procedure steps (d) to (i) for another two aerosol dispensers of the same product (3 in total, note: each dispenser is only tested once);

31.5.4 ***Test criteria and method of assessing results***

31.5.4.1 A test report containing the following information shall be drawn up:

a) The product tested and its references;

b) The internal pressure and discharge rate of the aerosol dispenser;

c) The temperature and relative air humidity of the room;

d) For each test, the discharge time (s) needed to achieve ignition (if the product does not ignite, state this);

e) The mass of the product sprayed during each test (in g);

f) The actual volume of the drum (in dm^3).

31.5.4.2 The time equivalent (t_{eq}) needed to achieve ignition in one cubic metre can be calculated as follows:

$$t_{eq} = \frac{1000 \times \text{discharge time (s)}}{\text{Actual volume of drum } (dm^3)}$$

31.5.4.3 The deflagration density (D_{def}) needed to achieve ignition during the test may also be calculated as follows:

$$D_{def} = \frac{1000 \times \text{Amount of product dispensed (g)}}{\text{Actual volume of drum } (dm^3)}$$

31.5.4.4 An aerosol with a chemical heat of combustion less than 20 kJ/g for which no ignition occurs in the ignition distance test (see sub-section 31.4 of this Manual) is classified as flammable if the time equivalent is less than or equal to 300 s/m^3 or the deflagration density is less than or equal to 300 g/m^3. Otherwise the aerosol is classified as non-flammable.

31.6 Aerosol foam flammability test

31.6.1 *Introduction*

31.6.1.1 This test standard describes the method to determine the flammability of an aerosol spray emitted in the form of a foam, mousse, gel or paste. An aerosol, which emits a foam, mousse, gel or paste is sprayed (approx. 5 g) on a watchglass and an ignition source (candle, wax taper, match or lighter) is placed at the base of the watchglass to observe if ignition and sustained combustion of the foam, mousse, gel or paste occurs. Ignition is defined as a stable flame maintained for at least 2 s and a minimum 4 cm in height.

31.6.2 *Apparatus and material*

31.6.2.1 The following apparatus is required:

Graduated scale, support and clamp	gradations in cm
Fire-resistant watchglass roughly 150 mm in diameter	
Chronometer (stopwatch)	accurate to ± 0.2 s
Candle, wax taper, match or lighter	
Calibrated laboratory scales (balance)	accurate to ± 0.1 g
Water bath maintained at 20 °C	accurate to ± 1 °C
Thermometer	accurate to ± 1 °C
Hygrometer	accurate to ± 5%
Pressure gauge	accurate to ± 0.1 bar

31.6.2.2 The watchglass is placed on a fire-resistant surface within a draught-free area that may be ventilated after each test. The graduated scale is positioned exactly behind the watchglass and held vertically by means of a support and clamp.

31.6.2.3 The scale is positioned in such a way that its origin is on a level with the watchglass base in a horizontal plane.

31.6.3 *Procedure*

31.6.3.1 *General requirements*

31.6.3.1.1 Before testing, each aerosol dispenser shall be conditioned and then primed by discharging for approximately 1 second. The purpose of this action is to remove non-homogeneous material from the diptube.

31.6.3.1.2 The instructions of use shall be strictly followed, including whether the dispenser is intended to be used in the upright or inverted position. When shaking is required, shake immediately before testing.

31.6.3.1.3 The tests shall be carried out in a draught-free environment capable of ventilation, with the temperature controlled at 20 °C ± 5 °C and relative humidity in the range of 30–80%.

31.6.3.2 *Test procedure*

(a) A minimum of four full aerosol dispensers per product shall be conditioned to 20°C ± 1°C with at least 95% of the dispenser immersed in the water for at least 30 min before each test (if the aerosol is fully immersed, 30 min conditioning is sufficient);

(b) Comply with general requirements. Record the temperature and relative humidity of the environment;

(c) Determine the internal pressure at 20 °C ± 1 °C (to eliminate faulty or partly filled aerosol dispensers);

(d) Measure the discharge or flow rate of the aerosol product to be examined, so that the amount of test product dispensed can be more accurately gauged;

(e) Weigh one of the aerosol dispensers and note its mass;

(f) On the basis of the measured discharge or flow rate and following the manufacturer's instructions, release approximately 5 g of the product onto the centre of the clean watchglass with the aim of producing a mound no higher than 25 mm;

(g) Within 5 s of completion of discharge, apply the source of ignition to the edge of the sample at its base and at the same time start the chronometer (stopwatch). If necessary, the ignition source shall be removed from the edge of the sample after approximately two seconds, in order to clearly observe if ignition has occurred. If no ignition of the sample is apparent, the ignition source shall be reapplied to the edge of the sample;

(h) If ignition occurs note the following points:

(i) The maximum height of the flame in cm above the base of the watchglass;

(ii) The flame duration in s;

(iii) Dry and re-weigh the aerosol dispenser and calculate the mass of the released product;

(i) Ventilate the test area immediately after each test;

(j) If ignition is not obtained and the released product remains in the form of a foam or paste throughout its period of use, steps (e) to (i) should be repeated. Allow the product to stand for 30 sec, 1 min, 2 min or 4 min before applying the ignition source;

(k) Repeat the test procedure steps (e) to (j) twice more (a total of 3) for the same can;

(l) Repeat the test procedure steps (e) to (k) for another two aerosol cans (3 cans in total) of the same product.

31.6.4 ***Test criteria and method of assessing results***

31.6.4.1 A test report containing the following information shall be drawn up:

(a) whether the product ignites;

(b) maximum flame height in cm;

(c) duration of flame in s;

(d) the mass of the product tested.

31.6.4.2 The aerosol product shall be classified as extremely flammable if the flame height is 20 cm or more and the flame duration is 2 s or more; or if the flame duration is 7 s or more and the flame height is 4 cm or more."

Section 33

33.4.1.3.1 Replace the second sentence with the following:
"In case a pyrophoric substance is tested, the test should be executed under nitrogen atmosphere."

Section 37

Replace the text between brackets in page 353 (English version) with the following:

"SECTION 37

CLASSIFICATION PROCEDURES, TEST METHODS AND CRITERIA RELATING TO SUBSTANCES OF CLASS 8

37.1 Purpose

37.1.1 This section presents the United Nations scheme for the classification of corrosive substances of Class 8 (see sections 2.8.1 and 2.8.2 of the Model Regulations). The test method for corrosion is given in sub-section 37.4 of this Manual. The method for determining corrosion to skin is provided in OECD Guideline 404 and the criteria are provided in Chapter 2.8 of the Model Regulations. If a substance is shown to be corrosive to skin, then it is not necessary to conduct the tests for metal corrosion for the purposes of classification.

37.2 Scope

37.2.1 New products offered for transport shall be subjected to the classification procedures as set out in paragraph 2.8.2.5, (c) (ii) of the Model Regulations unless it is impracticable (e.g. because of the physical properties) to perform the tests. Substances which cannot be tested shall be classified by analogy with existing entries. The classification procedure shall be undertaken before a new product is offered for transport.

37.3 Classification procedure

The following test procedures are designed to assess the corrosion hazard for an appropriate classification for transport.

37.4 Test methods for corrosion to metals

37.4.1 *Introduction*

37.4.1.1 Test C.1: Test for determining the corrosive properties of liquids and solids liquefying during transport as dangerous goods of Class 8, packing group III.

37.4.1.2 *Apparatus and material*

For exposure to the medium being classified specimen of 2 mm thick plates shall be made of the following materials:

- Aluminium, non-clad types 7075-T6 or AZ5GU-T6 and

- [Steel, S235JR+CR (1.0037 resp. St 37-2), S275J2G3+CR (1.0144 resp. St 44-3) or a similar type (Figure 1), ISO 3574 or Unified Numbering System (UNS) G10200].

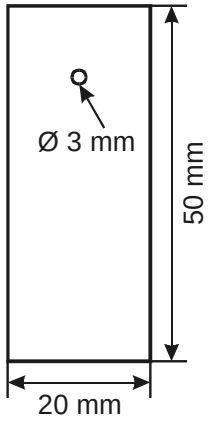


Figure 1: specimen

At least 3 sets of specimens shall be used for each metal (aluminium, steel).
3 l cup-like reaction receptacles with face cut top and three necks NS 29/32 as well as one neck NS 14 made of glass or PTFE shall be used. The entrance of air, however, into the receptacle has to be guaranteed. Aluminium and steel specimens have to be tested in different reaction receptacles. To prevent liquid loss a reflux condenser should be attached (Figure 2).

Figure 2: Exposure receptacle with reflux condenser

In order to carry out the test, the substance being classified shall have a minimum volume of 1.5 l to ensure enough reactive agent during the whole exposure time. Very long testing periods without changing the solution will sometimes give negative results. To get correct results and to avoid re-testing, the following items should be taken into account:

(a) Fresh solutions shall be provided during the course of the test;

(b) The volume should be large enough to avoid any appreciable change in its corrosivity during the test;

(c) If problems are expected, the composition should be checked by analysis at the end of the test to determine the extent of change in composition, such as might result from evaporation or depletion.

37.4.1.3 ***Procedure***

Metal sheets shall be polished with grinding paper of 120 grit. After removing the grinding remainings with alcohol in an ultrasound bath and degreasing with acetone, the metal specimens shall be weighed out to ± 0.0002 g. No chemical surface preparation (pickling, etching etc.) shall be performed to prevent surface "irritations" (inhibition, passivation). Specimens shall be fixed inside the receptacle by non-extruded PTFE-threads. Metal wire shall not be used. The test with the so prepared metals shall be initiated the same day to prevent reformation of oxide layer unless appropriate measures are taken to preserve the samples for further testing. For each test one metal specimen shall be dipped into the solution, another one only half way and a third one shall hang in the gas phase. The distance between the upper edge of the completely inserted specimen and the surface of the liquid shall be 10 mm. Losses of liquid shall be avoided.

The test temperature of 55 °C ± 1 shall be maintained throughout the test including the vapour phase as well.

Sheets shall be exposed at these stable conditions for at least one week (168 ± 1 hour). After finishing the test, the metal specimens shall be rinsed off and cleaned with a brush with synthetic or natural bristles (no metal). For non-mechanically removable remainings (adherent corrosion product or depositions) inhibited pickling solutions should be used. In those cases a not exposed reference specimen needs to be treated in the same manner (time, temperature, concentration, surface preparation) to determine the mass loss caused by the pickling solution. This value needs to be subtracted before evaluating the corrosion rate. After final cleaning with alcohol and acetone in an ultrasound bath, and once dry, the metal samples shall be weighed. The resulting mass under consideration of the specific mass of the metal leads to the corrosion rate.

37.4.1.4 ***Test criteria and method of assessing results***

Two types of corrosion behaviour need to be distinguished.

37.4.1.5 ***Test evaluation at uniform corrosion***

In case of uniform corrosion attack the mass loss of the most corroded sample shall be used. The test is considered positive if for any specimen the mass loss on the metal specimen is more than the amount stated in the following table:

Table 1: Minimum mass loss of specimens after different exposure times

exposure time	mass loss
7 days	13.5 %
14 days	26.5 %
21 days	39.2 %
28 days	51.5 %

NOTE: These values are calculated based on a 6.25 mm/year corrosion rate.

37.4.1.6 ***Test evaluation at localised corrosion***

When localised corrosion occurs besides or instead of uniform corrosion attack of surface, the depth of the deepest hole respectively the strongest thickness reduction will be added or only be used to determine the intrusion. If the deepest intrusion (to be determined metallographically) exceeds the values shown in the following table, the result is considered positive.

Table 2: Minimum intrusion depths after exposure time

exposure time	min. intrusion depth
7 days	120 µm
14 days	240 µm
21 days	360 µm
28 days	480 µm
