

2.2.8 Class 8 Corrosive substances**2.2.8.1 *Definition, general provisions and criteria***

2.2.8.1.1 Corrosive substances are substances which, by chemical action, will cause irreversible damage to the skin, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport. The heading of this class also covers other substances which form a corrosive liquid only in the presence of water, or which produce corrosive vapour or mist in the presence of natural moisture of the air.

2.2.8.1.2 For substances and mixtures that are corrosive to skin, general classification provisions are provided in 2.2.8.1.4. Skin corrosion refers to the production of irreversible damage to the skin, namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.

2.2.8.1.3 Liquids and solids which may become liquid during carriage, which are judged not to be skin corrosive shall still be considered for their potential to cause corrosion to certain metal surfaces in accordance with the criteria in 2.2.8.1.5.3 (c) (ii).

2.2.8.1.4 *General classification provisions*

2.2.8.1.4.1 Substances and articles of Class 8 are subdivided as follows:

C1-C11 Corrosive substances without subsidiary hazard and articles containing such substances:

C1-C4 Acid substances:

- C1 Inorganic, liquid;
- C2 Inorganic, solid;
- C3 Organic, liquid;
- C4 Organic, solid;

C5-C8 Basic substances:

- C5 Inorganic, liquid;
- C6 Inorganic, solid;
- C7 Organic, liquid;
- C8 Organic, solid;

C9-C10 Other corrosive substances:

- C9 Liquid;
- C10 Solid;

C11 Articles.

CF Corrosive substances, flammable:

- CF1 Liquid;
- CF2 Solid;

CS Corrosive substances, self-heating:

- CS1 Liquid;
- CS2 Solid;

CW	Corrosive substances which, in contact with water, emit flammable gases:
CW1	Liquid;
CW2	Solid;
CO	Corrosive substances, oxidizing:
CO1	Liquid;
CO2	Solid;
CT	Corrosive substances, toxic and articles containing such substances:
CT1	Liquid;
CT2	Solid;
CT3	Articles;
CFT	Corrosive substances, flammable, liquid, toxic;
COT	Corrosive substances, oxidizing, toxic.

Classification and assignment of packing groups

2.2.8.1.4.2 Substances and mixtures of Class 8 are divided among the three packing groups according to their degree of danger in carriage:

- (a) Packing group I: very dangerous substances and mixtures;
- (b) Packing group II: substances and mixtures presenting medium danger;
- (c) Packing group III: substances and mixtures that present minor danger.

2.2.8.1.4.3 Allocation of substances listed in Table A of Chapter 3.2 to the packing groups in Class 8 has been made on the basis of experience taking into account such additional factors as inhalation risk (see 2.2.8.1.4.5) and reactivity with water (including the formation of dangerous decomposition products).

2.2.8.1.4.4 New substances and mixtures can be assigned to packing groups on the basis of the length of time of contact necessary to produce irreversible damage of intact skin tissue in accordance with the criteria in 2.2.8.1.5. Alternatively, for mixtures, the criteria in 2.2.8.1.6 can be used.

2.2.8.1.4.5 A substance or mixture meeting the criteria of Class 8 having an inhalation toxicity of dusts and mists (LC_{50}) in the range of packing group I, but toxicity through oral ingestion or dermal contact only in the range of packing group III or less, shall be allocated to Class 8 (see 2.2.61.1.7.2).

2.2.8.1.5 *Packing group assignment for substances and mixtures*

2.2.8.1.5.1 Existing human and animal data including information from single or repeated exposure shall be the first line of evaluation, as they give information directly relevant to effects on the skin.

2.2.8.1.5.2 In assigning the packing group in accordance with 2.2.8.1.4.4, account shall be taken of human experience in instances of accidental exposure. In the absence of human experience the assignment shall be based on data obtained from experiments in accordance with OECD Test Guidelines Nos. 404⁶, 435⁷, 431⁸ or 430⁹. A substance or mixture which is determined not to be corrosive in accordance with one of these or non-classified in accordance with OECD Test Guideline No. 439¹⁰ may be considered not to be corrosive to skin for the purposes of ADN without further testing. If the test results indicate that the substance or mixture is corrosive and not assigned to packing group I, but the test method does not allow discrimination between packing groups II and III, it shall be considered to be packing group II. If the test results indicate that the substance or mixture is corrosive, but the test method does not allow discrimination between packing groups, it shall be assigned to packing group I if no other test results indicate a different packing group.

2.2.8.1.5.3 Packing groups are assigned to corrosive substances in accordance with the following criteria (see table 2.2.8.1.5.3):

- (a) Packing group I is assigned to substances that cause irreversible damage of intact skin tissue within an observation period up to 60 minutes starting after the exposure time of three minutes or less;
- (b) Packing group II is assigned to substances that cause irreversible damage of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than three minutes but not more than 60 minutes;
- (c) Packing group III is assigned to substances that:
 - (i) Cause irreversible damage of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than 60 minutes but not more than 4 hours; or
 - (ii) Are judged not to cause irreversible damage of intact skin tissue but which exhibit a corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55 °C when tested on both materials. 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, Unified Numbering System (UNS) G10200 or SAE 1020, 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.

NOTE: Where an initial test on either steel or aluminium indicates the substance being tested is corrosive the follow up test on the other metal is not required.

⁶ OECD Guideline for the testing of chemicals No. 404 "Acute Dermal Irritation/Corrosion" 2015.

⁷ OECD Guideline for the testing of chemicals No. 435 "In Vitro Membrane Barrier Test Method for Skin Corrosion" 2015.

⁸ OECD Guideline for the testing of chemicals No. 431 "In vitro skin corrosion: reconstructed human epidermis (RHE) test method" 2016.

⁹ OECD Guideline for the testing of chemicals No. 430 "In Vitro Skin Corrosion: Transcutaneous Electrical Resistance Test Method (TER)" 2015.

¹⁰ OECD Guideline for the testing of chemicals No. 439 "In Vitro Skin Irritation: Reconstructed Human Epidermis Test Method" 2015.

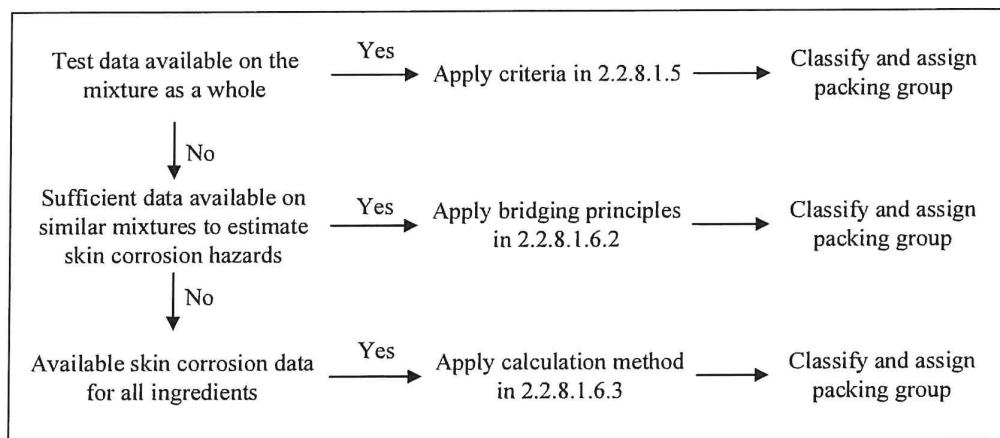
Table 2.2.8.1.5.3: Table summarizing the criteria in 2.2.8.1.5.3

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

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

2.2.8.1.6.1 General provisions

For mixtures it is necessary to obtain or derive information that allows the criteria to be applied to the mixture for the purpose of classification and assignment of packing groups. The approach to classification and assignment of packing groups is tiered, and is dependent upon the amount of information available for the mixture itself, for similar mixtures and/or for its ingredients. The flow chart of Figure 2.2.8.1.6.1 below outlines the process to be followed:

Figure 2.2.8.1.6.1: Step-wise approach to classify and assign packing group of corrosive mixtures

2.2.8.1.6.2 Bridging principles

Where a mixture has not been tested to determine its skin corrosion potential, but there are sufficient data on both the individual ingredients and similar tested mixtures to adequately classify and assign a packing group for the mixture, these data will be used in accordance with the following bridging principles. This ensures that the classification process uses the available data to the greatest extent possible in characterizing the hazards of the mixture.

- (a) Dilution: If a tested mixture is diluted with a diluent which does not meet the criteria for Class 8 and does not affect the packing group of other ingredients, then the new diluted mixture may be assigned to the same packing group as the original tested mixture.

NOTE: In certain cases, diluting a mixture or substance may lead to an increase in the corrosive properties. If this is the case, this bridging principle cannot be used.

- (b) Batching: The skin corrosion potential of a tested production batch of a mixture can be assumed to be substantially equivalent to that of another untested production batch of the same commercial product when produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the skin corrosion potential of the untested batch has changed. If the latter occurs, a new classification is necessary.
- (c) Concentration of mixtures of packing group I: If a tested mixture meeting the criteria for inclusion in packing group I is concentrated, the more concentrated untested mixture may be assigned to packing group I without additional testing.
- (d) Interpolation within one packing group: For three mixtures (A, B and C) with identical ingredients, where mixtures A and B have been tested and are in the same skin corrosion packing group, and where untested mixture C has the same Class 8 ingredients as mixtures A and B but has concentrations of Class 8 ingredients intermediate to the concentrations in mixtures A and B, then mixture C is assumed to be in the same skin corrosion packing group as A and B.
- (e) Substantially similar mixtures: Given the following:
 - (i) Two mixtures: (A+B) and (C+B);
 - (ii) The concentration of ingredient B is the same in both mixtures;
 - (iii) The concentration of ingredient A in mixture (A+B) equals the concentration of ingredient C in mixture (C+B);
 - (iv) Data on skin corrosion for ingredients A and C are available and substantially equivalent, i.e. they are the same skin corrosion packing group and do not affect the skin corrosion potential of B.If mixture (A+B) or (C+B) is already classified based on test data, then the other mixture may be assigned to the same packing group.

2.2.8.1.6.3 Calculation method based on the classification of the substances

2.2.8.1.6.3.1 Where a mixture has not been tested to determine its skin corrosion potential, nor is sufficient data available on similar mixtures, the corrosive properties of the substances in the mixture shall be considered to classify and assign a packing group.

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

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

2.2.8.1.6.3.3 To determine whether a mixture containing corrosive substances shall be considered a corrosive mixture and to assign a packing group, the calculation method in the flow chart in Figure 2.2.8.1.6.3 shall be applied. For this calculation method, generic concentration limits apply where 1% is used in the first step for the assessment of the packing group I substances, and where 5% is used for the other steps respectively.

2.2.8.1.6.3.4 When a specific concentration limit (SCL) is assigned to a substance following its entry in Table A of Chapter 3.2 or in a special provision, this limit shall be used instead of the generic concentration limits (GCL).

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

$$\frac{PGx_1}{GCL} + \frac{PGx_2}{SCL_2} + \cdots + \frac{PGx_i}{SCL_i} \geq 1$$

Where:

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

GCL = generic concentration limit

SCL_i = specific concentration limit assigned to substance i

The criterion for a packing group is fulfilled when the result of the calculation is ≥ 1 . The generic concentration limits to be used for the evaluation in each step of the calculation method are those found in Figure 2.2.8.1.6.3.

Examples for the application of the above formula can be found in the note below.

NOTE: *Examples for the application of the above formula*

Example 1: A mixture contains one corrosive substance in a concentration of 5% assigned to packing group I without a specific concentration limit:

Calculation for packing group I: $\frac{5}{5(GCL)} = 1 \rightarrow$ assign to Class 8, packing group I.

Example 2: A mixture contains three substances corrosive to skin; two of them (A and B) have specific concentration limits; for the third one (C) the generic concentration limit applies. The rest of the mixture needs not to be taken into consideration:

Substance X in the mixture and its packing group assignment within Class 8	Concentration (conc) in the mixture in %	Specific concentration limit (SCL) for packing group I	Specific concentration limit (SCL) for packing group II	Specific concentration limit (SCL) for packing group III
A, assigned to packing group I	3	30%	none	none
B, assigned to packing group I	2	20%	10%	none
C, assigned to packing group III	10	none	none	none

Calculation for packing group I: $\frac{3 \text{ (conc A)}}{30 \text{ (SCL PG I)}} + \frac{2 \text{ (conc B)}}{20 \text{ (SCL PG I)}} = 0,2 < 1$

The criterion for packing group I is not fulfilled.

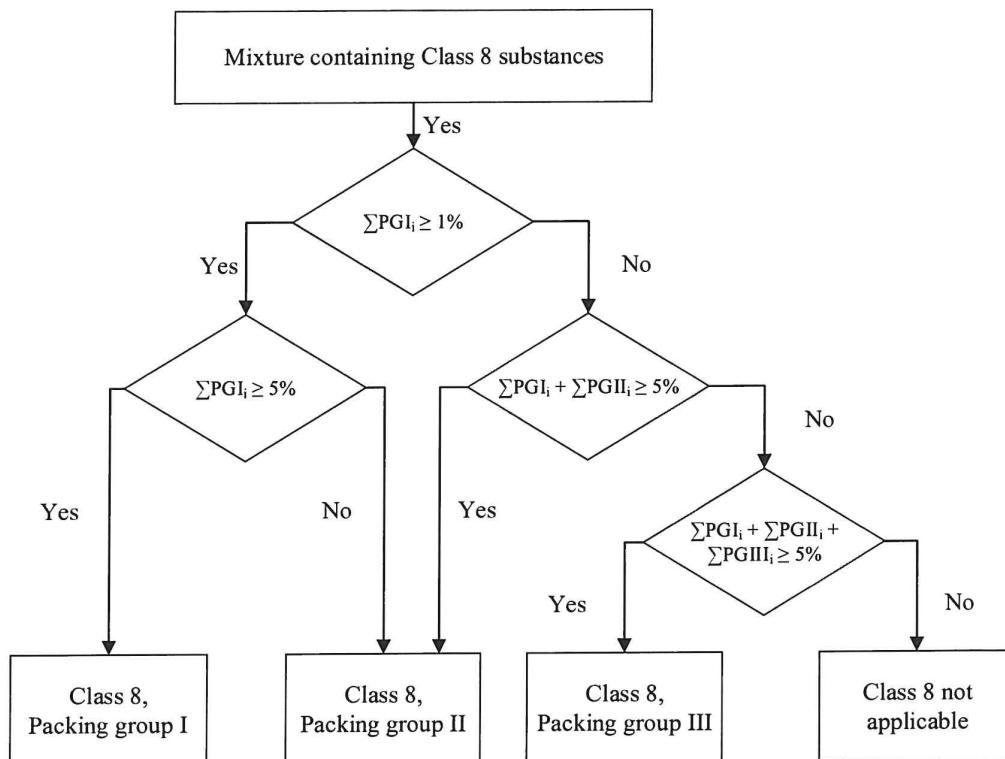
Calculation for packing group II: $\frac{3 \text{ (conc A)}}{5 \text{ (GCL PG II)}} + \frac{2 \text{ (conc B)}}{10 \text{ (SCL PG II)}} = 0,8 < 1$

The criterion for packing group II is not fulfilled.

$$\text{Calculation for packing group III: } \frac{3 \text{ (conc A)}}{5 \text{ (GCL PG III)}} + \frac{2 \text{ (conc B)}}{5 \text{ (GCL PG III)}} + \frac{10 \text{ (conc C)}}{5 \text{ (GCL PG III)}} = 3 \geq 1$$

The criterion for packing group III is fulfilled, the mixture shall be assigned to Class 8, packing group III.

Figure 2.2.8.1.6.3: Calculation method



2.2.8.1.7 If substances of Class 8, as a result of admixtures, come into categories of risk different from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong, on the basis of their actual degree of danger.

NOTE: For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.

2.2.8.1.8 On the basis of the criteria set out in paragraph 2.2.8.1.6, it may also be determined whether the nature of a solution or mixture mentioned by name or containing a substance mentioned by name is such that the solution or mixture is not subject to the provisions for this class.

2.2.8.1.9 *(Deleted)*

NOTE: UN No. 1910 calcium oxide and UN No. 2812 sodium aluminate, listed in the UN Model Regulations, are not subject to the provisions of ADN.

2.2.8.2 *Substances not accepted for carriage*

2.2.8.2.1 Chemically unstable substances of Class 8 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions.

2.2.8.2.2 The following substances shall not be accepted for carriage:

- UN No. 1798 NITROHYDROCHLORIC ACID;
- chemically unstable mixtures of spent sulphuric acid;
- chemically unstable mixtures of nitrating acid or mixtures of residual sulphuric and nitric acids, not denitrated;
- perchloric acid aqueous solution with more than 72% pure acid, by mass, or mixtures of perchloric acid with any liquid other than water.

2.2.8.3 *List of collective entries***Corrosive substances without subsidiary hazard and articles containing such substances**

Acid	inorganic	liquid C1	2584 ALKYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid or 2584 ARYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid 2693 BISULPHITES, AQUEOUS SOLUTION, N.O.S. 2837 BISULPHATES, AQUEOUS SOLUTION 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
		solid C2	1740 HYDROGENDIFLUORIDES, SOLID, N.O.S. 2583 ALKYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid or 2583 ARYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid 3260 CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
		liquid C3	2586 ALKYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid or 2586 ARYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid 2987 CHLOROSILANES, CORROSIVE, N.O.S. 3145 ALKYLPHENOLS, LIQUID, N.O.S. (including C ₂ -C ₁₂ homologues) 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
		solid C4	2430 ALKYLPHENOLS, SOLID, N.O.S. (including C ₂ -C ₁₂ homologues) 2585 ALKYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid or 2585 ARYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid 3261 CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
	inorganic	liquid C5	1719 CAUSTIC ALKALI LIQUID, N.O.S. 2797 BATTERY FLUID, ALKALI 3266 CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
		solid C6	3262 CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.
	organic	liquid C7	2735 AMINES, LIQUID, CORROSIVE, N.O.S. or 2735 POLYAMINES, LIQUID, CORROSIVE, N.O.S. 3267 CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.
		solid C8	3259 AMINES, SOLID, CORROSIVE, N.O.S., or 3259 POLYAMINES, SOLID, CORROSIVE, N.O.S. 3263 CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.
	Other corrosive substances	liquid C9	1903 DISINFECTANT, LIQUID, CORROSIVE, N.O.S 2801 DYE, LIQUID, CORROSIVE, N.O.S. or 2801 DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S. 3066 PAINT (including paint, enamel, stain, shellac, varnish, polish, liquid filler and lacquer base) or 3066 PAINT RELATED MATERIAL (including paint thinning or reducing compound) 1760 CORROSIVE LIQUID, N.O.S.
		solid ^a C10	3147 DYE, SOLID, CORROSIVE, N.O.S. or 3147 DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S. 3244 SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S. 1759 CORROSIVE SOLID, N.O.S.
	Articles	C11	1774 FIRE EXTINGUISHER CHARGES, corrosive liquid 2028 BOMBS, SMOKE, NON-EXPLOSIVE with corrosive liquid, without initiating device 2794 BATTERIES, WET, FILLED WITH ACID, electric storage 2795 BATTERIES, WET, FILLED WITH ALKALI, electric storage 2800 BATTERIES, WET, NON-SPILLABLE, electric storage 3028 BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage 3477 FUEL CELL CARTRIDGES containing corrosive substances, or 3477 FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT, containing corrosive substances, or 3477 FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing corrosive substances 3547 ARTICLES CONTAINING CORROSIVE SUBSTANCE, N.O.S.

(cont'd on next page)

^a Mixtures of solids which are not subject to the provisions of ADN and of corrosive liquids may be carried under UN No. 3244 without being subject to the classification criteria of Class 8, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. Each packaging shall correspond to a design type which has passed the leakproofness test for Packing group II level.

Corrosive substances with subsidiary hazard(s) and articles containing such substances

<i>(cont'd)</i> Flammable^b CF	liquid CF1 3470 PAINT, CORROSIVE, FLAMMABLE (including paint, enamel, stain, shellac, varnish, polish, liquid filler and lacquer base) or 3470 PAINT RELATED MATERIAL, CORROSIVE, FLAMMABLE (including paint thinning or reducing compound) 2734 AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. or 2734 POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. 2986 CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S. 2920 CORROSIVE LIQUID, FLAMMABLE, N.O.S.
	solid CF2 2921 CORROSIVE SOLID, FLAMMABLE, N.O.S.
 Self-heating CS	liquid CS1 3301 CORROSIVE LIQUID, SELF-HEATING, N.O.S.
	solid CS2 3095 CORROSIVE SOLID, SELF-HEATING, N.O.S.
 Water-reactive CW	liquid^b CW1 3094 CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.
	solid CW2 3096 CORROSIVE SOLID, WATER-REACTIVE, N.O.S.
 Oxidizing CO	liquid CO1 3093 CORROSIVE LIQUID, OXIDIZING, N.O.S.
	solid CO2 3084 CORROSIVE SOLID, OXIDIZING, N.O.S.
 Toxic^d CT	liquid^c CT1 3471 HYDROGEN DIFLUORIDES SOLUTION, N.O.S. 2922 CORROSIVE LIQUID, TOXIC, N.O.S.
	solid^e CT2 2923 CORROSIVE SOLID, TOXIC, N.O.S.
	articles CT3 3506 MERCURY CONTAINED IN MANUFACTURED ARTICLES
 Flammable, liquid, toxic^d	CFT No collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to table of precedence of hazards in 2.1.3.10.
 Oxidizing, toxic^{d, e}	COT No collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to table of precedence of hazards in 2.1.3.10.

^b Chlorosilanes which, in contact with water or moist air, emit flammable gases, are substances of Class 4.3.^c Chloroformates having predominantly toxic properties are substances of Class 6.1.^d Corrosive substances which are highly toxic by inhalation, as defined in 2.2.61.1.4 to 2.2.61.1.9 are substances of Class 6.1.^e UN No. 2505 AMMONIUM FLUORIDE, UN No. 1812 POTASSIUM FLUORIDE, UN No. 1690 SODIUM FLUORIDE, SOLD, UN No. 2674 SODIUM FLUOROSILICATE, UN No. 2856 FLUOROSILICATES, N.O.S., UN No. 3415 SODIUM FLUORIDE SOLUTION and UN No. 3422 POTASSIUM FLUORIDE SOLUTION are substances of Class 6.1.

2.2.9 **Class 9 Miscellaneous dangerous substances and articles**

2.2.9.1 ***Criteria***

2.2.9.1.1 The heading of Class 9 covers substances and articles which, during carriage, present a danger not covered by the heading of other classes.

2.2.9.1.2 The substances and articles of Class 9 are subdivided as follows:

 M1 Substances which, on inhalation as fine dust, may endanger health;

 M2 Substances and articles which, in the event of fire, may form dioxins;

 M3 Substances evolving flammable vapour;

 M4 Lithium batteries and sodium ion batteries;

 M5 Life-saving appliances;

 M6-M8 Environmentally hazardous substances:

 M6 Pollutant to the aquatic environment, liquid;

 M7 Pollutant to the aquatic environment, solid;

 M8 Genetically modified micro-organisms and organisms;

 M9-M10 Elevated temperature substances:

 M9 Liquid;

 M10 Solid;

 M11 Other substances and articles presenting a danger during carriage, but not meeting the definitions of another class.

 M12 Other substances and articles presenting a danger during carriage in tank vessels, but not meeting the definitions of another class.

2.2.9.1.3 *Definitions and classification*

Substances and articles classified in Class 9 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of that Table or of sub-section 2.2.9.3 shall be done in accordance with 2.2.9.1.4 to 2.2.9.1.8, 2.2.9.1.10, 2.2.9.1.11, 2.2.9.1.13 and 2.2.9.1.14 below.

2.2.9.1.4 *Substances which, on inhalation as fine dust, may endanger health*

Substances which, on inhalation as fine dust, may endanger health include asbestos and mixtures containing asbestos.

2.2.9.1.5 *Substances and articles which, in the event of fire, may form dioxins*

Substances and articles which, in the event of fire, may form dioxins include polychlorinated biphenyls (PCBs) and terphenyls (PCTs) and polyhalogenated biphenyls and terphenyls and mixtures containing these substances, as well as articles such as transformers, condensers and articles containing those substances or mixtures.

NOTE: Mixtures with a PCB or PCT content of not more than 50 mg/kg are not subject to the provisions of ADN.

2.2.9.1.6 *Substances evolving flammable vapour*

Substances evolving flammable vapour include polymers containing flammable liquids with a flash-point not exceeding 55 °C.

2.2.9.1.7 *Lithium batteries and sodium ion batteries*

2.2.9.1.7.1 *Lithium batteries*

Lithium batteries shall meet the following requirements, except when otherwise provided for in ADN (e.g. for prototype batteries and small production runs under special provision 310 or damaged batteries under special provision 376).

NOTE: For UN 3536 LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT, see special provision 389 in Chapter 3.3.

Cells and batteries, cells and batteries contained in equipment, or cells and batteries packed with equipment, containing lithium in any form shall be assigned to UN Nos. 3090, 3091, 3480 or 3481 as appropriate. They may be carried under these entries if they meet the following provisions:

(a) Each cell or battery is of the type proved to meet the requirements of each test of the *Manual of Tests and Criteria*, Part III, sub-section 38.3;

NOTE: Batteries shall be of a design type proved to meet the testing requirements of the "Manual of Tests and Criteria", Part III, sub-section 38.3, irrespective of whether the cells of which they are composed are of a tested type.

(b) Each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under normal conditions of carriage;

(c) Each cell and battery is equipped with an effective means of preventing external short circuits;

(d) Each battery containing cells or series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g., diodes, fuses, etc.);

(e) Cells and batteries shall be manufactured under a quality management programme that includes:

(i) description of the organizational structure and responsibilities of personnel with regard to design and product quality;

(ii) The relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;

(iii) Process controls that should include relevant activities to prevent and detect internal short circuit failure during manufacture of cells;

(iv) Quality records, such as inspection reports, test data, calibration data and certificates. Test data shall be kept and made available to the competent authority upon request;

- (v) Management reviews to ensure the effective operation of the quality management programme;
- (vi) A process for control of documents and their revision;
- (vii) A means for control of cells or batteries that are not conforming to the type tested as mentioned in (a) above;
- (viii) Training programmes and qualification procedures for relevant personnel; and
- (ix) Procedures to ensure that there is no damage to the final product.

NOTE: *In-house quality management programmes may be accepted. Third party certification is not required, but the procedures listed in (i) to (ix) above shall be properly recorded and traceable. A copy of the quality management programme shall be made available to the competent authority upon request.*

- (f) Lithium batteries, containing both primary lithium metal cells and rechargeable lithium ion cells, that are not designed to be externally charged (see special provision 387 of Chapter 3.3) shall meet the following conditions:
 - (i) The rechargeable lithium ion cells can only be charged from the primary lithium metal cells;
 - (ii) Overcharge of the rechargeable lithium ion cells is precluded by design;
 - (iii) The battery has been tested as a lithium primary battery;
 - (iv) Component cells of the battery shall be of a type proved to meet the respective testing requirements of the *Manual of Tests and Criteria*, part III, sub-section 38.3;
- (g) Except for button cells installed in equipment (including circuit boards), manufacturers and subsequent distributors of cells or batteries manufactured after 30 June 2003 shall make available the test summary as specified in the *Manual of Tests and Criteria*, Part III, sub-section 38.3, paragraph 38.3.5.

NOTE: *The term "make available" means that manufacturers and subsequent distributors ensure that the test summary is accessible so that the consignor or other persons in the supply chain can confirm compliance.*

Lithium batteries are not subject to the provisions of ADN if they meet the requirements of special provision 188 of Chapter 3.3.

2.2.9.1.7.2 Sodium ion batteries

Cells and batteries, cells and batteries contained in equipment, or cells and batteries packed with equipment containing sodium ion, which are a rechargeable electrochemical system where the positive and negative electrode are both intercalation or insertion compounds, constructed with no metallic sodium (or sodium alloy) in either electrode and with an organic non aqueous compound as electrolyte, shall be assigned to UN Nos. 3551 or 3552 as appropriate.

NOTE: *Intercalated sodium exists in an ionic or quasi-atomic form in the lattice of the electrode material.*

They may be carried under these entries if they meet the following provisions:

(a) Each cell or battery is of the type proved to meet the requirements of applicable tests of the *Manual of Tests and Criteria*, Part III, sub-section 38.3;

NOTE: *Batteries shall be of a type proved to meet the testing requirements of the "Manual of Tests and Criteria", Part III, sub-section 38.3, irrespective of whether the cells of which they are composed are of a tested type.*

(b) Each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under conditions normally encountered during carriage;

(c) Each cell and battery is equipped with an effective means of preventing external short circuits;

(d) Each battery containing cells or a series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g., diodes, fuses, etc.);

(e) Cells and batteries shall be manufactured under a quality management programme as prescribed under 2.2.9.1.7.1 (e) (i) to (ix);

(f) Manufacturers and subsequent distributors of cells or batteries shall make available the test summary as specified in the *Manual of Tests and Criteria*, Part III, sub-section 38.3, paragraph 38.3.5.

NOTE: *The term "make available" means that manufacturers and subsequent distributors ensure that the test summary is accessible so that the consignor or other persons in the supply chain can confirm compliance.*

Sodium ion batteries are not subject to the provisions of ADN if they meet the requirements of special provisions 188 or 400 of Chapter 3.3.

2.2.9.1.8 *Life-saving appliances*

Life-saving appliances include life-saving appliances and motor vehicle components which meet the descriptions of special provisions 235 or 296 of Chapter 3.3.

2.2.9.1.9 *Environmentally hazardous substances*

(Deleted)

2.2.9.1.10 *Pollutants to the aquatic environment: environmentally hazardous substances (aquatic environment)*

2.2.9.1.10.1 For carriage in packages or in bulk, substances, solutions and mixtures meeting the criteria for Acute 1, Chronic 1 or Chronic 2 in Chapter 2.4 (see also 2.1.3.8) shall be considered to be environmentally hazardous (aquatic environment). Substances which cannot be assigned to other classes in ADN or to other Class 9 entries and which meet these criteria shall be assigned to UN Nos. 3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., or 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S, and to packing group III.

2.2.9.1.10.2 For carriage in tank vessels, the substances, solutions and mixtures referred to in 2.2.9.1.10.1 and those meeting the criteria for Acute 2, Acute 3 or Chronic 3 in Chapter 2.4 shall be considered to be environmentally hazardous.

Substances classified as environmentally hazardous which meet the criteria for Acute or Chronic Category 1 shall be assigned to group 'N1'.

Substances classified as environmentally hazardous which meet the criteria for Chronic Categories 2 or 3 shall be assigned to group 'N2'.

Substances classified as environmentally hazardous which meet the criteria for Acute Categories 2 or 3 shall be assigned to group 'N3'.

Substances which meet the criteria of 2.2.9.1.10.1 shall be assigned to UN Nos. 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S, or 3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., MOLTEN. Those that meet the additional criteria in this paragraph shall be assigned to identification Nos. 9005, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S, MOLTEN, or 9006, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

2.2.9.1.10.3 Substances or mixtures classified as environmentally hazardous substances (aquatic environment) on the basis of Regulation 1272/2008/EC³

Notwithstanding the provisions of 2.2.9.1.10.1, if data for classification according to the criteria of 2.4.3 and 2.4.4 are not available, a substance or mixture:

- (a) Shall be classified as an environmentally hazardous substance (aquatic environment) if it has to be assigned category(ies) Aquatic Acute 1, Aquatic Chronic 1 or Aquatic Chronic 2 according to Regulation 1272/2008/EC³;
- (b) May be regarded as not being an environmentally hazardous substance (aquatic environment) for carriage in packages or in bulk in the sense of 2.2.9.10.1 if it does not have to be assigned such a category according to the said Regulation.

2.2.9.1.10.4 (Reserved)

2.2.9.1.10.5 For carriage in tank vessels, substances, solutions and mixtures are considered as floating substances, solutions and mixtures (floaters) if they meet the following criteria: ¹¹

Water solubility	< 0.1%
Vapour pressure	< 0.3 kPa
Relative density	≤ 1,000.

For carriage in tank vessels, substances, solutions and mixtures are considered as substances, solutions and mixtures that sink (sinkers) if they meet the following criteria: ¹¹

Water solubility	< 0.1%
Relative density	> 1,000.

³ Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directive 67/548/EEC and 1999/45/EC; and amending Regulation (EC) No 1907/2006, published in the Official Journal of the European Union, L 353, 31 December 2008, p 1-1355.

¹¹ The values of relative density, vapour pressure and water solubility to be used according to the GESAMP model are the values at 20°C.

2.2.9.1.11 *Genetically modified micro-organisms or organisms*

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. They are assigned to Class 9 (UN No. 3245) if they do not meet the definition of toxic substances or infectious substances, but are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction.

NOTE 1: *GMMOs and GMOs which are infectious are substances of Class 6.2, UN Nos. 2814, 2900 or 3373).*

NOTE 2: *GMMOs or GMOs are not subject to the provisions of ADN when authorized for use by the competent authorities of the countries of origin, transit and destination.*¹²

NOTE 3: *Pharmaceutical products (such as vaccines) that are packed in a form ready to be administered, including those in clinical trials, and that contain GMMOs or GMOs are not subject to ADN.*

NOTE 4: *Genetically modified live animals which, in accordance with the current state of scientific knowledge, have no known pathogenic effect on humans, animals and plants and are carried in receptacles that are suitable for safely preventing both the escape of the animals and unauthorized access to them, are not subject to the provisions of ADN. The provisions specified by the International Air Transport Association (IATA) for air transport "Live Animals Regulations, LAR" can be drawn on as guidelines for suitable receptacles for the transport of live animals.*

NOTE 5: *Live animals shall not be used to carry genetically modified micro-organisms classified in Class 9 unless the substance can be carried no other way. Genetically modified live animals shall be carried under terms and conditions of the competent authorities of the countries of origin and destination.*

2.2.9.1.12 *(Deleted)*2.2.9.1.13 *Elevated temperature substances*

Elevated temperature substances include substances which are carried or handed over for carriage in the liquid state at or above 100 °C and, in the case of those with a flash-point, below their flash-point. They also include solids which are carried or handed over for carriage at or above 240 °C.

NOTE 1: *Elevated temperature substances may be assigned to Class 9 only if they do not meet the criteria of any other class.*

NOTE 2: *Substances having a flash-point above 60 °C which are carried or handed over for carriage within a range of 15 K below the flash-point are substances of Class 3, identification number 9001.*

¹² See Part C of Directive 2001/18/EC of the European Parliament and of the Council on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC (Official Journal of the European Communities, No. L 106, of 17 April 2001, pp 8-14) and Regulation (EC) No. 1829/2003 of the European Parliament and of the Council on genetically modified food and feed (Official Journal of the European Union, No. L 268, of 18 October 2003, pp 1-23), which set out the authorization procedures for the European Union.

2.2.9.1.14 *Other substances and articles presenting a danger during carriage but not meeting the definitions of another class*

The following other miscellaneous substances and articles not meeting the definitions of another class are assigned to Class 9:

Solid ammonia compounds having a flash-point below 60 °C
Low hazard dithionites
Highly volatile liquids
Substances emitting noxious fumes
Substances containing allergens
Chemical kits and first aid kits
Electric double layer capacitors (with an energy storage capacity greater than 0.3 Wh).
Vehicles, engines and machinery, internal combustion.
Articles containing miscellaneous dangerous goods

The following miscellaneous substances not meeting the definition of another class are assigned to Class 9 when they are carried in bulk or in tank vessels:

- UN 2071 AMMONIUM NITRATE BASED FERTILIZERS;
NOTE: Solid ammonium nitrate based fertilizers shall be classified in accordance with the procedures as set out in the "Manual of Tests and Criteria", Part III, Section 39.
- UN 2216 FISH MEAL, STABILIZED (humidity between 5% by mass and 12% by mass with not more than 15% fat by mass); or
- UN 2216 FISH SCRAP, STABILIZED (humidity between 5% by mass and 12% by mass with not more than 15% fat by mass);
- Identification No. 9003 SUBSTANCES HAVING A FLASH-POINT ABOVE 60 °C AND NOT MORE THAN 100 °C which cannot be assigned to another class or another entry of Class 9. If these substances can also be assigned to Identification No. 9005 or Identification No. 9006, then Identification No. 9003 shall take precedence.
- Identification No. 9004, 4,4'-DIPHENYLMETHANE DIISOCYANATE;
- Identification No. 9005, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S, MOLTEN, which cannot be assigned to UN No. 3077;
- Identification No. 9006, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., which cannot be assigned to UN No. 3082.

NOTE: UN No. 1845 carbon dioxide, solid (dry ice),¹³ UN No. 2807 magnetized material, UN No. 3334 aviation regulated liquid, n.o.s. and UN No. 3335 aviation regulated solid, n.o.s., listed in the UN Model Regulations, are not subject to the provisions of ADN.

¹³ For UN No. 1845 carbon dioxide, solid (dry ice), see 5.5.3.

2.2.9.1.15 *Assignment of the packing groups*

When indicated in column 4 of Table A of Chapter 3.2, substances and articles of Class 9 are assigned to one of the following packing groups according to their degree of danger:

Packing group II: substances presenting medium danger;

Packing group III: substances presenting low danger.

2.2.9.2 *Substances and articles not accepted for carriage*

The following substances and articles shall not be accepted for carriage:

- Lithium batteries and sodium ion batteries which do not meet the relevant conditions of special provisions 188, 230, 310, 636 or 670 of Chapter 3.3;
- Uncleaned empty containment vessels for apparatus such as transformers, condensers and hydraulic apparatus containing substances assigned to UN Nos. 2315, 3151, 3152 or 3432.

2.2.9.3 *List of entries*

Substances which, on inhalation as fine dust, may endanger health	M1	2212 ASBESTOS, AMPHIBOLE (amosite, tremolite, actinolite, anthophyllite, crocidolite) 2590 ASBESTOS, CHRYSOTILE
Substances and articles which, in the event of fire, may form dioxins	M2	2315 POLYCHLORINATED BIPHENYLS, LIQUID 3432 POLYCHLORINATED BIPHENYLS, SOLID 3151 POLYHALOGENATED BIPHENYLS, LIQUID or 3151 HALOGENATED MONOMETHYLDIPHENYLMETHANES, LIQUID or 3151 POLYHALOGENATED TERPHENYLS, LIQUID 3152 POLYHALOGENATED BIPHENYLS, SOLID or 3152 HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID or 3152 POLYHALOGENATED TERPHENYLS, SOLID
Substances evolving flammable vapour	M3	2211 POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour 3314 PLASTICS MOULDING COMPOUND in dough, sheet or extruded rope form evolving flammable vapour
Lithium batteries and sodium ion batteries	M4	3090 LITHIUM METAL BATTERIES (including lithium alloy batteries) 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including lithium alloy batteries) or 3091 LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries) 3480 LITHIUM ION BATTERIES (including lithium ion polymer batteries) 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including lithium ion polymer batteries) or 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries) 3536 LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries 3551 SODIUM ION BATTERIES with organic electrolyte 3552 SODIUM ION BATTERIES CONTAINED IN EQUIPMENT or SODIUM ION BATTERIES PACKED WITH EQUIPMENT, with organic electrolyte
Life-saving appliances	M5	2990 LIFE-SAVING APPLIANCES, SELF-INFLATING 3072 LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment 3268 SAFETY DEVICES, electrically initiated 3559 FIRE SUPPRESSANT DISPERSING DEVICES
Environmentally hazardous substances	M6	3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
	M7	3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
(cont'd on next page)	M8	3245 GENETICALLY MODIFIED MICROORGANISMS or 3245 GENETICALLY MODIFIED ORGANISMS

2.2.9.3 *List of entries (cont'd)*

Elevated temperature substances	liquid	M9	3257 ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100 °C and below its flash-point (including molten metal, molten salts, etc.)
	solid	M10	3258 ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240 °C
Other substances and articles presenting a danger during carriage, but not meeting the definitions of another class			
<p>Only substances and articles listed in Table A of Chapter 3.2 are subject to the provisions for Class 9 under this classification code, as follows:</p> <p>1841 ACETALDEHYDE AMMONIA 1931 ZINC DITHIONITE (ZINC HYDROSULPHITE) 1941 DIBROMODIFLUOROMETHANE 1990 BENZALDEHYDE 2071 AMMONIUM NITRATE BASED FERTILIZER (only in bulk) 2216 FISH MEAL, STABILISED 2216 FISH SCRAP, STABILISED 2969 CASTOR BEANS, or 2969 CASTOR MEAL, or 2969 CASTOR POMACE, or 2969 CASTOR FLAKE 3166 VEHICLE, FLAMMABLE GAS POWERED or 3166 VEHICLE, FLAMMABLE LIQUID POWERED or 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED 3171 BATTERY POWERED VEHICLE or 3171 BATTERY POWERED EQUIPMENT 3316 CHEMICAL KIT, or 3316 FIRST AID KIT 3359 FUMIGATED CARGO TRANSPORT UNIT 3363 DANGEROUS GOODS IN ARTICLES or 3363 DANGEROUS GOODS IN MACHINERY or 3363 DANGEROUS GOODS IN APPARATUS 3499 CAPACITOR, ELECTRIC DOUBLE LAYER (with an energy storage capacity greater than 0.3Wh) 3508 CAPACITOR, ASYMMETRIC (with an energy storage capacity greater than 0.3Wh) 3509 PACKAGINGS, DISCARDED, EMPTY, UNCLEANED 3530 ENGINE, INTERNAL COMBUSTION or 3530 MACHINERY, INTERNAL COMBUSTION 3556 VEHICLE, LITHIUM ION BATTERY POWERED 3557 VEHICLE, LITHIUM METAL BATTERY POWERED 3558 VEHICLE, SODIUM ION BATTERY POWERED 3548 ARTICLES CONTAINING MISCELLANEOUS DANGEROUS GOODS N.O.S.</p>			
Other substances and articles presenting a danger during carriage in tank vessels, but not meeting the definitions of another class			
<p>Only substances and articles listed in Table A of Chapter 3.2 are subject to the provisions for Class 9 under this classification code, as follows:</p> <p>M12 9003 SUBSTANCES WITH A FLASH-POINT ABOVE 60 °C AND NOT MORE THAN 100 °C, which do not belong to another class 9004 DIPHENYLMETHANE-4, 4'-DIISOCYANATE 9005 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., MOLTEN 9006 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.</p>			

CHAPTER 2.3**TEST METHODS****2.3.0 General**

Unless otherwise provided for in Chapter 2.2 or in this Chapter, the test methods to be used for the classification of dangerous goods are those described in the *Manual of Tests and Criteria*.

2.3.1 Exudation test for blasting explosives of Type A

2.3.1.1 Blasting explosives of type A (UN No. 0081) shall, if they contain more than 40% liquid nitric ester, in addition to the testing specified in the *Manual of Tests and Criteria*, satisfy the following exudation test.

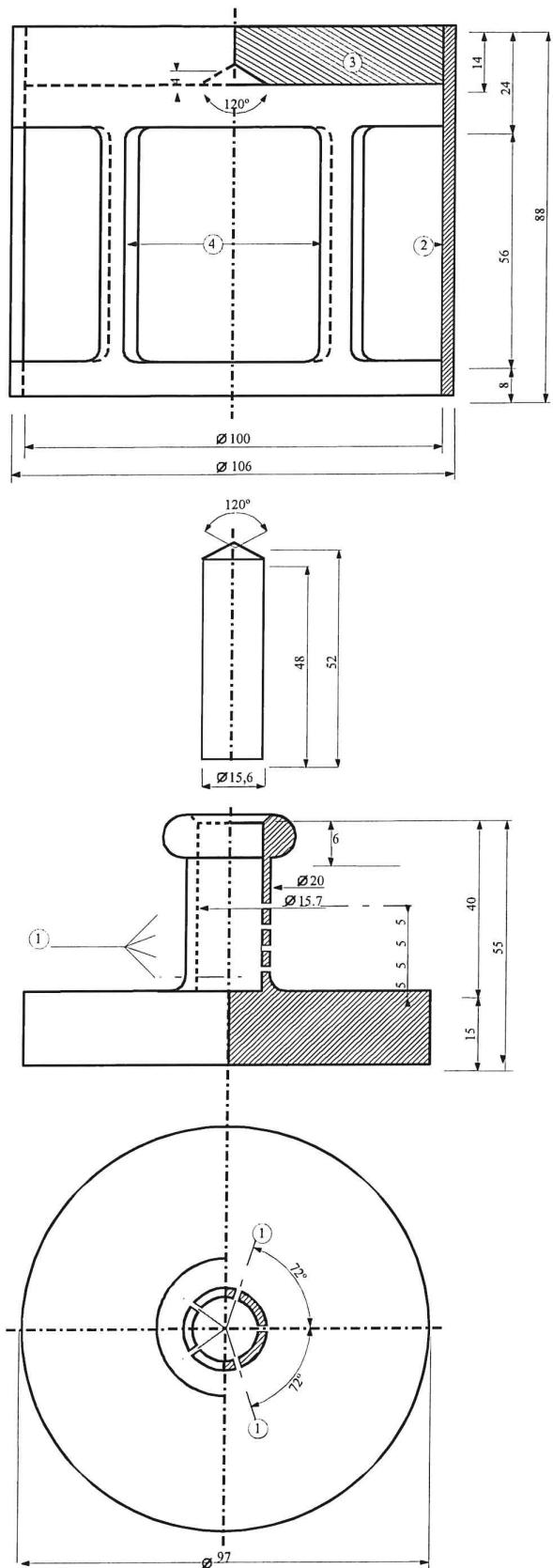
2.3.1.2 The apparatus for testing blasting explosive for exudation (figs. 1 to 3) consists of a hollow bronze cylinder. This cylinder, which is closed at one end by a plate of the same metal, has an internal diameter of 15.7 mm and a depth of 40 mm.

It is pierced by 20 holes 0.5 mm in diameter (four sets of five holes) on the circumference. A bronze piston, cylindrically fashioned over a length of 48 mm and having a total length of 52 mm, slides into the vertically placed cylinder.

The piston, whose diameter is 15.6 mm, is loaded with a mass of 2 220 g so that a pressure of 120 kPa (1.20 bar) is exerted on the base of the cylinder.

2.3.1.3 A small plug of blasting explosive weighing 5 to 8 g, 30 mm long and 15 mm in diameter, is wrapped in very fine gauze and placed in the cylinder; the piston and its loading mass are then placed on it so that the blasting explosive is subjected to a pressure of 120 kPa (1.20 bar). The time taken for the appearance of the first signs of oily droplets (nitroglycerine) at the outer orifices of the cylinder holes is noted.

2.3.1.4 The blasting explosive is considered satisfactory if the time elapsing before the appearance of the liquid exudations is more than five minutes, the test having been carried out at a temperature of 15 °C to 25 °C.



Test of blasting explosive for exudation

Fig.1: Bell-form charge, mass 2220 g, capable of being suspended from a bronze piston

Fig.2: Cylindrical bronze piston,
dimensions in mm

Fig.3: Hollow bronze cylinder, closed at one end; Plan and cut dimensions in mm

Fig. 1 to 3

- (1) 4 series of 5 holes at 0.5 Ø
- (2) copper
- (3) lead plate with centre cone at the inferior face
- (4) 4 openings, approximately 46x56,
set at even intervals on the periphery

2.3.2 Tests relating to nitrated cellulose mixtures of Class 1 and Class 4.1

2.3.2.1 In order to determine the criteria of the nitrocellulose, the Bergmann-Junk test or the methyl violet paper test in the *Manual of Tests and Criteria* Appendix 10 shall be performed (see Chapter 3.3, special provisions 393 and 394). If there is doubt that the ignition temperature of the nitrocellulose is considerably higher than 132 °C in the case of the Bergmann-Junk test or higher than 134.5 °C in the case of the methyl violet paper test, the ignition temperature test described in 2.3.2.5 should be carried out before these tests are performed. If the ignition temperature of nitrocellulose mixtures is higher than 180 °C or the ignition temperature of plasticized nitrocellulose is higher than 170 °C, the Bergmann-Junk test or the methyl violet paper test can be carried out safely.

2.3.2.2 Before undergoing the tests in 2.3.2.5, the samples shall be dried for not less than 15 hours at the ambient temperature in a vacuum desiccator containing fused and granulated calcium chloride, the sample substance being spread in a thin layer; for this purpose, substances which are neither in powder form nor fibrous shall be ground, or grated, or cut into small pieces. The pressure in the desiccator shall be brought below 6.5 kPa (0.065 bar).

2.3.2.3 Before being dried as prescribed in 2.3.2.2 above, plasticized nitrocellulose shall undergo preliminary drying in a well-ventilated oven, with its temperature set at 70 °C, until the loss of mass per quarter-hour is less than 0.3 % of the original mass.

2.3.2.4 Weakly nitrated nitrocellulose shall first undergo preliminary drying as prescribed in 2.3.2.3 above; drying shall then be completed by keeping the nitrocellulose for at least 15 hours over concentrated sulphuric acid in a desiccator.

2.3.2.5 Ignition temperature (see 2.3.2.1)

(a) The ignition temperature is determined by heating 0.2 g of substance enclosed in a glass test tube immersed in a Wood's alloy bath. The test tube is placed in the bath when the latter has reached 100 °C. The temperature of the bath is then progressively increased by 5 °C per minute;

(b) The test tubes must have the following dimensions:

length	125 mm
internal diameter	15 mm
thickness of wall	0.5 mm

and shall be immersed to a depth of 20 mm;

(c) The test shall be repeated three times, the temperature at which ignition of the substance occurs, i.e., slow or rapid combustion, deflagration or detonation, being noted each time;

(d) The lowest temperature recorded in the three tests is the ignition temperature.

2.3.3 Tests relating to flammable liquids of Classes 3, 6.1 and 8**2.3.3.1 Determination of flash-point**

2.3.3.1.1 The following methods for determining the flash-point of flammable liquids may be used:

International standards:

ISO 1516 (Determination of flash/no flash – Closed cup equilibrium method)

ISO 1523 (Determination of flash point – Closed cup equilibrium method)

ISO 2719 (Determination of flash point – Pensky-Martens closed cup method)

ISO 13736 (Determination of flash point – Abel closed-cup method)

ISO 3679 (Determination of flash point – Rapid equilibrium closed cup method)

ISO 3680 (Determination of flash/no flash – Rapid equilibrium closed cup method)

National standards:

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959:

ASTM D3828-07a, Standard Test Methods for Flash Point by Small Scale Closed-Cup Tester

ASTM D56-05, Standard Test Method for Flash Point by Tag Closed-Cup Tester

ASTM D3278-96(2004)e1, Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus

ASTM D93-08, Standard Test Methods for Flash Point by Pensky-Martens Closed-Cup Tester

Association française de normalisation, AFNOR, 11, rue de Pressensé, F-93571 La Plaine Saint-Denis Cedex:

French Standard NF M 07 - 019

French Standards NF M 07 - 011 / NF T 30 - 050 / NF T 66 - 009

French Standard NF M 07 - 036

Deutsches Institut für Normung, Burggrafenstr. 6, D-10787 Berlin:

Standard DIN 51755 (flash-points below 65 °C)

State Committee of the Council of Ministers for Standardization, RUS-113813, GSP, Moscow, M-49 Leninsky Prospect, 9:

GOST 12.1.044-84

2.3.3.1.2 To determine the flash-point of paints, gums and similar viscous products containing solvents, only apparatus and test methods suitable for determining the flash-point for viscous liquids shall be used, in accordance with the following standards:

- (a) International Standard ISO 3679:1983;
- (b) International Standard ISO 3680:1983;
- (c) International Standard ISO 1523:1983;
- (d) International Standards EN ISO 13736 and EN ISO 2719, Method B.

2.3.3.1.3 The standards listed in 2.3.3.1.1 shall only be used for flash-point ranges which are specified therein. The possibility of chemical reactions between the substance and the sample holder shall be considered when selecting the standard to be used. The apparatus shall, as far as is consistent with safety, be placed in a draught-free position. For safety, a method utilizing a small sample size, around 2 ml, shall be used for organic peroxides and self-reactive substances (also known as "energetic" substances), or for toxic substances.

2.3.3.1.4 When the flash-point, determined by a non-equilibrium method is found to be 23 ± 2 °C or 60 ± 2 °C, it shall be confirmed for each temperature range by an equilibrium method.

2.3.3.1.5 In the event of a dispute as to the classification of a flammable liquid, the classification proposed by the consignor shall be accepted if a check-test of the flash-point yields a result not differing by more than 2 °C from the limits (23 °C and 60 °C respectively) stated in 2.2.3.1. If the difference is more than 2 °C, a second check-test shall be carried out, and the lowest figure of the flash-points obtained in either check-test shall be adopted.

2.3.3.2 *Determination of initial boiling point*

The following methods for determining the initial boiling point of flammable liquids may be used:

International standards:

ISO 3924 (Petroleum products – Determination of boiling range distribution – Gas chromatography method)

ISO 4626 (Volatile organic liquids – Determination of boiling range of organic solvents used as raw materials)

ISO 3405 (Petroleum products – Determination of distillation characteristics at atmospheric pressure)

National standards:

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959:

ASTM D86-07a, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure

ASTM D1078-05, Standard Test Method for Distillation Range of Volatile Organic Liquids

Further acceptable methods:

Method A.2 as described in Part A of the Annex to Commission Regulation (EC) No 440/2008¹.

¹ *Commission Regulation (EC) No 440/2008 of 30 May 2008 laying down test methods pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (Official Journal of the European Union, No. L 142 of 31.05.2008, p.1-739 and No. L 143 of 03.06.2008, p.55).*

2.3.3.3 *Test for determining peroxide content*

To determine the peroxide content of a liquid, the procedure is as follows:

A quantity p (about 5 g, weighed to the nearest 0.01 g) of the liquid to be titrated is placed in an Erlenmeyer flask; 20 cm³ of acetic anhydride and about 1 g of powdered solid potassium iodide are added; the flask is shaken and, after 10 minutes, heated for 3 minutes to about 60 °C. When it has been left to cool for 5 minutes, 25 cm³ of water are added. After this, it is left standing for half an hour, then the liberated iodine is titrated with a decinormal solution of sodium thiosulphate, no indicator being added; complete discolouration indicates the end of the reaction. If n is the number of cm³ of thiosulphate solution required, the percentage of peroxide (calculated as H₂O₂) present in the sample is obtained by the formula:

$$\frac{17n}{100p}$$

2.3.4 *Test for determining fluidity*

To determine the fluidity of liquid, viscous or pasty substances and mixtures, the following test method shall be used.

2.3.4.1 *Test apparatus*

Commercial penetrometer conforming to ISO 2137:1985, with a guide rod of 47.5 g ± 0.05 g; sieve disc of duralumin with conical bores and a mass of 102.5 g ± 0.05 g (see Figure 1); penetration vessel with an inside diameter of 72 mm to 80 mm for reception of the sample.

2.3.4.2 *Test procedure*

The sample is poured into the penetration vessel not less than half an hour before the measurement. The vessel is then hermetically closed and left standing until the measurement. The sample in the hermetically closed penetration vessel is heated to 35 °C ± 0.5 °C and is placed on the penetrometer table immediately prior to measurement (not more than two minutes). The point S of the sieve disc is then brought into contact with the surface of the liquid and the rate of penetration is measured.

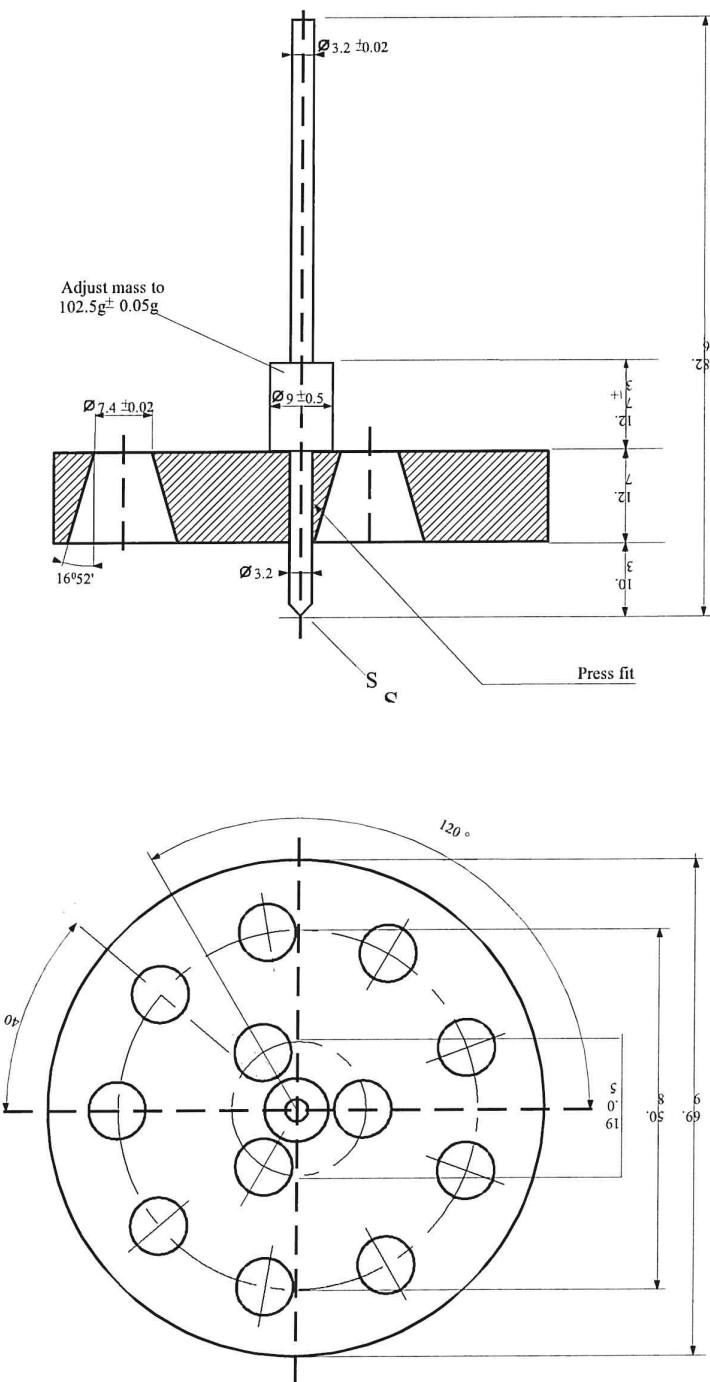
2.3.4.3 *Evaluation of test results*

A substance is pasty if, after the centre S has been brought into contact with the surface of the sample, the penetration indicated by the dial gauge:

- (a) after a loading time of 5 s ± 0.1 s, is less than 15.0 mm ± 0.3 mm; or
- (b) after a loading time of 5 s ± 0.1 s, is greater than 15.0 mm ± 0.3 mm, but the additional penetration after another 55 s ± 0.5 s is less than 5.0 mm ± 0.5 mm.

NOTE: In the case of samples having a flow point, it is often impossible to produce a steady level surface in the penetration vessel and, hence, to establish satisfactory initial measuring conditions for the contact of the point S. Furthermore, with some samples, the impact of the sieve disc can cause an elastic deformation of the surface and, in the first few seconds, simulate a deeper penetration. In all these cases, it may be appropriate to make the evaluation in paragraph (b) above.

Figure 1 – Penetrometer



Tolerances not specified are ± 0.1 mm.

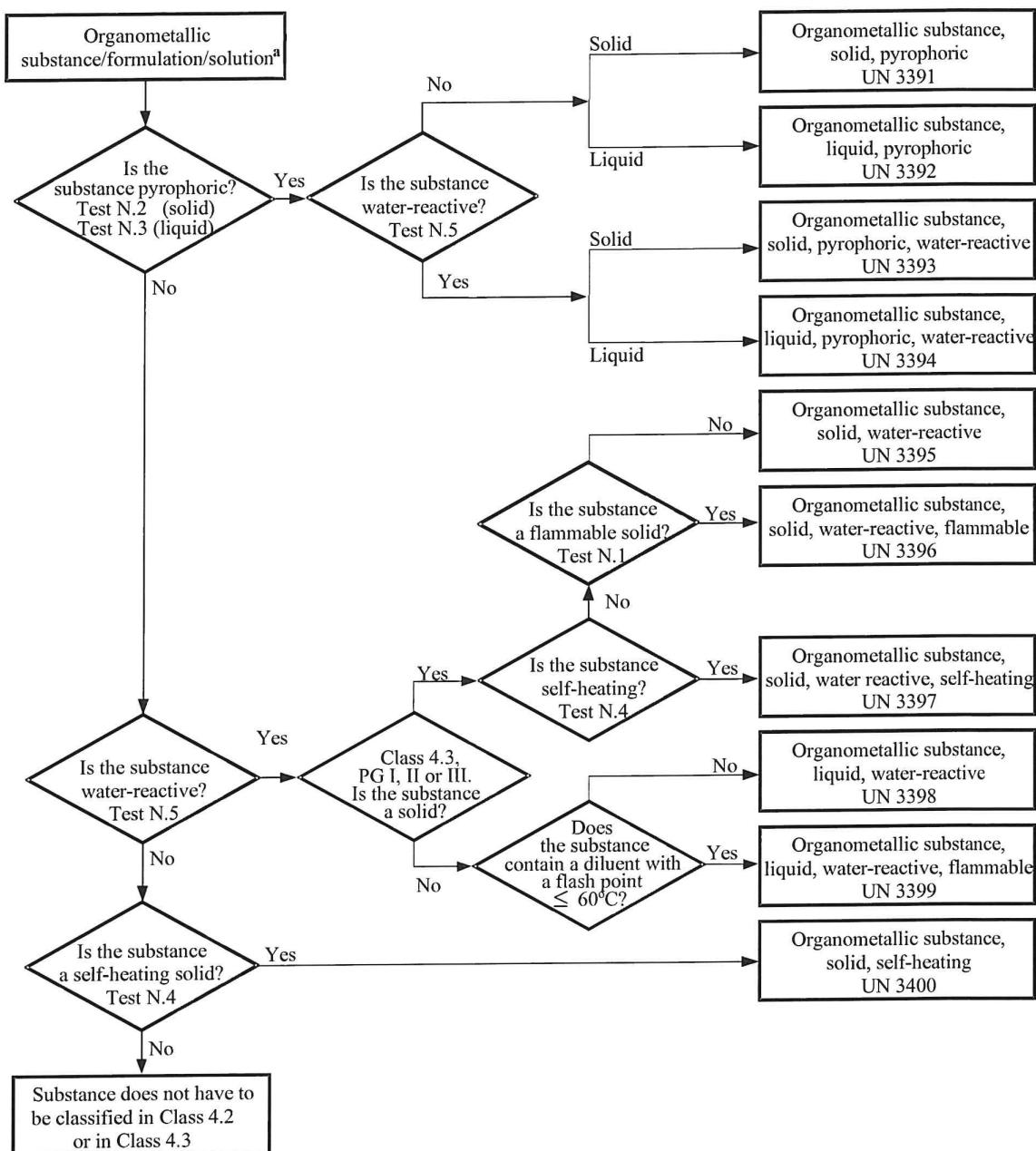
2.3.5**Classification of organometallic substances in Classes 4.2 and 4.3**

Depending on their properties as determined in accordance with tests N.1 to N.5 of the *Manual of Tests and Criteria*, Part III, section 33, organometallic substances may be classified in Classes 4.2 or 4.3, as appropriate, in accordance with the flowchart scheme given in Figure 2.3.5.

NOTE 1: *Depending on their other properties and on the precedence of hazard table (see 2.1.3.10), organometallic substances may have to be classified in other classes as appropriate.*

NOTE 2: *Flammable solutions with organometallic compounds in concentrations which are not liable to spontaneous combustion or, in contact with water, do not emit flammable gases in dangerous quantities, are substances of Class 3.*

Figure 2.3.5 Flowchart scheme for the classification of organometallic substances in Classes 4.2 and 4.3^b



^a 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 of 2.1.3.10.

^b Test methods N.1 to N.5 can be found in the Manual of Tests and Criteria, Part III, Section 33.

CHAPTER 2.4**CRITERIA FOR SUBSTANCES HAZARDOUS TO THE AQUATIC ENVIRONMENT****2.4.1 General definitions**

2.4.1.1 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). For the purposes of this Chapter, ‘substance’ means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

2.4.1.2 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.

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

2.4.1.4 The following definitions apply for acronyms or terms used in this section:

- BCF: Bioconcentration Factor;
- BOD: Biochemical Oxygen Demand;
- COD: Chemical Oxygen Demand;
- GLP: Good Laboratory Practices;
- EC_x: the concentration associated with x% response;
- EC₅₀: the effective concentration of substance that causes 50% of the maximum response;
- ErC₅₀: EC₅₀ in terms of reduction of growth;
- K_{ow}: octanol/water partition coefficient;
- LC₅₀ (50% lethal concentration): the concentration of a substance in water which causes the death of 50% (one half) in a group of test animals;
- L(E)C₅₀: LC₅₀ or EC₅₀;
- NOEC (No Observed Effect Concentration): the test concentration immediately below the lowest tested concentration with statistically significant adverse effect. The NOEC has no statistically significant adverse effect compared to the control;
- OECD Test Guidelines: test guidelines published by the Organisation for Economic Co-operation and Development (OECD).

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 See annex 10 of GHS.

2.4.2 Definitions and data requirements

2.4.2.1 The basic elements for classification of environmentally hazardous substances (aquatic environment) are as follows:

- (a) Acute aquatic toxicity;
- (b) Chronic aquatic toxicity;
- (c) Potential for or actual bioaccumulation; and
- (d) Degradation (biotic or abiotic) for organic chemicals.

2.4.2.2 While data from internationally harmonized test methods are preferred, in practice, data from national methods may also be used where they are considered as equivalent. In general, it has been agreed that 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 should be based on the best available data.

2.4.2.3 **Acute aquatic toxicity** means the intrinsic property of a substance to be injurious to an organism in a short-term aquatic exposure to that substance.

Acute (short-term) hazard, for classification purposes, means the hazard of a chemical caused by its acute toxicity to an organism during short-term aquatic exposure to that chemical.

Acute aquatic toxicity shall normally be determined using a fish 96-hour LC₅₀ (OECD Test Guideline 203 or equivalent), a crustacea species 48-hour EC₅₀ (OECD Test Guideline 202 or equivalent) and/or an algal species 72- or 96-hour EC₅₀ (OECD Test Guideline 201 or equivalent). These species are considered as surrogate for all aquatic organisms, and data on other species such as Lemna may also be considered if the test methodology is suitable.

2.4.2.4 **Chronic aquatic toxicity** means the intrinsic property of a substance to cause adverse effects to aquatic organisms during aquatic exposures which are determined in relation to the life-cycle of the organism.

Long-term hazard, for classification purposes, means the hazard of a chemical caused by its chronic toxicity following long-term exposure in the aquatic environment.

Chronic toxicity data are less available than acute data and the range of testing procedures less standardized. Data generated according to OECD Test Guidelines 210 (Fish Early Life Stage) or 211 (Daphnia Reproduction) and 201 (Algal Growth Inhibition) can be accepted. Other validated and internationally accepted tests could also be used. The NOECs or other equivalent ECx shall be used.

2.4.2.5 **Bioaccumulation** means net result of uptake, transformation and elimination of a substance in an organism due to all routes of exposure (i.e. air, water, sediment/soil and food).

The **potential for bioaccumulation** shall normally be determined by using the octanol/water partition coefficient, usually reported as a log K_{ow} determined by OECD Test Guidelines 107, 117 or 123. While this represents a potential to bioaccumulate, an experimentally determined Bioconcentration Factor (BCF) provides a better measure and should be used in preference when available. A BCF should be determined according to OECD Test Guideline 305.

2.4.2.6 **Degradation** means the decomposition of organic molecules to smaller molecules and eventually to carbon dioxide, water and salts.

Environmental degradation may be biotic or abiotic (e.g. hydrolysis) and the criteria reflect this fact. Ready biodegradation can most easily be defined using the biodegradability tests (A-F) of OECD Test Guideline 301. A pass level in these tests can be considered as indicative of rapid degradation in most environments. These are freshwater tests and thus the use of the results from OECD Test Guideline 306, which is more suitable for marine environments, has also been included. Where such data are not available, a BOD_5 (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 shall be considered rapidly degradable in the environment if the following criteria are met:

- (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, unless the substance is identified as a complex, multi-component substance with structurally similar constituents. In this case, and where there is sufficient justification, the 10-day window condition may be waived and the pass level applied at 28 days⁴; 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.

2.4.3 Substance classification categories and criteria

NOTE: Chronic Category 4 of Chapter 4.1 of GHS is reproduced in this section for information, although it is not relevant in the context of ADN.

2.4.3.1 The following substances shall be considered to be environmentally hazardous (aquatic environment):

- (a) For carriage in packages, substances which meet the criteria for Acute 1, Chronic 1 or Chronic 2, according to table 2.4.3.1 below; and
- (b) For carriage in tank vessels, substances which meet the criteria for Acute 1, Acute 2 or Acute 3, or Chronic 1, Chronic 2 or Chronic 3, according to table 2.4.3.1 below.

³ Special guidance on data interpretation is provided in Chapter 4.1 and Annex 9 to GHS.

⁴ See Chapter 4.1 and Annex 9, paragraph A9.4.2.2.3 of the GHS.

Table 2.4.3.1: Categories for substances hazardous to the aquatic environment (see Note 1)

(a) Acute (short-term) aquatic hazard	
<u>Category Acute 1:</u> (Note 2)	
96 h LC ₅₀ (for fish)	≤ 1 mg/l and/or
48 h EC ₅₀ (for crustacea)	≤ 1 mg/l and/or
72 or 96 h ErC ₅₀ (for algae or other aquatic plants)	≤ 1 mg/l (see Note 3)
<u>Category Acute 2:</u>	
96 h LC ₅₀ (for fish)	> 1 but ≤ 10 mg/l and/or
48 h EC ₅₀ (for crustacea)	> 1 but ≤ 10 mg/l and/or
72 or 96 h ErC ₅₀ (for algae or other aquatic plants)	> 1 but ≤ 10 mg/l (see Note 3)
<u>Category Acute 3:</u>	
96 h LC ₅₀ (for fish)	> 10 but ≤ 100 mg/l and/or
48 h EC ₅₀ (for crustacea)	> 10 but ≤ 100 mg/l and/or
72 or 96 h ErC ₅₀ (for algae or other aquatic plants)	> 10 but ≤ 100 mg/l (see Note 3)
(b) Long-term aquatic hazard (see also figure 2.4.3.1)	
(i) Non-rapidly degradable substances (see Note 4) for which there are adequate chronic toxicity data available	
<u>Category Chronic 1:</u> (see Note 2)	
Chronic NOEC or EC _x (for fish)	≤ 0.1 mg/l and/or
Chronic NOEC or EC _x (for crustacea)	≤ 0.1 mg/l and/or
Chronic NOEC or EC _x (for algae or other aquatic plants)	≤ 0.1 mg/l
<u>Category Chronic 2:</u>	
Chronic NOEC or EC _x (for fish)	≤ 1 mg/l and/or
Chronic NOEC or EC _x (for crustacea)	≤ 1 mg/l and/or
Chronic NOEC or EC _x (for algae or other aquatic plants)	≤ 1 mg/l
(ii) Rapidly degradable substances for which there are adequate chronic toxicity data available	
<u>Category Chronic 1:</u> (see Note 2)	
Chronic NOEC or EC _x (for fish)	≤ 0.01 mg/l and/or
Chronic NOEC or EC _x (for crustacea)	≤ 0.01 mg/l and/or
Chronic NOEC or EC _x (for algae or other aquatic plants)	≤ 0.01 mg/l
<u>Category Chronic 2:</u>	
Chronic NOEC or EC _x (for fish)	≤ 0.1 mg/l and/or
Chronic NOEC or EC _x (for crustacea)	≤ 0.1 mg/l and/or
Chronic NOEC or EC _x (for algae or other aquatic plants)	≤ 0.1 mg/l
<u>Category Chronic 3:</u>	
Chronic NOEC or EC _x (for fish)	≤ 1 mg/l and/or
Chronic NOEC or EC _x (for crustacea)	≤ 1 mg/l and/or
Chronic NOEC or EC _x (for algae or other aquatic plants)	≤ 1 mg/l

(iii) Substances for which adequate chronic toxicity data are not available

Category Chronic 1: (see Note 2)

96 h LC ₅₀ (for fish)	≤ 1 mg/l and/or
48 h EC ₅₀ (for crustacea)	≤ 1 mg/l and/or
72 or 96 h ErC ₅₀ (for algae or other aquatic plants)	≤ 1 mg/l (see Note 3)

and the substance is not rapidly degradable and/or the experimentally determined BCF is ≥ 500 (or, if absent, the log K_{ow} ≥ 4) (see Notes 4 and 5).

Category Chronic 2:

96 h LC ₅₀ (for fish)	> 1 but ≤ 10 mg/l and/or
48 h EC ₅₀ (for crustacea)	> 1 but ≤ 10 mg/l and/or
72 or 96 h ErC ₅₀ (for algae or other aquatic plants)	> 1 but ≤ 10 mg/l (see Note 3)

and the substance is not rapidly degradable and/or the experimentally determined BCF is ≥ 500 (or, if absent, the log K_{ow} ≥ 4) (see Notes 4 and 5).

Category Chronic 3:

96 h LC ₅₀ (for fish)	> 10 but ≤ 100 mg/l and/or
48 h EC ₅₀ (for crustacea)	> 10 but ≤ 100 mg/l and/or
72 or 96 h ErC ₅₀ (for algae or other aquatic plants)	> 10 but ≤ 100 mg/l (see Note 3)

and the substance is not rapidly degradable and/or the experimentally determined BCF is ≥ 500 (or, if absent, the log K_{ow} ≥ 4) (see Notes 4 and 5).

(c) "Safety net" classification

Category Chronic 4:

Poorly soluble substances for which no acute toxicity is recorded at levels up to the water solubility, and which are not rapidly degradable and have a log K_{ow} ≥ 4, indicating a potential to bioaccumulate, will be classified in this category unless other scientific evidence exists showing classification to be unnecessary. Such evidence would include an experimentally determined BCF < 500, or a chronic toxicity NOECs > 1 mg/l, or evidence of rapid degradation in the environment.

Substances which come under Category Chronic 4 alone are not considered to be environmentally hazardous in the sense of ADN.

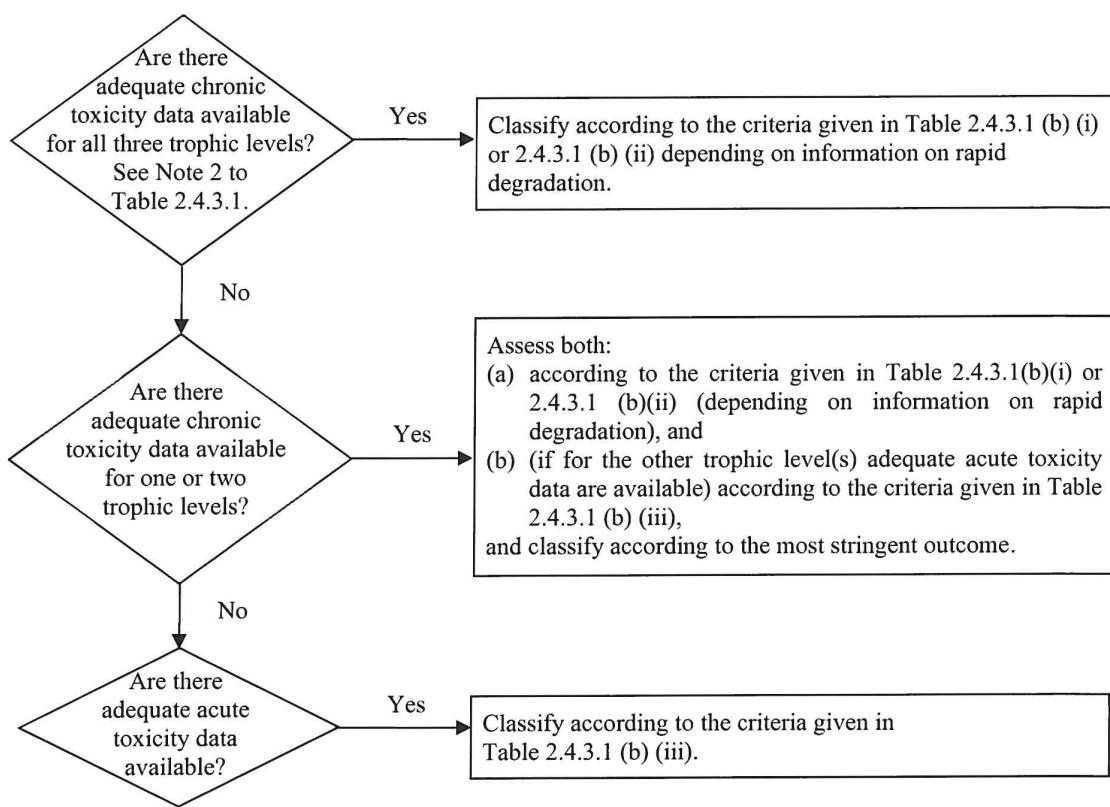
NOTE 1: The organisms, fish, crustacea and algae are tested as surrogate species covering a range of trophic levels and taxa, and the test methods are highly standardized. Data on other organisms may also be considered, however, provided they represent equivalent species and test endpoints.

NOTE 2: When classifying substances as Acute 1 and/or Chronic 1 it is necessary at the same time to indicate an appropriate M factor (see 2.4.4.6.4) to apply the summation method.

NOTE 3: Where the algal toxicity ErC₅₀ (= EC₅₀ (growth rate)) falls more than 100 times below the next most sensitive species and results in a classification based solely on this effect, consideration shall be given to whether this toxicity is representative of the toxicity to aquatic plants. Where it can be shown that this is not the case, professional judgement shall be used in deciding if classification shall be applied. Classification shall be based on the ErC₅₀. In circumstances where the basis of the EC₅₀ is not specified and no ErC₅₀ is recorded, classification shall be based on the lowest EC₅₀ available.

NOTE 4: Lack of rapid degradability is based on either a lack of ready biodegradability or other evidence of lack of rapid degradation. When no useful data on degradability are available, either experimentally determined or estimated data, the substance shall be regarded as not rapidly degradable.

NOTE 5: Potential to bioaccumulate, based on an experimentally derived BCF ≥ 500 or, if absent, a log K_{ow} ≥ 4 provided log K_{ow} is an appropriate descriptor for the bioaccumulation potential of the substance. Measured log K_{ow} values take precedence over estimated values and measured BCF values take precedence over log K_{ow} values.

Figure 2.4.3.1: Categories for substances long-term hazardous to the aquatic environment

2.4.3.2 The classification scheme in Table 2.4.3.2 below summarizes the classification criteria for substances.

Table 2.4.3.2: Classification scheme for substances hazardous to the aquatic environment

Classification categories			
Acute hazard (Note 1)	Long-term hazard (Note 2)		
	Adequate chronic toxicity data available		Adequate chronic toxicity data not available (Note 1)
	Non-rapidly degradable substances (Note 3)	Rapidly degradable substances (Note 3)	
Category: Acute 1	Category: Chronic 1	Category: Chronic 1	Category: Chronic 1
$L(E)C_{50} \leq 1.00$	NOEC or $EC_x \leq 0.1$	NOEC or $EC_x \leq 0.01$	$L(E)C_{50} \leq 1.00$ and lack of rapid degradability and/or $BCF \geq 500$ or, if absent $\log K_{ow} \geq 4$
Category: Acute 2	Category: Chronic 2	Category: Chronic 2	Category: Chronic 2
$1.00 < L(E)C_{50} \leq 10.0$	$0.1 < NOEC \text{ or } EC_x \leq 1$	$0.01 < NOEC \text{ or } EC_x \leq 0.1$	$1.00 < L(E)C_{50} \leq 10.0$ and lack of rapid degradability and/or $BCF \geq 500$ or, if absent $\log K_{ow} \geq 4$
Category: Acute 3		Category: Chronic 3	Category: Chronic 3
$10.0 < L(E)C_{50} \leq 100$		$0.1 < NOEC \text{ or } EC_x \leq 1$	$10.0 < L(E)C_{50} \leq 100$ and lack of rapid degradability and/or $BCF \geq 500$ or, if absent $\log K_{ow} \geq 4$
	Category: Chronic 4 (Note 4) Example: (Note 5) No acute toxicity and lack of rapid degradability and $BCF \geq 500$ or, if absent $\log K_{ow} \geq 4$, unless NOECs > 1 mg/l		

NOTE 1: Acute toxicity band based on $L(E)C_{50}$ values in mg/l for fish, crustacea and/or algae or other aquatic plants (or Quantitative Structure Activity Relationships (QSAR) estimation if no experimental data⁵).

NOTE 2: Substances are classified in the various chronic categories unless there are adequate chronic toxicity data available for all three trophic levels above the water solubility or above 1 mg/l. ("Adequate" means that the data sufficiently cover the endpoint of concern. Generally this would mean measured test data, but in order to avoid unnecessary testing it can on a case by case basis also be estimated data, e.g. (QSAR, or for obvious cases expert judgement).

NOTE 3: Chronic toxicity band based on NOEC or equivalent EC_x values in mg/l for fish or crustacea or other recognized measures for chronic toxicity.

NOTE 4: The system also introduces a "safety net" classification (referred to as category Chronic 4) for use when the data available do not allow classification under the formal criteria but there are nevertheless some grounds for concern.

NOTE 5: For poorly soluble substances for which no acute toxicity has been demonstrated at the solubility limit, and are both not rapidly degraded and have a potential to bioaccumulate, this category should apply unless it can be demonstrated that the substance does not require classification for aquatic long-term hazards.

⁵ Special guidance is provided in Chapter 4.1, paragraph 4.1.2.13 and Annex 9, Section A9.6 of the GHS.

2.4.4**Classification categories and criteria for mixtures**

NOTE: *Chronic Category 4 of Chapter 4.1 of GHS is reproduced in this section for information, although it is not relevant in the context of ADN.*

2.4.4.1

The classification system for mixtures covers all classification categories which are used for substances, meaning categories Acute 1 to 3 and Chronic 1 to 4. In order to make use of all available data for purposes of classifying the aquatic environmental hazards of the mixture, the following assumption has been made and is applied where appropriate.

The "relevant ingredients" of a mixture are those which are present in a concentration equal to or greater than 0.1% (by mass) for ingredients classified as Acute and/or Chronic 1 and equal to or greater than 1% for other ingredients, unless there is a presumption (e.g. in the case of highly toxic ingredients) that an ingredient present at less than 0.1% can still be relevant for classifying the mixture for aquatic environmental hazards.

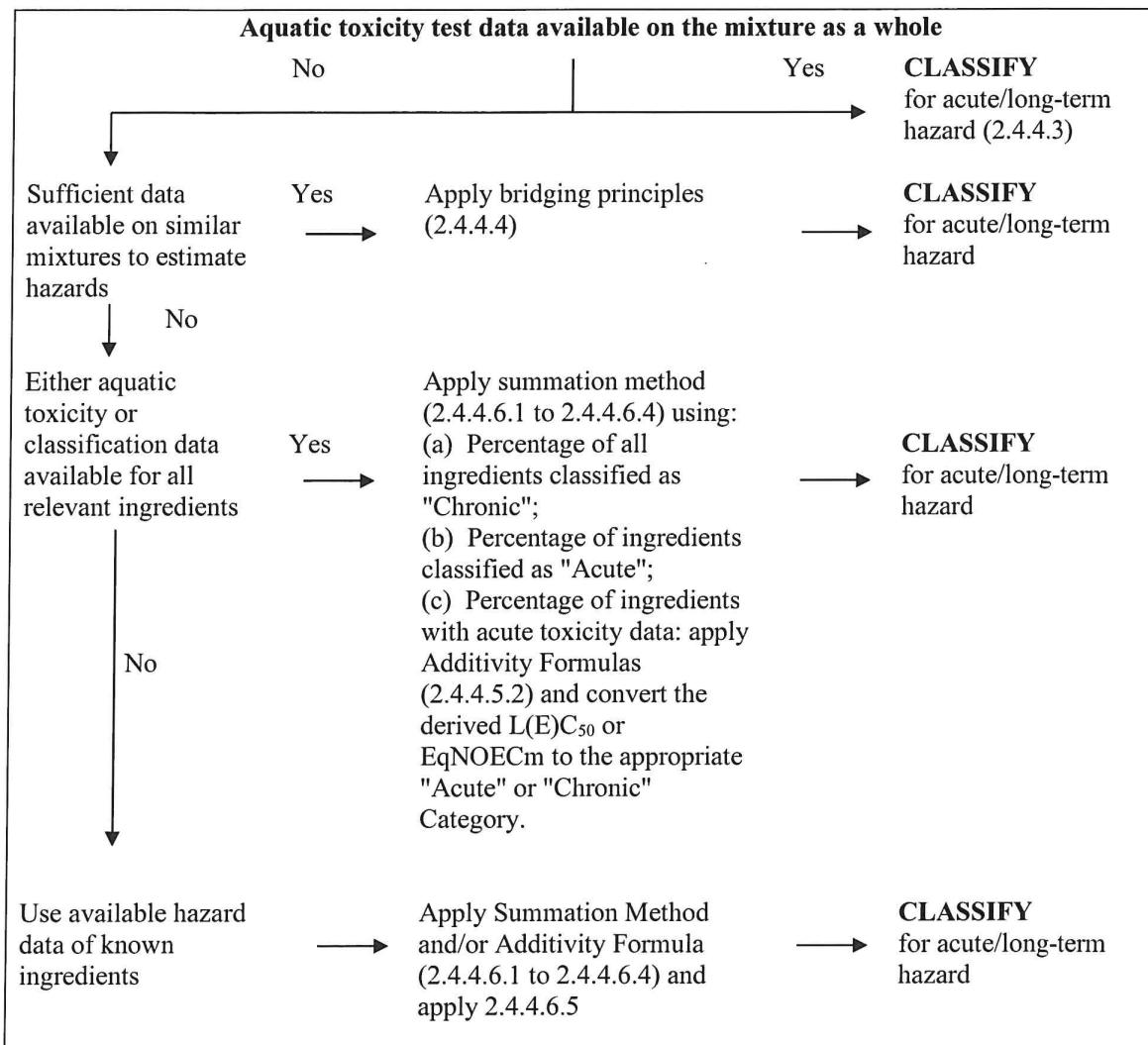
2.4.4.2

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 ingredients. Elements of the tiered approach include:

- (a) Classification based on tested mixtures;
- (b) Classification based on bridging principles;
- (c) Use of 'summation of classified ingredients' and/or an 'additivity formula'.

Figure 2.4.4.2 outlines the process to be followed.

Figure 2.4.4.2: Tiered approach to classification of mixtures for acute and long-term environmental hazards



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

2.4.4.3.1 When the mixture as a whole has been tested to determine its aquatic toxicity, this information shall be used for classifying the mixture according to the criteria that have been agreed for substances. The classification is normally based on the data for fish, crustacea and algae/plants (2.4.2.3 and 2.4.2.4). When adequate acute or chronic data for the mixture as a whole are lacking, "bridging principles" or "summation method" shall be applied (see 2.4.4.4 and 2.4.4.5).

2.4.4.3.2 The long-term hazard classification of mixtures requires additional information on degradability and in certain cases bioaccumulation. There are no degradability and bioaccumulation data for mixtures as a whole. Degradability and bioaccumulation tests for mixtures are not used as they are usually difficult to interpret, and such tests may be meaningful only for single substances.

2.4.4.3.3 Classification for categories Acute 1, 2 and 3

(a) When there are adequate acute toxicity test data (LC_{50} or EC_{50}) available for the mixture as a whole showing $L(E)C_{50} \leq 100 \text{ mg/l}$:

Classify the mixture as Acute 1, 2 or 3 in accordance with Table 2.4.3.1 (a);

(b) When there are acute toxicity test data ($LC_{50}(s)$ or $EC_{50}(s)$) available for the mixture as a whole showing $L(E)C_{50}(s) > 100 \text{ mg/l}$, or above the water solubility:

No need to classify for acute hazard under ADN.

2.4.4.3.4 Classification for categories Chronic 1, 2 and 3

(a) When there are adequate chronic toxicity data (EC_x or $NOEC$) available for the mixture as a whole showing EC_x or $NOEC$ of the tested mixture $\leq 1 \text{ mg/l}$:

(i) classify the mixture as Chronic 1, 2 or 3 in accordance with Table 2.4.3.1 (b) (ii) (rapidly degradable) if the available information allows the conclusion that all relevant ingredients of the mixture are rapidly degradable;

NOTE: In this situation, when EC_x or $NOEC$ of the tested mixture $> 1 \text{ mg/l}$, there is no need to classify for long-term hazard under ADN.

(ii) classify the mixture as Chronic 1, 2 or 3 in all other cases in accordance with Table 2.4.3.1 (b) (i) (non-rapidly degradable);

(b) When there are adequate chronic toxicity data (EC_x or $NOEC$) available for the mixture as a whole showing $EC_x(s)$ or $NOEC(s)$ of the tested mixture $> 1 \text{ mg/l}$ or above the water solubility:

No need to classify for long-term hazard under ADN.

2.4.4.3.5 Classification for category Chronic 4

If there are nevertheless reasons for concern:

Classify the mixture as Chronic 4 (safety net classification) in accordance with Table 2.4.3.1 (c).

2.4.4.4 Classification of mixtures when toxicity data are not available for the complete mixture: bridging principles

2.4.4.4.1 Where the mixture itself has not been tested to determine its aquatic environmental hazard, but there are sufficient data on the individual ingredients and similar tested mixtures to adequately characterize the hazards of the mixture, these 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 characterizing the hazards of the mixture without the necessity for additional testing in animals.

2.4.4.4.2 Dilution

Where a new mixture is formed by diluting a tested mixture or a substance with a diluent which has an equivalent or lower aquatic hazard classification than the least toxic original ingredient and which is not expected to affect the aquatic hazards of other ingredients, then the resulting mixture shall be classified as equivalent to the original tested mixture or substance. Alternatively, the method explained in 2.4.4.5 may be applied.

2.4.4.4.3 *Batching*

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

2.4.4.4.4 *Concentration of mixtures which are classified with the most severe classification categories (Chronic 1 and Acute 1)*

If a tested mixture is classified as Chronic 1 and/or Acute 1, and the ingredients of the mixture which are classified as Chronic 1 and/or Acute 1 are further concentrated, the more concentrated untested mixture shall be classified with the same classification category as the original tested mixture without additional testing.

2.4.4.4.5 *Interpolation within one toxicity category*

For three mixtures (A, B and C) with identical ingredients, where mixtures A and B have been tested and are in the same toxicity category, and where untested mixture C has the same toxicologically active ingredients as mixtures A and B but has concentrations of toxicologically active ingredients intermediate to the concentrations in mixtures A and B, then mixture C is assumed to be in the same category as A and B.

2.4.4.4.6 *Substantially similar mixtures*

Given the following:

- (a) Two mixtures:
 - (i) A + B;
 - (ii) C + B;
- (b) The concentration of ingredient B is essentially the same in both mixtures;
- (c) The concentration of ingredient A in mixture (i) equals that of ingredient C in mixture (ii);
- (d) Data on aquatic hazards for A and C are available and are substantially equivalent, i.e. they are in the same hazard category and are not expected to affect the aquatic toxicity of B.

If mixture (i) or (ii) is already classified based on test data, then the other mixture can be assigned the same hazard category.

2.4.4.5 *Classification of mixtures when toxicity data are available for all ingredients or only for some ingredients of the mixture*

- 2.4.4.5.1 The classification of a mixture is based on summation of the concentrations of its classified ingredients. The percentage of ingredients classified as 'Acute' or 'Chronic' will feed straight into the summation method. Details of the summation method are described in 2.4.4.6.1 to 2.4.4.6.4.

2.4.4.5.2

Mixtures may be made of a combination of both ingredients that are classified (as Acute 1 to 3 and/or Chronic 1 to 4) and those for which adequate toxicity test data are available. When adequate toxicity data are available for more than one ingredient in the mixture, the combined toxicity of those ingredients shall be calculated using the following additivity formulas (a) or (b), depending on the nature of the toxicity data:

(a) Based on acute aquatic toxicity:

$$\frac{\sum C_i}{L(E)C_{50m}} = \sum_n \frac{C_i}{L(E)C_{50i}}$$

where:

C_i = concentration of ingredient i (mass percentage);

$L(E)C_{50i}$ = LC₅₀ or EC₅₀ for ingredient i (mg/l);

n = number of ingredients, and i is running from 1 to n;

$L(E)C_{50m}$ = L(E)C₅₀ of the part of the mixture with test data;

The calculated toxicity shall be used to assign that portion of the mixture an acute hazard category which is then subsequently used in applying the summation method;

(b) Based on chronic aquatic toxicity:

$$\frac{\sum C_i + \sum C_j}{EqNOEC_m} = \sum_n \frac{C_i}{NOEC_i} + \sum_n \frac{C_j}{0.1 \times NOEC_j}$$

where:

C_i = concentration of ingredient i (mass percentage) covering the rapidly degradable ingredients;

C_j = concentration of ingredient j (mass percentage) covering the non-rapidly degradable ingredients;

$NOEC_i$ = NOEC (or other recognized measures for chronic toxicity) for ingredient i covering the rapidly degradable ingredients, in mg/l;

$NOEC_j$ = NOEC (or other recognized measures for chronic toxicity) for ingredient j covering the non-rapidly degradable ingredients, in mg/l;

n = number of ingredients, and i and j are running from 1 to n;

$EqNOEC_m$ = equivalent NOEC of the part of the mixture with test data;

The equivalent toxicity thus reflects the fact that non-rapidly degrading substances are classified one hazard category level more "severe" than rapidly degrading substances.

The calculated equivalent toxicity shall be used to assign that portion of the mixture a long-term hazard category, in accordance with the criteria for rapidly degradable substances (Table 2.4.3.1 (b) (ii)), which is then subsequently used in applying the summation method.

2.4.4.5.3 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 ingredient toxicity values that relate to the same taxonomic group (i.e. fish, crustacea or algae) and then to use the highest toxicity (lowest value) obtained (i.e. use the most sensitive of the three groups). However, when toxicity data for each ingredient are not available in the same taxonomic group, the toxicity value of each ingredient shall be selected in the same manner that toxicity values are selected for the classification of substances, i.e. the highest toxicity (from the most sensitive test organism) is used. The calculated acute and chronic toxicity may then be used to classify this part of the mixture as Acute 1, 2 or 3 and/or Chronic 1, 2, or 3 using the same criteria described for substances.

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

2.4.4.6 *Summation method*

2.4.4.6.1 *Classification procedures*

In general, a more severe classification for mixtures overrides a less severe classification, e.g. a classification with Chronic 1 overrides a classification with Chronic 2. As a consequence, the classification procedure is already completed if the result of the classification is Chronic 1. A more severe classification than Chronic 1 is not possible; therefore, it is not necessary to pursue the classification procedure further.

2.4.4.6.2 *Classification for categories Acute 1, 2 and 3*

2.4.4.6.2.1 First, all ingredients classified as Acute 1 are considered. If the sum of the concentrations (in %) of these ingredients is $\geq 25\%$, the whole mixture is classified as Acute 1. If the result of the calculation is a classification of the mixture as Acute 1, the classification process is completed.

2.4.4.6.2.2 In cases where the mixture is not classified as Acute 1, classification of the mixture as Acute 2 shall be considered. A mixture is classified as Acute 2 if 10 times the sum of all ingredients classified as Acute 1 plus the sum of all ingredients classified as Acute 2 is $\geq 25\%$. If the result of the calculation is classification of the mixture as Acute 2, the classification process is completed.

2.4.4.6.2.3 In cases where the mixture is not classified either as Acute 1 or Acute 2, classification of the mixture as Acute 3 shall be considered. A mixture is classified as Acute 3 if 100 times the sum of all ingredients classified as Acute 1 plus 10 times the sum of all ingredients classified as Acute 2 plus the sum of all ingredients classified as Acute 3 is $\geq 25\%$.

2.4.4.6.2.4 The classification of mixtures for acute hazards based on this summation of the concentrations of classified ingredients is summarized in Table 2.4.4.6.2.4.

Table 2.4.4.6.2.4: Classification of a mixture for acute hazards based on summation of the concentrations of classified ingredients

Sum of the concentrations (in %) of ingredients classified as:	Mixture classified as:
Acute 1 $\times M^a$ $\geq 25\%$	Acute 1
$(M \times 10 \times \text{Acute 1}) + \text{Acute 2} \geq 25\%$	Acute 2
$(M \times 100 \times \text{Acute 1}) + (10 \times \text{Acute 2}) + \text{Acute 3} \geq 25\%$	Acute 3

^a For explanation of the M factor, see 2.4.4.6.4.

2.4.4.6.3 *Classification for categories Chronic 1, 2, 3 and 4*

2.4.4.6.3.1 First, all ingredients classified as Chronic 1 are considered. If the sum of the concentrations (in %) of these ingredients is $\geq 25\%$, the mixture shall be classified as Chronic 1. If the result of the calculation is a classification of the mixture as Chronic 1, the classification procedure is completed.

2.4.4.6.3.2 In cases where the mixture is not classified as Chronic 1, classification of the mixture as Chronic 2 shall be considered. A mixture is classified as Chronic 2 if 10 times the sum of the concentrations (in %) of all ingredients classified as Chronic 1 plus the sum of the concentrations (in %) of all ingredients classified as Chronic 2 is $\geq 25\%$. If the result of the calculation is classification of the mixture as Chronic 2, the classification process is completed.

2.4.4.6.3.3 In cases where the mixture is not classified either as Chronic 1 or Chronic 2, classification of the mixture as Chronic 3 shall be considered. A mixture is classified as Chronic 3 if 100 times the sum of all ingredients classified as Chronic 1 plus 10 times the sum of all ingredients classified as Chronic 2 plus the sum of all ingredients classified as Chronic 3 is $\geq 25\%$.

2.4.4.6.3.4 If the mixture is still not classified in Category Chronic 1, 2 or 3, classification of the mixture as Chronic 4 need not be considered for the purposes of ADN. A mixture is classified as Chronic 4 if the sum of the percentages of ingredients classified as Chronic 1, 2, 3 and 4 is $\geq 25\%$.

2.4.4.6.3.5 The classification of mixtures for long-term hazards based on this summation of the concentrations of classified ingredients is summarized in Table 2.4.4.6.3.5 below.

Table 2.4.4.6.3.5: Classification of a mixture for long-term hazards based on summation of the concentrations of classified ingredients

Sum of the concentrations (in %) of ingredients classified as:	Mixture classified as:
$\text{Chronic 1} \times M^a \geq 25\%$	Chronic 1
$(M \times 10 \times \text{Chronic 1}) + \text{Chronic 2} \geq 25\%$	Chronic 2
$(M \times 100 \times \text{Chronic 1}) + (10 \times \text{Chronic 2}) + \text{Chronic 3} \geq 25\%$	Chronic 3
$\text{Chronic 1} + \text{Chronic 2} + \text{Chronic 3} + \text{Chronic 4} \geq 25\%$	Chronic 4

^a For explanation of the M factor, see 2.4.4.6.4.

2.4.4.6.4 *Mixtures with highly toxic ingredients*

Acute 1 or Chronic 1 ingredients with acute toxicities well below 1 mg/l and/or chronic toxicities well below 0.1 mg/l (if non-rapidly degradable) and 0.01 mg/l (if rapidly degradable) may influence the toxicity of the mixture and shall be given increased weight in applying the summation method. When a mixture contains ingredients classified as Acute or Chronic 1, the tiered approach described in 2.4.4.6.2 and 2.4.4.6.3 shall be applied using a weighted sum by multiplying the concentrations of Acute 1 and Chronic 1 ingredients by a factor, instead of merely adding up the percentages. This means that the concentration of "Acute 1" in the left column of Table 2.4.4.6.2.4 and the concentration of "Chronic 1" in the left column of Table 2.4.4.6.3.4 are multiplied by the appropriate multiplying factor. The multiplying factors to be applied to these ingredients are defined using the toxicity value, as summarized in Table 2.4.4.6.4 below. Therefore, in order to classify a mixture containing Acute/Chronic 1 ingredients, the classifier needs to be informed of the value of the M factor in order to apply the summation method. Alternatively, the additivity formula (see 2.4.4.5.2) may be used when toxicity data are available for all highly toxic ingredients in the mixture and there is convincing evidence that all other ingredients, including those for which specific acute and/or chronic toxicity data are not available, are of low or no toxicity and do not significantly contribute to the environmental hazard of the mixture.

Table 2.4.4.6.4 Multiplying factors for highly toxic ingredients of mixtures

Acute toxicity	M factor	Chronic toxicity	M factor	
L(E)C ₅₀ value		NOEC value	NRD ^a ingredients	RD ^b ingredients
0.1 < L(E)C ₅₀ ≤ 1	1	0.01 < NOEC ≤ 0.1	1	–
0.01 < L(E)C ₅₀ ≤ 0.1	10	0.001 < NOEC ≤ 0.01	10	1
0.001 < L(E)C ₅₀ ≤ 0.01	100	0.0001 < NOEC ≤ 0.001	100	10
0.0001 < L(E)C ₅₀ ≤ 0.001	1 000	0.00001 < NOEC ≤ 0.0001	1 000	100
0.00001 < L(E)C ₅₀ ≤ 0.0001	10 000	0.000001 < NOEC ≤ 0.00001	10 000	1 000
(continue in factor 10 intervals)		(continue in factor 10 intervals)		

^a Non-rapidly degradable.^b Rapidly degradable.**2.4.4.6.5 Classification of mixtures with ingredients without any useable information**

In the event that no useable information on acute and/or chronic aquatic toxicity is available for one or more relevant ingredients, 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 ingredients only.

PART 3

Dangerous goods list, special provisions and exemptions related to limited and excepted quantities

CHAPTER 3.1

GENERAL

3.1.1 Introduction

In addition to the provisions referred to or given in the tables of this Part, the general requirements of each Part, Chapter and/or Section are to be observed. These general requirements are not given in the tables. When a general requirement is contradictory to a special provision, the special provision prevails.

3.1.2 Proper shipping name

NOTE: For proper shipping names used for the carriage of samples, see 2.1.4.1.

3.1.2.1 The proper shipping name is that portion of the entry most accurately describing the goods in Table A or Table C in Chapter 3.2, which is shown in upper case characters (plus any numbers, Greek letters, "sec", "tert", and the letters "m", "n", "o", "p", which form an integral part of the name). Particulars concerning the vapour pressure (vp) and the boiling point (bp) in column (2) of Table C in Chapter 3.2 are part of the proper shipping name. An alternative proper shipping name may be shown in brackets following the main proper shipping name. In Table A, it is shown in upper case characters (e.g., ETHANOL (ETHYL ALCOHOL)). In Table C, it is shown in lower case characters (e.g. ACETONITRILE (methyl cyanide)). Portions of an entry appearing in lower case need not be considered as part of the proper shipping name unless otherwise stated above.

3.1.2.2 When a combination of several distinct proper shipping names are listed under a single UN number, and these are separated by "or" in lower case or are punctuated by commas, only the most appropriate shall be shown in the transport document and package marks. Examples illustrating the selection of the proper shipping name for such entries are:

(a) UN 1057 LIGHTERS or LIGHTER REFILLS - The proper shipping name is the most appropriate of the following possible combinations:

LIGHTERS

LIGHTER REFILLS;

(b) 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.

3.1.2.3 Proper shipping names may be used in the singular or plural as appropriate. In addition, when qualifying words are used as part of the proper shipping name, their sequence on documentation or package marks is optional. For instance, "DIMETHYLAMINE AQUEOUS SOLUTION" may alternatively be shown "AQUEOUS SOLUTION OF DIMETHYLAMINE". Commercial or military names for goods of Class 1 which contain the proper shipping name supplemented by additional descriptive text may be used.

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 other¹.

3.1.2.5 Unless it is already included in capital letters in the name indicated in Table A or Table C in Chapter 3.2, the qualifying word "MOLTEN" shall be added as part of the proper shipping name when a substance, which is a solid in accordance with the definition in 1.2.1, is offered for carriage in the molten state (e.g. ALKYLPHENOL, SOLID, N.O.S., MOLTEN).

3.1.2.6 Except for self-reactive substances and organic peroxides and unless it is already included in capital letters in the name indicated in Column (2) of Table A of Chapter 3.2, the word "STABILIZED" shall be added as part of the proper shipping name of a substance which without stabilization would be forbidden from carriage in accordance with paragraphs 2.2.X.2 due to it being liable to dangerously react under conditions normally encountered in carriage (e.g.: "TOXIC LIQUID, ORGANIC, N.O.S., STABILIZED").

When temperature control is used to stabilize such substances to prevent the development of any dangerous excess pressure, or the evolution of excessive heat, or when chemical stabilization is used in combination with temperature control, then:

- (a) For liquids and solids where the SAPT² (measured without or with inhibitor, when chemical stabilization is applied) is less than or equal to that prescribed in 2.2.41.1.21, the provisions of 2.2.41.1.17, special provision 386 of Chapter 3.3, 7.1.7, special provision V8 of Chapter 7.2 of ADR, special provision S4 of Chapter 8.5 of ADR and the requirements of Chapter 9.6 of ADR apply except that the term "SADT" as used in these paragraphs is understood to include also "SAPT" when the substance concerned reacts by polymerization;
- (b) Unless it is already included in capital letters in the name indicated in Column (2) of Table A in Chapter 3.2, the words "TEMPERATURE CONTROLLED" shall be added as part of the proper shipping name;
- (c) For gases: the conditions of carriage shall be approved by the competent authority.

3.1.2.7 Hydrates may be carried under the proper shipping name for the anhydrous substance.

3.1.2.8 *Generic or "not otherwise specified" (N.O.S.) names*

3.1.2.8.1 Generic and "not otherwise specified" proper shipping names that are assigned to special provision 274 or 318 in Column (6) of Table A in Chapter 3.2 or remark 27 in column (20) of Table C in Chapter 3.2 shall be supplemented with the technical name of the goods unless a national law or international convention prohibits its disclosure if it is a controlled substance. For explosive substances and articles of Class 1, the dangerous goods description may be supplemented by additional descriptive text to indicate commercial or military names. Technical names shall be entered in brackets immediately following the proper shipping name. An appropriate modifier, such as "contains" or "containing" or other qualifying words such as "mixture", "solution", etc. and the percentage of the technical constituent may also be used. For example: "UN 1993 FLAMMABLE LIQUID, N.O.S. (CONTAINS XYLENE AND BENZENE), 3, II".

¹ Details are provided in the alphabetical index (Table B of Chapter 3.2), e.g.:

NITROXYLENES, LIQUID 6.1 1665
NITROXYLENES, SOLID 6.1 3447

² For the definition of self-accelerating polymerization temperature (SAPT), see 1.2.1.

3.1.2.8.1.1 The technical name shall be a recognized chemical name or biological name, or other name currently used in scientific and technical handbooks, journals and texts. Trade names shall not be used for this purpose. In the case of pesticides, only ISO common name(s), other name(s) in the World Health Organization (WHO) Recommended Classification of Pesticides by Hazard and Guidelines to Classification, or the name(s) of the active substance(s) may be used.

3.1.2.8.1.2 When a mixture of dangerous goods or articles containing dangerous goods are described by one of the “N.O.S.” or “generic” entries to which special provision 274 has been allocated in Column (6) of Table A in Chapter 3.2, not more than the two constituents which most predominantly contribute to the hazard or hazards of the mixture or of the articles need to be shown, excluding controlled substances when their disclosure is prohibited by national law or international convention. If a package containing a mixture is labelled with any subsidiary hazard label, one of the two technical names shown in parentheses shall be the name of the constituent which compels the use of the subsidiary hazard label.

NOTE: see 5.4.1.2.2.

3.1.2.8.1.3 Examples illustrating the selection of the proper shipping name supplemented with the technical name of goods for such N.O.S. entries are:

UN 2902 PESTICIDE, LIQUID, TOXIC, N.O.S. (drazoxolon);

UN 3394 ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE (trimethylgallium).

UN 3540 ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S. (pyrrolidine)

3.1.2.8.1.4 For UN Nos. 3077 and 3082 only, the technical name may be a name shown in capital letters in column 2 of Table A of Chapter 3.2, provided that this name does not include “N.O.S.” and that special provision 274 is not assigned. The name which most appropriately describes the substance or mixture shall be used, e.g.:

UN 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (PAINT)

UN 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (PERFUMERY PRODUCTS).

3.1.2.8.1.5 *(Deleted)*

3.1.3 Solutions or mixtures

NOTE: *Where a substance is specifically mentioned by name in Table A of Chapter 3.2, it shall be identified in carriage by the proper shipping name in Column (2) of Table A of Chapter 3.2. Such substances may contain technical impurities (for example those deriving from the production process) or additives for stability or other purposes that do not affect its classification. However, a substance mentioned by name containing technical impurities or additives for stability or other purposes affecting its classification shall be considered a solution or mixture (see 2.1.3.3).*

3.1.3.1 A solution or mixture is not subject to ADN if the characteristics, properties, form or physical state of the solution or mixture are such that it does not meet the criteria, including human experience criteria, for inclusion in any class.

3.1.3.2 A solution or mixture meeting the classification criteria of ADN composed of a single predominant substance mentioned by name in Table A of Chapter 3.2 and one or more substances not subject to ADN and/or traces of one or more substances mentioned by name in Table A of Chapter 3.2, shall be assigned the UN number and proper shipping name of the predominant substance mentioned by name in Table A of Chapter 3.2 unless:

- (a) The solution or mixture is mentioned by name in Table A of Chapter 3.2;
- (b) The name and description of the substance mentioned by name in Table A of Chapter 3.2 specifically indicate that they apply only to the pure substance;
- (c) The class, classification code, packing group, or physical state of the solution or mixture is different from that of the substance mentioned by name in Table A of Chapter 3.2; or
- (d) The hazard characteristics and properties of the solution or mixture necessitate emergency response measures that are different from those required for the substance mentioned by name in Table A of Chapter 3.2.

Qualifying words such as "SOLUTION" or "MIXTURE", as appropriate, shall be added as part of the proper shipping name, for example, "ACETONE SOLUTION". In addition, the concentration of the mixture or solution may also be indicated after the basic description of the mixture or solution, for example, "ACETONE 75% SOLUTION".

3.1.3.3 A solution or mixture meeting the classification criteria of ADN that is not mentioned by name in Table A of Chapter 3.2 and that is composed of two or more dangerous goods shall be assigned to an entry that has the proper shipping name, description, class, classification code and packing group that most precisely describe the solution or mixture.

CHAPTER 3.2**DANGEROUS GOODS LIST****3.2.1****Table A: List of dangerous goods in numerical order**

Explanations concerning Table A:

As a rule, each row of Table A deals with the substance(s) or article(s) covered by a specific UN number or an identification number. However, when substances or articles belonging to the same UN number have different chemical properties, physical properties and/or carriage conditions, several consecutive rows may be used for that UN number or identification number.

Each column of Table A is dedicated to a specific subject as indicated in the explanatory notes below. The intersection of columns and rows (cell) contains information concerning the subject treated in that column, for the substance(s) or article(s) of that row:

- The first four cells identify the substance(s) or article(s) belonging to that row (additional information in that respect may be given by the special provisions referred to in Column (6));
- The following cells give the applicable special provisions, either in the form of complete information or in coded form. The codes cross-refer to detailed information that is to be found in the numbers indicated in the explanatory notes below. An empty cell means either that there is no special provision and that only the general requirements apply, or that the carriage restriction indicated in the explanatory notes is in force. When used in this table, an alphanumeric code starting with the letters “SP” designates a special provision of Chapter 3.3.

The applicable general requirements are not referred to in the corresponding cells.

Explanatory notes for each column:

Column (1) “UN number/identification number”.

Contains the UN number or the identification number:

- of the dangerous substance or article if the substance or article has been assigned its own specific UN number or identification number, or
- of the generic or n.o.s. entry to which the dangerous substances or articles not mentioned by name shall be assigned in accordance with the criteria (“decision trees”) of Part 2.

Column (2) “Name and description”

Contains, in upper case characters, the name of the substance or article, if the substance or article has been assigned its own specific UN number or identification number, or of the generic or n.o.s. entry to which it has been assigned in accordance with the criteria (“decision trees”) of Part 2. This name shall be used as the proper shipping name or, when applicable, as part of the proper shipping name (see 3.1.2 for further details on the proper shipping name).

A descriptive text in lower case characters is added after the proper shipping name to clarify the scope of the entry if the classification and/or carriage conditions of the substance or article may be different under certain conditions.

Column (3a)	“Class”
	Contains the number of the Class, whose heading covers the dangerous substance or article. This Class number is assigned in accordance with the procedures and criteria of Part 2.
Column (3b)	“Classification code”
	Contains the classification code of the dangerous substance or article.
	<ul style="list-style-type: none"> – For dangerous substances or articles of Class 1, the code consists of a division number and compatibility group letter, which are assigned in accordance with the procedures and criteria of 2.2.1.1.4. – For dangerous substances or articles of Class 2, the code consists of a number and one or more letters representing the hazardous property group, which are explained in 2.2.2.1.2 and 2.2.2.1.3. – For dangerous substances or articles of Classes 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2 and 9, the codes are explained in 2.2.x.1.2.¹ – For dangerous substances or articles of Class 8, the codes are explained in 2.2.8.1.4.1; – Dangerous substances or articles of Class 7 do not have a classification code.
Column (4)	“Packing group”
	Contains the packing group number(s) (I, II or III) assigned to the dangerous substance. These packing group numbers are assigned on the basis of the procedures and criteria of Part 2. Articles and certain substances are not assigned to packing groups. Packing groups may also be assigned via special provisions in Chapter 3.3 as indicated in column (6).
Column (5)	“Labels”
	Contains the model number of the labels/placards (see 5.2.2.2 and 5.3.1.1.7) that have to be affixed to packages, containers, tank-containers, portable tanks, MEGCs, vehicles and wagons. However:
	<ul style="list-style-type: none"> – For substances or articles of Class 7, 7X means label model No. 7A, 7B or 7C as appropriate according to the category (see 5.1.5.3.4 and 5.2.2.1.11.1) or placard No. 7D (see 5.3.1.1.3 and 5.3.1.1.7.2).

¹ *x = the Class number of the dangerous substance or article, without dividing point if applicable.*

The general provisions on labelling/placarding (e.g. number of labels, their location) are to be found in 5.2.2.1 for packages, and in 5.3.1, for containers, tank-containers, MEGCs, portable tanks, vehicles and wagons.

NOTE: *Special provisions, indicated in Column (6), may change the above labelling provisions.*

Column (6)	“Special provisions”	Contains the numeric codes of special provisions that have to be met. These provisions concern a wide array of subjects, mainly connected with the contents of Columns (1) to (5) (e.g. carriage prohibitions, exemptions from certain requirements, explanations concerning the classification of certain forms of the dangerous goods concerned and additional labelling or marking provisions), and are listed in Chapter 3.3 in numerical order. If Column (6) is empty, no special provisions apply to the contents of Columns (1) to (5) for the dangerous goods concerned. Special provisions specific to inland navigation begin at 800.
Column (7a)	“Limited Quantities”	Provides the maximum quantity per inner packaging or article for carrying dangerous goods as limited quantities in accordance with Chapter 3.4.
Column (7b)	“Excepted Quantities”	Contains an alphanumeric code with the following meaning: <ul style="list-style-type: none">– “E0” signifies that no exemption from the provisions of ADN exists for the dangerous goods packed in excepted quantities;– All the other alphanumeric codes starting with the letter “E” signify that the provisions of ADN are not applicable if the conditions indicated in Chapter 3.5 are fulfilled.
Column (8)	“Carriage permitted”	This column contains the alphabetic codes concerning the permitted form of carriage in inland navigation vessels. If column (8) is empty, the substance or article may only be carried in packages. If column (8) contains code “B”, carriage is permitted in packages or in bulk (see 7.1.1.11). If column (8) contains code “T”, carriage is permitted in packages and in tank vessels. In the event of carriage in tank vessels, the requirements of Table C are applicable (see 7.2.1.21).
Column (9)	“Equipment required”	This column contains the alphanumeric codes for the equipment required for the carriage of the dangerous substance or article (see 8.1.5).

Column (10) “Ventilation”

This column contains the alphanumeric codes of the special requirements concerning ventilation applicable to carriage with the following meaning:

- alphanumeric codes starting with the letters “VE” mean that special additional conditions are applicable to carriage. These can be found in 7.1.6.12 and establish special requirements.

Column (11) “Provisions concerning loading, unloading and carriage”

This column contains the alphanumeric codes of the special requirements applicable to carriage with the following meaning:

- alphanumeric codes starting with the letters “CO”, “ST” and “RA” mean that special additional conditions are applicable to carriage in bulk. These can be found in 7.1.6.11 and establish special requirements.
- alphanumeric codes starting with the letters “LO” mean that special additional conditions are applicable prior to loading. These can be found in 7.1.6.13 and establish special requirements.
- alphanumeric codes starting with the letters “HA” mean that special additional conditions are applicable to the handling and stowage of the cargo. These can be found in 7.1.6.14 and establish special requirements.
- alphanumeric codes starting with the letters “IN” mean that special additional conditions are applicable to the inspection of holds during carriage. These can be found in 7.1.6.16 and establish special requirements.

Column (12) “Number of blue cones/lights”

This column contains the number of cones/lights which should constitute the marking of the vessel during the carriage of this dangerous substance or article (see 7.1.5).

Column (13) “Additional requirements/Remarks”

This column contains additional requirements or observations concerning the carriage of this dangerous substance or article.

UN No. or ID No.	Name and description	Class	Classification Code	Packing group	Labels	Special provis- ions	Limited and excepted quantities	Carriage permitted	Equipment required	Venti- lation	Provisions concerning loading, unloading and carriage	Number of blue cones/ lights	Remarks
(1)	3.1.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
0004	AMMONIUM PICRATE dry, or wetted with less than 10% water, by mass	1	(3a) (2)	(3b) (4)	1	0	(7a)	(7b)	(9)	(10)	(11)	(12)	(13)
0005	CARTRIDGES FOR WEAPONS with bursting charge	1	1.1F	1	0	0	E0	PP	PP	LC01 HA01, HA02, HA03	LC01 HA01, HA02, HA03	LC01 HA01, HA02, HA03	3
0006	CARTRIDGES FOR WEAPONS with bursting charge	1	1.1E	1	0	0	E0	PP	PP	LC01 HA01, HA02, HA03	LC01 HA01, HA02, HA03	LC01 HA01, HA02, HA03	3
0007	CARTRIDGES FOR WEAPONS with bursting charge	1	1.2F	1	0	0	E0	PP	PP	LC01 HA01, HA02, HA03	LC01 HA01, HA02, HA03	LC01 HA01, HA02, HA03	3
0009	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	1	1.2G	1	0	0	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	3
0010	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	1	1.3G	1	0	0	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	3
0012	CARTRIDGES FOR WEAPONS, INERT PROJECTILE	1	1.4S	1.4	364	5 kg	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	0
0014	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS	1	1.4S	1.4	364	5 kg	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	0
0015	CARTRIDGES FOR TOOLS, BLANK	1	1.2G	1	0	0	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	0
0015	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	1	1.2G	1+8	0	0	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	3
0015	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing corrosive substances	1	1.2G	1+6.1	0	0	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	3
0015	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing toxic by inhalation substances	1	1.3G	1	0	0	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	3
0016	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing corrosive substances	1	1.3G	1+8	0	0	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	3
0016	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing toxic by inhalation substances	1	1.3G	1+6.1	0	0	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	3
0018	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	1	1.2G	1+6.1+8	802	0	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	3
0019	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	1	1.3G	1+6.1+8	802	0	E0	PP	PP	LC01 HA01, HA03	LC01 HA01, HA03	LC01 HA01, HA03	3
0020	AMMUNITION, TOXIC with burster, expelling charge or propelling charge	1	1.2K										
0021	AMMUNITION, TOXIC with burster, expelling charge or propelling charge	1	1.3K										
0027	BLACK POWDER (GUNPOWDER), granular or as meal	1	1.1D	1	0	0	E0	PP	PP	LC01 HA01, HA02, HA03	LC01 HA01, HA02, HA03	LC01 HA01, HA02, HA03	3

CARRIAGE PROHIBITED

CARRIAGE PROHIBITED

UN No. or ID No.	Name and description	Class	Classification Code	Packing group	Labels	Special provis- ions	Limited and excepted quantities	Carriage permitted	Equipment required	Venti- lation	Provisions concerning loading, unloading and carriage	Number of blue cones/ lights	Remarks
(1)	3.1.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
0028	BLACK POWDER (GUNPOWDER), COMPRESSED or BLACK POWDER (GUNPOWDER), IN PELLETS	1	(3a) (2)	(4)	(5)	(6)	(7a)	0	(8)	(9)	(10)	(11)	(12) (13)
0029	DETONATORS, NON-ELECTRIC for blasting	1	1.1B	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0030	DETONATORS, ELECTRIC for blasting	1	1.1B	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0033	BOMBS with bursting charge	1	1.1F	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0034	BOMBS with bursting charge	1	1.1D	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0035	BOMBS with bursting charge	1	1.2D	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0037	BOMBS, PHOTO-FLASH	1	1.1F	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0038	BOMBS, PHOTO-FLASH	1	1.1D	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0039	BOMBS, PHOTO-FLASH	1	1.2G	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0042	BOOSTERS without detonator	1	1.1D	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0043	BURSTERS, explosive	1	1.1D	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0044	PRIMERS, CAP TYPE	1	1.4S	1.4	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	0
0048	CHARGES, DEMOLITION	1	1.1D	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0049	CARTRIDGES, FLASH	1	1.1G	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0050	CARTRIDGES, FLASH	1	1.3G	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0054	CARTRIDGES, SIGNAL	1	1.3G	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3
0055	CASES, CARTRIDGE, EMPTY, WITH PRIMER	1	1.4S	1.4	364	5 kg	E0	0	PP	PP	L001	HA01, HA02, HA03	0
0056	CHARGES, DEPTH	1	1.1D	1	0	0	E0	0	PP	PP	L001	HA01, HA02, HA03	3

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(1)		2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
0059	CHARGES, SHAPED without detonator	(2)	(3a)	(3b)	(4)	(5)	(6)	(7b)	(8)	(9)	(10)	L001	(12)
0060	CHARGES, SUPPLEMENTARY, EXPLOSIVE	1	1.1D	1		0	E0		PP		HA01, HA02, HA03		3
0065	CORD, DETONATING, flexible	1	1.1D	1		0	E0		PP		L001	HA01, HA02, HA03	3
0066	CORD, IGNITER	1	1.4G	1.4		0	E0		PP		L001	HA01, HA02, HA03	3
0070	CUTTERS, CABLE, EXPLOSIVE	1	1.4S	1.4		0	E0		PP		L001	HA01, HA02, HA03	0
0072	CYCLOTRIMETHYLENENITRITRAMINE (CYCLOLONITE; HEXOGEN; RDX), WETTED with not less than 15% water, by mass	1	1.1D	1		266	0	E0	PP		L001	HA01, HA02, HA03	3
0073	DETONATORS FOR AMMUNITION	1	1.1B	1		0	E0		PP		L001	HA01, HA02, HA03	1
0074	DIAZODINITROPHENOL, WETTED with not less than 40% water, or mixture of alcohol and water, by mass	1	1.1A	1		266	0	E0	PP		L001	HA01, HA02, HA03	3
0075	DIETHYLENEGLYCOL DINITRATE, DESENSITIZED	1	1.1D	1		266	0	E0	PP		L001	HA01, HA02, HA03	3
0076	DINITROPHENOL, dry or wetted with less than 15% water, by mass	1	1.1D	1+6.1	802	0	E0		PP		L001	HA01, HA02, HA03	3
0077	DINITROPHENOLATES, alkali metals, dry or wetted with not less than 25% non-volatile, water-insoluble phleomizer, by mass	1	1.3C	1+6.1	802	0	E0		PP		L001	HA01, HA02, HA03	3
0078	DINITRORESORCINOL, dry or wetted, with less than 15% water, by mass	1	1.1D	1		0	E0		PP		L001	HA01, HA02, HA03	3
0079	HEXANITRODIPHENYLAMINE (DIPICRYLAMINE; HEXYL.)	1	1.1D	1		0	E0		PP		L001	HA01, HA02, HA03	3
0081	EXPLOSIVE, BLASTING, TYPE A	1	1.1D	1	616	0	E0		PP		L001	HA01, HA02, HA03	3
0082	EXPLOSIVE, BLASTING, TYPE B	1	1.1D	1	617	0	E0		PP		L001	HA01, HA02, HA03	3
0083	EXPLOSIVE, BLASTING, TYPE C	1	1.1D	1	267	0	E0		PP		L001	HA01, HA02, HA03	3
0084	EXPLOSIVE, BLASTING, TYPE D	1	1.1D	1	617	0	E0		PP		L001	HA01, HA02, HA03	3

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(1)	31.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	71.6	71.6	7.1.5	3.2.1 (13)
0092	FLARES, SURFACE (2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)
0093	FLARES, AERIAL	1	1.3G	1	0	E0			PP		LO01	HA01, HA03	3
0094	FLASH POWDER	1	1.3G	1	0	E0			PP		LO01	HA01, HA03	3
0099	FRACTURING DEVICES, EXPLOSIVE without detonator, for oil wells	1	1.1D	1	0	E0			PP		LO01	HA01, HA02, HA03	3
0101	FUSE, NON-DETONATING	1	1.3G	1	0	E0			PP		LO01	HA01, HA02, HA03	3
0102	CORD (FUSE), DETONATING, metal clad	1	1.2D	1	0	E0			PP		LO01	HA01, HA03	3
0103	FUSE, IGNITER, tubular, metal clad	1	1.4G	1.4	0	E0			PP		LO01	HA01, HA03	3
0104	CORD (FUSE), DETONATING, MILD EFFECT, metal clad	1	1.4D	1.4	0	E0			PP		LO01	HA01, HA03	3
0105	FUSE, SAFETY	1	1.4S	1.4	0	E0			PP		LO01	HA01, HA03	1
0106	FUZES, DETONATING	1	1.1B	1	0	E0			PP		LO01	HA01, HA03	0
0107	FUZES, DETONATING	1	1.2B	1	0	E0			PP		LO01	HA01, HA02, HA03	3
0110	GRENADES, PRACTICE, hand or rifle	1	1.4S	1.4	0	E0			PP		LO01	HA01, HA02, HA03	3
0113	GUANYL NITROSAMINO GUANYLIDENE HYDRAZINE, WETTED with not less than 30% water, by mass	1	1.1A	1	266	0	E0		PP		LO01	HA01, HA03	3
0114	GUANYL NITROSAMINO GUANYLIDENE (TETRAZENE), WETTED with not less than 30% water, or mixture of alcohol and water, by mass	1	1.1A	1	266	0	E0		PP		LO01	HA01, HA02, HA03	3
0118	HEXOLITE (HEXOTOL), dry or wetted with less than 15% water, by mass	1	1.1D	1	0	E0			PP		LO01	HA01, HA02, HA03	3
0121	IGNITERS	1	1.1G	1	0	E0			PP		LO01	HA01, HA02, HA03	3
0124	JET PIERFORATING GUNS, CHARGED, oil well, without detonator	1	1.1D	1	0	E0			PP		LO01	HA01, HA02, HA03	3
0129	LEAD AZIDE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1A	1	266	0	E0		PP		LO01	HA01, HA02, HA03	3

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(1)	3.1.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	LEAD STYPHNATE (LEAD TRINITRORESORCINATE), WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1A	(3b)	(4)	(5)	(6)	(7b)	(8)	(9)	(10)	(11)	(12) (13)
0131	LIGHTERS, FUSE	1	1.4S		1.4		0	E0	PP		LO01	HA01, HA02, HA03	3
0132	DEFLAGRATING METAL SALTS OF AROMATIC NITRODERIVATIVES, N.O.S.	1	1.3C		1	274	0	E0	PP		LO01	HA01, HA03	0
0133	MANNITOL HEXANITRATE (NITROMANNITE), WETTED with not less than 40% water, or mixture of alcohol and water, by mass	1	1.1D		1	266	0	E0	PP		LO01	HA01, HA03	3
0135	MERCURY FULMINATE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1A		1	266	0	E0	PP		LO01	HA01, HA02, HA03	3
0136	MINES with bursting charge	1	1.1F		1	0	0	E0	PP		LO01	HA01, HA02, HA03	3
0137	MINES with bursting charge	1	1.1D		1	0	0	E0	PP		LO01	HA01, HA02, HA03	3
0138	MINES with bursting charge	1	1.2D		1	0	0	E0	PP		LO01	HA01, HA02, HA03	3
0143	NITROGLYCERIN, DESENSITIZED with not less than 40% non-volatile water-insoluble phlegmatizer, by mass	1	1.1D	1+6.1	266	0	E0	PP			LO01	HA01, HA02, HA03	3
0144	NITROGLYCERIN SOLUTION IN ALCOHOL with more than 1% but not more than 10% nitroglycerin	1	1.1D		1	271	271		PP		LO01	HA01, HA02, HA03	3
0146	NITROSTARCH, dry or wetted with less than 20% water, by mass	1	1.1D		1	358	0	E0	PP		LO01	HA01, HA02, HA03	3
0147	NITRO UREA	1	1.1D		1	0	0	E0	PP		LO01	HA01, HA02, HA03	3
0150	PENTAERYTHRITRE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), WETTED with not less than 25% water, by mass, or DESENSITIZED with not less than 15% phlegmatizer, by mass	1	1.1D		1	266	0	E0	PP		LO01	HA01, HA02, HA03	3
0151	PENTOLITE, dry or wetted with less than 12% water, by mass	1	1.1D		1	0	0	E0	PP		LO01	HA01, HA02, HA03	3
0153	TRINITROANILINE (PICRAMIDE)	1	1.1D		1	266	0	E0	PP		LO01	HA01, HA02, HA03	3
0154	TRINITROPHENOL (PICRIC ACID), dry or wetted with less than 30% water, by mass	1	1.1D		1	0	0	E0	PP		LO01	HA01, HA02, HA03	3

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0112		2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	TRINITROCHLOROBENZENE (PICRYL CHLORIDE)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)
0155	POWDER CAKE (POWDER PASTE), WETTED with not less than 25% water, by mass	1	1.1D	1	0	0	E0		PP	L001	HA01, HA02, HA03		(13)
0159	POWDER, SMOKELESS	1	1.3C	1	266	0	E0		PP	L001	HA01, HA03		
0160	PROJECTILES with bursting charge	1	1.1F	1	0	0	E0		PP	L001	HA01, HA02, HA03		
0161	PROJECTILES with bursting charge	1	1.1D	1	0	0	E0		PP	L001	HA01, HA02, HA03		
0167	PROJECTILES with bursting charge	1	1.1F	1	0	0	E0		PP	L001	HA01, HA02, HA03		
0168	PROJECTILES with bursting charge	1	1.1D	1	0	0	E0		PP	L001	HA01, HA02, HA03		
0169	PROJECTILES with bursting charge	1	1.2D	1	0	0	E0		PP	L001	HA01, HA02, HA03		
0171	AMMUNITION, ILLUMINATING with or without bursting charge or propelling charge	1	1.2G	1	0	0	E0		PP	L001	HA01, HA03		
0173	RELEASE DEVICES, EXPLOSIVE	1	1.4S	1.4	0	0	E0		PP	L001	HA01, HA03		
0174	RIVETS, EXPLOSIVE	1	1.4S	1.4	0	0	E0		PP	L001	HA01, HA03		
0180	ROCKETS with bursting charge	1	1.1F	1	0	0	E0		PP	L001	HA01, HA02, HA03		
0181	ROCKETS with bursting charge	1	1.1E	1	0	0	E0		PP	L001	HA01, HA02, HA03		
0182	ROCKETS with bursting charge	1	1.2E	1	0	0	E0		PP	L001	HA01, HA02, HA03		
0183	ROCKETS with inert head	1	1.3C	1	0	0	E0		PP	L001	HA01, HA03		
0186	ROCKET MOTORS	1	1.3C	1	0	0	E0		PP	L001	HA01, HA03		
0190	SAMPLES, EXPLOSIVE, other than initiating explosive	1			16 274	0	E0		PP	L001	HA01, HA02, HA03		
0191	SIGNAL DEVICES, HAND	1	1.4G		1.4	0	E0		PP	L001	HA01, HA03		
0192	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1	1.1G	1	0	0	E0		PP	L001	HA01, HA02, HA03	1	
0193	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1	1.4S		1.4	0	E0		PP	L001	HA01, HA03	0	

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(1)	3.1.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
0194	SIGNALS, DISTRESS, ship	(2)	(3a)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12) (13)
0195	SIGNALS, DISTRESS, ship	1	1.G	1			0	E0		PP		L001	HA01, HA02, HA03
0196	SIGNALS, SMOKE	1	1.3G	1		0	E0		PP			L001	HA01, HA03
0197	SIGNALS, SMOKE	1	1.G	1.4		0	E0		PP			L001	HA01, HA02, HA03
0204	OUNDING DEVICES, EXPLOSIVE	1	1.2F	1		0	E0		PP			L001	HA01, HA02, HA03
0207	TETRANITROANILINE	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03
0208	TRINITROPHENYLMETHYLNITRAMINE (TETRYL)	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03
0209	TRINITROTOLUENE (TNT), dry or wetted with less than 30% water, by mass	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03
0212	TRACERS FOR AMMUNITION	1	1.3G	1		0	E0		PP			L001	HA01, HA02, HA03
0213	TRINITROANISOLE	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03
0214	TRINITROBENZENE, dry or wetted with less than 30% water, by mass	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03
0215	TRINITROBENZOIC ACID, dry or wetted with less than 30% water, by mass	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03
0216	TRINITRO-m-CRESOL	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03
0217	TRINITRONAPHTHALENE	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03
0218	TRINITROPHENETOLE	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03
0219	TRINITRORESORCINOL (STYPHNIC ACID), dry or wetted with less than 20% water, or mixture of alcohol and water, by mass	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03
0220	UREA NITRATE, dry or wetted with less than 20% water, by mass	1	1.1D	1		0	E0		PP			L001	HA01, HA02, HA03

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(1)	3.1.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
0221	WARHEADS, TORPEDO with bursting charge	(2)	(3a)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12)
0222	AMMONIUM NITRATE	1	1.1D	1	0				PP		L001	HA01, HA02, HA03	3
0224	BARIUM AZIDE, dry or wetted with less than 50% water, by mass	1	1.1A	1+6.1	802	0	E0		PP		L001	HA01, HA02, HA03	3
0225	BOOSTERS WITH DETONATOR	1	1.1B	1	0	E0			PP		L001	HA01, HA02, HA03	3
0226	CYCLOTETRAMETHYLENETRANITRAMINE (HMX, OCTOGEN), WETTED with not less than 15% water, by mass	1	1.1D	1	266	0	E0		PP		L001	HA01, HA02, HA03	3
0234	SODIUM DINITRO-o-CRESOLATE, dry or wetted with less than 15% water, by mass	1	1.3C	1	0	E0			PP		L001	HA01, HA02, HA03	3
0235	SODIUM PICRAMATE, dry or wetted with less than 20% water, by mass	1	1.3C	1	0	E0			PP		L001	HA01, HA02, HA03	3
0236	ZIRCONIUM PICRAMATE, dry or wetted with less than 20% water, by mass	1	1.3C	1	0	E0			PP		L001	HA01, HA02, HA03	3
0237	CHARGES, SHAPED, FLEXIBLE, LINEAR	1	1.4D	1.4	0	E0			PP		L001	HA01, HA02, HA03	3
0238	ROCKETS, LINE-THROWING	1	1.2G	1	0	E0			PP		L001	HA01, HA02, HA03	3
0240	ROCKETS, LINE-THROWING	1	1.3G	1	0	E0			PP		L001	HA01, HA02, HA03	3
0241	EXPLOSIVE, BLASTING, TYPE E	1	1.1D	1	617	0	E0		PP		L001	HA01, HA02, HA03	3
0242	CHARGES, PROPELLING, FOR CANNON	1	1.3C	1	0	E0			PP		L001	HA01, HA02, HA03	3
0243	AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.2H	1	0	E0			PP		L001	HA01, HA02, HA03	3
0244	AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.3H	1	0	E0			PP		L001	HA01, HA02, HA03	3
0245	AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.2H	1	0	E0			PP		L001	HA01, HA02, HA03	3
0246	AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.3H	1	0	E0			PP		L001	HA01, HA02, HA03	3
0247	AMMUNITION, INCENDIARY, LIQUID or gel, with burster, expelling charge or propelling charge	1	1.3J	1	0	E0			PP		L001	HA01, HA02, HA03	3
0248	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge	1	1.2L	1	274	0	E0		PP		L001	HA01, HA02, HA03	3
0249	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge	1	1.3L	1	274	0	E0		PP		L001	HA01, HA02, HA03	3

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	3.1.2	2.2	2.2	2.1.1.3 (3a)	5.2.2 (4)	3.3 (5)	3.4 (6)	3.5.1.2 (7a)	3.2.1 (8)	8.1.5 (9)	7.1.6 (10)	7.1.5 (11)	3.2.1 (13)
(1)	ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge	1	1.3L	1		0	E0		PP		L001	HA01, HA03	3
0250	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	1	1.3G	1		0	E0		PP		L001	HA01, HA03	3
0254	DETONATORS, ELECTRIC for blasting	1	1.4B	1.4		0	E0		PP		L001	HA01, HA02, HA03	1
0255													
0257	FUZES, DETONATING	1	1.4B	1.4		0	E0		PP		L001	HA01, HA02, HA03	1
0266	OCTOLITE (OCTOL), dry or wetted with less than 15% water, by mass	1	1.1D	1		0	E0		PP		L001	HA01, HA02, HA03	3
0267	DETONATORS, NON-ELECTRIC for blasting	1	1.4B	1.4		0	E0		PP		L001	HA01, HA02, HA03	1
0268	BOOSTERS WITH DETONATOR	1	1.2B	1		0	E0		PP		L001	HA01, HA02, HA03	1
0271	CHARGES, PROPELLING	1	1.1C	1		0	E0		PP		L001	HA01, HA02, HA03	3
0272	CHARGES, PROPELLING	1	1.3C	1		0	E0		PP		L001	HA01, HA02, HA03	3
0275	CARTRIDGES, POWER DEVICE	1	1.3C	1		0	E0		PP		L001	HA01, HA02, HA03	3
0276	CARTRIDGES, POWER DEVICE	1	1.4C	1.4		0	E0		PP		L001	HA01, HA02, HA03	3
0277	CARTRIDGES, OIL WELL	1	1.3C	1		0	E0		PP		L001	HA01, HA02, HA03	3
0278	CARTRIDGES, OIL WELL	1	1.4C	1.4		0	E0		PP		L001	HA01, HA02, HA03	1
0279	CHARGES, PROPELLING, FOR CANNON	1	1.1C	1		0	E0		PP		L001	HA01, HA02, HA03	3
0280	ROCKET MOTORS	1	1.1C	1		0	E0		PP		L001	HA01, HA02, HA03	3
0281	ROCKET MOTORS	1	1.2C	1		0	E0		PP		L001	HA01, HA02, HA03	3
0282	NITROGUANIDINE (PICRITE), dry or wetted with less than 20% water, by mass	1	1.1D	1		0	E0		PP		L001	HA01, HA02, HA03	3
0283	BOOSTERS without detonator	1	1.2D	1		0	E0		PP		L001	HA01, HA02, HA03	3
0284	GRENADES, hand or rifle, with bursting charge	1	1.1D	1		0	E0		PP		L001	HA01, HA02, HA03	3

UN No. or ID No.	Name and description	Classification Code	Class	Packing group	Labels	Special provis- ions	Limited and excepted quantities	Carriage permitted	Equipment required	Venti- lation	Provisions concerning loading, unloading and carriage	Number of blue cones/ lights	Remarks
0285	GRENADES, hand or rifle, with bursting charge	3.1.2 (2)	2.2 (3a)	2.1.1.3 (3b)	5.2.2 (4)	3.3 (5)	3.4 (7a)	3.5.1.2 (7b)	3.2.1 (8)	8.1.5 (9)	7.1.6 (10)	7.1.5 (11)	3.2.1 (13)
0286	WARHEADS, ROCKET with bursting charge		1	1.2D	1	0	0	E0		PP		L001 HA01, HA03	3
0287	WARHEADS, ROCKET with bursting charge		1	1.1D	1	0	0	E0		PP		L001 HA01, HA02, HA03	3
0288	CHARGES, SHAPED, FLEXIBLE, LINEAR		1	1.1D	1	0	0	E0		PP		L001 HA01, HA03	3
0289	CORD, DETONATING, flexible		1	1.4D	1.4	0	0	E0		PP		L001 HA01, HA03	3
0290	CORD (FUSE), DETONATING, metal clad		1	1.1D	1	0	0	E0		PP		L001 HA01, HA02, HA03	3
0291	BOMBS with bursting charge		1	1.2F	1	0	0	E0		PP		L001 HA01, HA02, HA03	1
0292	GRENADES, hand or rifle, with bursting charge		1	1.1F	1	0	0	E0		PP		L001 HA01, HA02, HA03	3
0293	GRENADES, hand or rifle, with bursting charge		1	1.2F	1	0	0	E0		PP		L001 HA01, HA02, HA03	3
0294	MINES with bursting charge		1	1.2F	1	0	0	E0		PP		L001 HA01, HA02, HA03	3
0295	ROCKETS with bursting charge		1	1.2F	1	0	0	E0		PP		L001 HA01, HA02, HA03	3
0296	OUNDING DEVICES, EXPLOSIVE		1	1.1F	1	0	0	E0		PP		L001 HA01, HA02, HA03	3
0297	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge		1	1.4G	1.4	0	0	E0		PP		L001 HA01, HA03	1
0299	BOMBS, PHOTO-FLASH		1	1.3G	1	0	0	E0		PP		L001 HA01, HA03	3
0300	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge		1	1.4G	1.4	0	0	E0		PP		L001 HA01, HA03	1
0301	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge		1	1.4G	1.4+6.1+8	802	0	E0		PP		L001 HA01, HA03	1
0303	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge		1	1.4G	1.4	0	0	E0		PP		L001 HA01, HA03	1
0303	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing corrosive substances		1	1.4G	1.4+8	0	0	E0		PP		L001 HA01, HA03	1

UN No. or ID No.	Name and description	Class Code	Packing group	Labels	Special provis- ions	Limited and excepted quantities	Carriage permitted	Equipment required	Venti- lation	Provisions concerning loading, unloading and carriage	Number of blue cones/ lights	Remarks
(1)	3.1.2 (2)	2.2 (3a)	2.1.1.3 (4)	5.2.2 (5)	3.3 (6)	3.4 (7a)	3.5.1.2 (8)	3.2.1 (9)	8.1.5 (10)	7.1.6 (11)	7.1.5 (12)	3.2.1 (13)
0303	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing toxic by inhalation substances	1	1.4G	1.4+6.1		0	E0		PP	LO01	HA01, HA03	
0305	FLASH POWDER	1	1.3G	1		0	E0		PP	LO01	HA01, HA03	
0306	TRACERS FOR AMMUNITION	1	1.4G	1.4		0	E0		PP	LO01	HA01, HA03	
0312	CARTRIDGES, SIGNAL	1	1.4G	1.4		0	E0		PP	LO01	HA01, HA03	
0313	SIGNALS, SMOKE	1	1.2G	1		0	E0		PP	LO01	HA01, HA03	
0314	IGNITERS	1	1.2G	1		0	E0		PP	LO01	HA01, HA03	
0315	IGNITERS	1	1.3G	1		0	E0		PP	LO01	HA01, HA03	
0316	FUZES, IGNITING	1	1.3G	1		0	E0		PP	LO01	HA01, HA03	
0317	FUZES, IGNITING	1	1.4G	1.4		0	E0		PP	LO01	HA01, HA03	
0318	GRENADES, PRACTICE, hand or rifle	1	1.3G	1		0	E0		PP	LO01	HA01, HA03	
0319	PRIMERS, TUBULAR	1	1.3G	1		0	E0		PP	LO01	HA01, HA03	
0320	PRIMERS, TUBULAR	1	1.4G	1.4		0	E0		PP	LO01	HA01, HA03	
0321	CARTRIDGES FOR WEAPONS with bursting charge	1	1.2E	1		0	E0		PP	LO01	HA01, HA03	
0322	ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge	1	1.2L	1		0	E0		PP	LO01	HA01, HA03	
0323	CARTRIDGES, POWER DEVICE	1	1.4S	1.4	347	0	E0		PP	LO01	HA01, HA03	0
0324	PROJECTILES with bursting charge	1	1.2F	1		0	E0		PP	LO01	HA01, HA03	
0325	IGNITERS	1	1.4G	1.4		0	E0		PP	LO01	HA01, HA03	
0326	CARTRIDGES FOR WEAPONS, BLANK	1	1.1C	1		0	E0		PP	LO01	HA01, HA02, HA03	
0327	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK	1	1.3C	1		0	E0		PP	LO01	HA01, HA03	
0328	CARTRIDGES FOR WEAPONS, INERT PROJECTILE	1	1.2C	1		0	E0		PP	LO01	HA01, HA03	
0329	TORPEDOES with bursting charge	1	1.1E	1		0	E0		PP	LO01	HA01, HA02, HA03	

UN No. or ID No.	Name and description	Class	Classi- fication Code	Packing group	Labels	Special provis- ions	Limited and excepted quantities	Carriage permitted	Equipment required	Ventila- tion	Provisions concerning loading, unloading and carriage	Number of blue cones/ lights	Remarks
(1)	3.1.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(2)	TORPEDOES with bursting charge	1	1.IF	(3a)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
0330								0	E0		PP	L001	HA01, HA02, HA03
0331	EXPLOSIVE, BLASTING, TYPE B (AGENT, BLASTING, TYPE B)	1	1.5D			1.5	617	0	E0		PP	L001	HA01, HA03
0332	EXPLOSIVE, BLASTING, TYPE E (AGENT, BLASTING, TYPE E)	1	1.5D			1.5	617	0	E0		PP	L001	HA01, HA03
0333	FIREWORKS	1	1.1G			1	645	0	E0		PP	L001	HA01, HA02, HA03
0334	FIREWORKS	1	1.2G			1	645	0	E0		PP	L001	HA01, HA03
0335	FIREWORKS	1	1.3G			1	645	0	E0		PP	L001	HA01, HA03
0336	FIREWORKS	1	1.4G			1.4	645	0	E0		PP	L001	HA01, HA03
0337	FIREWORKS	1	1.4S			1.4	645	0	E0		PP	L001	HA01, HA03
0338	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK	1	1.4C			1.4		0	E0		PP	L001	HA01, HA03
0339	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1	1.4C			1.4		0	E0		PP	L001	HA01, HA03
0340	NITROCELLULOSE, dry or wetted with less than 25% water (or alcohol), by mass	1	1.1D			1	393	0	E0		PP	L001	HA01, HA02, HA03
0341	NITROCELLULOSE, unmodified or plasticized with less than 18% plasticizing substance, by mass	1	1.1D			1	393	0	E0		PP	L001	HA01, HA02, HA03
0342	NITROCELLULOSE, WETTED with not less than 25% alcohol, by mass	1	1.3C			1	105	0	E0		PP	L001	HA01, HA03
0343	NITROCELLULOSE, PLASTICIZED with not less than 18% plasticizing substance, by mass	1	1.3C			1	105	0	E0		PP	L001	HA01, HA03
0344	PROJECTILES with bursting charge	1	1.4D			1.4		0	E0		PP	L001	HA01, HA03
0345	PROJECTILES, inert with tracer	1	1.4S			1.4		0	E0		PP	L001	HA01, HA03
0346	PROJECTILES with bursting or expelling charge	1	1.2D			1	0	E0		PP	L001	HA01, HA03	
0347	PROJECTILES with bursting or expelling charge	1	1.4D			1.4		0	E0		PP	L001	HA01, HA03
0348	CARTRIDGES FOR WEAPONS with bursting charge	1	1.4F			1.4		0	E0		PP	L001	HA01, HA02, HA03
0349	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4S			1.4	178	0	E0		PP	L001	HA01, HA03
												347	

UN No. or ID No.	Name and description	Class	Classification Code	Packing group	Labels	Special provis- ions	Limited and excepted quantities	Carriage permitted	Equipment required	Venti- lation	Provisions concerning loading, unloading and carriage	Number of blue cones/ lights	Remarks
(1)	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.5	3.2.1 (13)
0330	ARTICLES, EXPLOSIVE, N.O.S.	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11) (12)
0351	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4B		1.4	178	0	E0		PP		L001	HA01, HA02, HA03
0352	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4C		1.4	178	0	E0		PP		L001	HA01, HA03
0353	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4G		1.4	178	0	E0		PP		L001	HA03
0354	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1L	1	178	0	E0		PP		L001	HA01, HA03	
0355	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2L	1	178	0	E0		PP		L001	HA01, HA03	
0356	ARTICLES, EXPLOSIVE, N.O.S.	1	1.3L	1	178	0	E0		PP		L001	HA03	
0357	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1L	1	178	0	E0		PP		L001	HA01, HA03	
0358	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.2L	1	178	0	E0		PP		L001	HA01, HA03	
0359	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.3L	1	178	0	E0		PP		L001	HA01, HA03	
0360	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1	1.1B	1	178	0	E0		PP		L001	HA01, HA03	
0361	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1	1.4B		1.4	0	E0		PP		L001	HA01, HA03	
0362	AMMUNITION, PRACTICE	1	1.4G		1.4	0	E0		PP		L001	HA01, HA03	
0363	AMMUNITION, PROOF	1	1.4S		1.4	0	E0		PP		L001	HA01, HA03	
0364	DETONATORS FOR AMMUNITION	1	1.2B	1	1	0	E0		PP		L001	HA01, HA02, HA03	
0365	DETONATORS FOR AMMUNITION	1	1.4B		1.4	0	E0		PP		L001	HA01, HA02, HA03	
0366	DETONATORS FOR AMMUNITION	1	1.4S		1.4	347	0	E0		PP		L001	HA03
0367	FUZES, DETONATING	1	1.4S		1.4	347	0	E0		PP		L001	HA01, HA03
0368	FUZES, IGNITING	1	1.4S		1.4	0	E0		PP		L001	HA01, HA03	
0369	WARHEADS, ROCKET with bursting charge	1	1.1F	1	1	0	E0		PP		L001	HA01, HA02, HA03	

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	3.1.2 (2)	2.2 (3a)	2.1.1.3 (3b)	5.2.2 (4)	3.3 (5)	3.4 (6)	3.5.1.2 (7a)	3.2.1 (8)	8.1.5 (9)	7.1.6 (10)	7.1.6 (11)	7.1.5 (12)	3.2.1 (13)
0370	WARHEADS, ROCKET with burster or expelling charge	1	1.4D		1.4		0	E0	PP		LO01	HA01, HA03	1
0371	WARHEADS, ROCKET with burster or expelling charge	1	1.4F		1.4		0	E0	PP		LO01	HA01, HA02, HA03	1
0372	GRENADES, PRACTICE, hand or rifle	1	1.2G		1		0	E0	PP		LO01	HA01, HA03	3
0373	SIGNAL DEVICES, HAND	1	1.4S		1.4		0	E0	PP		LO01	HA01, HA03	0
0374	SOUNDING DEVICES, EXPLOSIVE	1	1.1D		1		0	E0	PP		LO01	HA01, HA02, HA03	3
0375	SOUNDING DEVICES, EXPLOSIVE	1	1.2D		1		0	E0	PP		LO01	HA01, HA03	3
0376	PRIMERS, TUBULAR	1	1.4S		1.4		0	E0	PP		LO01	HA01, HA03	3
0377	PRIMERS, CAP TYPE	1	1.1B		1		0	E0	PP		LO01	HA01, HA03	0
0378	PRIMERS, CAP TYPE	1	1.4B		1.4		0	E0	PP		LO01	HA01, HA02, HA03	3
0379	CASES, CARTRIDGE, EMPTY, WITH PRIMER	1	1.4C		1.4		0	E0	PP		LO01	HA01, HA03	1
0380	ARTICLES, PYROPHORIC	1	1.2L		1		0	E0	PP		LO01	HA01, HA03	3
0381	CARTRIDGES, POWER DEVICE	1	1.2C		1		0	E0	PP		LO01	HA01, HA03	3
0382	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1	1.2B		1	178	0	E0	PP		LO01	HA01, HA02, HA03	3
0383	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1	1.4B		1.4	178	0	E0	PP		LO01	HA01, HA02, HA03	1
0384	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1	1.4S		1.4	274			PP		LO01	HA01, HA02, HA03	0
0385	5-NITROBENZOTRIAZOL	1	1.1D		1		0	E0	PP		LO01	HA01, HA02, HA03	3
0386	TRINITROBENZENESULPHONIC ACID	1	1.1D		1		0	E0	PP		LO01	HA01, HA02, HA03	3
0387	TRINITROFLUORENONE	1	1.1D		1		0	E0	PP		LO01	HA01, HA02, HA03	3

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0388	TRINITROTOLUENE (TNT) AND TRINITROBENZENE MIXTURE OR TRINITROTOLUENE (TNT) AND HEXANITROSTILBENE MIXTURE	2.2 (2)	2.2 (3a)	2.1.1.3 (3b)	5.2.2 (4)	3.3 (5)	3.4 (6)	3.5.1.2 (7a)	3.2.1 (8)	3.1.5 (9)	7.1.6 (10)	7.1.5 (11)	3.2.1 (12) (13)
0389	TRINITROTOLUENE (TNT) MIXTURE CONTAINING TRINITROBENZENE AND HEXANITROSTILBENE	1	1.1D	1	1	0	E0				LO01	HA01, HA02, HA03	3
0390	TRITONAL	1	1.1D	1	1	0	E0		PP	LO01	HA01, HA02, HA03	3	
0391	CYCLOTRIMETHYLENENITRITRAMINE (CYCLOTRIENE; HEXAGEN; RDX) AND CYCLOCOTRAMETHYLENENITRANTRAMINE (HMX; OCTOGEN) MIXTURE, WETTED with not less than 15% water, by mass or DESENSITIZED with not less than 10% dibenzatinitrobenzene	1	1.1D	1	266	0	E0		PP	LO01	HA01, HA02, HA03	3	
0392	HEXANITROSTILBENE	1	1.1D	1	1	0	E0		PP	LO01	HA01, HA02, HA03	3	
0393	HEXOTONAL	1	1.1D	1	0	E0			PP	LO01	HA01, HA02, HA03	3	
0394	TRINITRORESORCINOL (STYPHNIC ACID), WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1D	1	0	E0			PP	LO01	HA01, HA02, HA03	3	
0395	ROCKET MOTORS, LIQUID FUELLED	1	1.21	1	0	E0			PP	LO01	HA01, HA02, HA03	3	
0396	ROCKET MOTORS, LIQUID FUELLED	1	1.31	1	0	E0			PP	LO01	HA01, HA02, HA03	3	
0397	ROCKETS, LIQUID FUELLED with bursting charge	1	1.11	1	0	E0			PP	LO01	HA01, HA02, HA03	3	
0398	ROCKETS, LIQUID FUELLED with bursting charge	1	1.21	1	0	E0			PP	LO01	HA01, HA02, HA03	3	
0399	BOMBS WITH FLAMMABLE LIQUID with bursting charge	1	1.11	1	0	E0			PP	LO01	HA01, HA02, HA03	3	
0400	BOMBS WITH FLAMMABLE LIQUID with bursting charge	1	1.21	1	0	E0			PP	LO01	HA01, HA02, HA03	3	
0401	DIPICRYL SULPHIDE, dry or wetted with less than 10% water, by mass	1	1.1D	1	0	E0			PP	LO01	HA01, HA02, HA03	3	
0402	AMMONIUM PERCHLORATE	1	1.1D	1	152	0	E0		PP	LO01	HA01, HA02, HA03	3	
0403	FLARES, AERIAL	1	1.4G	1.4	0	E0			PP	LO01	HA01, HA02, HA03	1	

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(1)	3.1.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
0404	FLARES, AERIAL (2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)	(12) (13)
0405	CARTRIDGES, SIGNAL	1	1.4S	1.4		0	E0		PP		L001	H.A01, H.A03	0
0406	DINITROSOBENZENE	1	1.3C		1.4	0	E0		PP		L001	H.A01, H.A03	0
0407	TETRAZOL-1-ACETIC ACID	1	1.4C	1.4		0	E0		PP		L001	H.A01, H.A03	3
0408	FUZES, DETONATING with protective features	1	1.1D		1	0	E0		PP		L001	H.A01, H.A03	1
0409	FUZES, DETONATING with protective features	1	1.2D		1	0	E0		PP		L001	H.A01, H.A03	3
0410	FUZES, DETONATING with protective features	1	1.4D	1.4		0	E0		PP		L001	H.A01, H.A03	1
0411	PENTAERYTHRITOL TETRANITRATE (PENTAERYTHRITOL TETRANITRATE, PETN) with not less than 7% wax, by mass	1	1.1D		1	131	0	E0	PP		L001	H.A01, H.A02, H.A03	3
0412	CARTRIDGES FOR WEAPONS with bursting charge	1	1.4E	1.4		0	E0		PP		L001	H.A01, H.A03	1
0413	CARTRIDGES FOR WEAPONS, BLANK	1	1.2C	1		0	E0		PP		L001	H.A01, H.A03	3
0414	CHARGES, PROPELLING, FOR CANNON	1	1.2C		1	0	E0		PP		L001	H.A01, H.A03	3
0415	CHARGES, PROPELLING	1	1.2C	1		0	E0		PP		L001	H.A01, H.A03	3
0417	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1	1.3C	1		0	E0		PP		L001	H.A01, H.A03	3
0418	FLARES, SURFACE	1	1.1G		1	0	E0		PP		L001	H.A01, H.A02, H.A03	3
0419	FLARES, SURFACE	1	1.2G	1		0	E0		PP		L001	H.A01, H.A03	3
0420	FLARES, AERIAL	1	1.1G		1	0	E0		PP		L001	H.A01, H.A03	3
0421	FLARES, AERIAL	1	1.2G	1		0	E0		PP		L001	H.A01, H.A03	3
0424	PROJECTILES, inert with tracer	1	1.3G		1	0	E0		PP		L001	H.A01, H.A03	3
0425	PROJECTILES, inert with tracer	1	1.4G	1.4		0	E0		PP		L001	H.A01, H.A03	1
0426	PROJECTILES with bursting or expelling charge	1	1.2F		1	0	E0		PP		L001	H.A01, H.A02, H.A03	3
0427	PROJECTILES with bursting or expelling charge	1	1.4F	1.4		0	E0		PP		L001	H.A01, H.A02, H.A03	1

UN No. or ID No.	Name and description	Class	Classification Code	Packing group	Labels	Special provis- ions	Limited and excepted quantities	Carriage permitted	Equipment required	Venti- lation	Provisions concerning loading, unloading and carriage	Number of blue cones/ lights	Remarks
	3.1.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1
(1)	ARTICLES, PYROTECHNIC for technical purposes	(3a)	(3b)	(4)	(5)	(6)	(7a)	(8)	(9)	(10)	(11)	(12)	(13)
0428	ARTICLES, PYROTECHNIC for technical purposes	1	1.1G	1	0	0	E0	PP	PP	PP	LO01	HA01, HA02, HA03	3
0429	ARTICLES, PYROTECHNIC for technical purposes	1	1.2G	1	0	0	E0	PP	PP	PP	LO01	HA01, HA03	3
0430	ARTICLES, PYROTECHNIC for technical purposes	1	1.3G	1	0	0	E0	PP	PP	PP	LO01	HA01, HA03	3
0431	ARTICLES, PYROTECHNIC for technical purposes	1	1.4G	1	0	0	E0	PP	PP	PP	LO01	HA01, HA03	1
0432	ARTICLES, PYROTECHNIC for technical purposes	1	1.4S	1	0	0	E0	PP	PP	PP	LO01	HA01, HA03	0
0433	POWDER CAKE (POWDER PASTE), WETTED with not less than 17% alcohol, by mass	1	1.1C	1	266	0	E0	PP	PP	PP	LO01	HA01, HA02, HA03	3
0434	PROJECTILES with burster or expelling charge	1	1.2G	1	0	0	E0	PP	PP	PP	LO01	HA01, HA03	3
0435	PROJECTILES with burster or expelling charge	1	1.4G	1	4	0	E0	PP	PP	PP	LO01	HA01, HA03	1
0436	ROCKETS with expelling charge	1	1.2C	1	1	0	E0	PP	PP	PP	LO01	HA01, HA03	3
0437	ROCKETS with expelling charge	1	1.3C	1	0	0	E0	PP	PP	PP	LO01	HA01, HA03	3
0438	ROCKETS with expelling charge	1	1.4C	1	4	0	E0	PP	PP	PP	LO01	HA01, HA03	1
0439	CHARGES, SHAPED, without detonator	1	1.2D	1	1	0	E0	PP	PP	PP	LO01	HA01, HA03	3
0440	CHARGES, SHAPED, without detonator	1	1.4D	1	4	0	E0	PP	PP	PP	LO01	HA01, HA03	3
0441	CHARGES, SHAPED, without detonator	1	1.4S	1	4	347	0	E0	PP	PP	LO01	HA01, HA03	0
0442	CHARGES, EXPLOSIVE, COMMERCIAL, without detonator	1	1.1D	1	1	0	E0	PP	PP	PP	LO01	HA01, HA03	3
0443	CHARGES, EXPLOSIVE, COMMERCIAL, without detonator	1	1.2D	1	1	0	E0	PP	PP	PP	LO01	HA01, HA03	3
0444	CHARGES, EXPLOSIVE, COMMERCIAL, without detonator	1	1.4D	1	4	0	E0	PP	PP	PP	LO01	HA01, HA03	1
0445	CHARGES, EXPLOSIVE, COMMERCIAL, without detonator	1	1.4S	1	4	347	0	E0	PP	PP	LO01	HA01, HA03	0
0446	CASES, COMBUSTIBLE, EMPTY, WITH/OUT PRIMER	1	1.4C		1.4	0	E0	PP	PP	PP	LO01	HA01, HA03	1
0447	CASES, COMBUSTIBLE, EMPTY, WITH/OUT PRIMER	1	1.3C	1	1	0	E0	PP	PP	PP	LO01	HA01, HA03	3
0448	5-MERCAPTOETRAZOL-1-ACETIC ACID	1	1.4C		1.4	0	E0	PP	PP	PP	LO01	HA01, HA03	1
0449	TORPEDOES, LIQUID FUELLED with or without bursting charge	1	1.1J		1	0	E0	PP	PP	PP	LO01	HA01, HA02, HA03	3

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(1)	3.1.2 (2)	2.2 (3a)	2.1.1.3 (4)	5.2.2 (5)	3.3 (6)	3.4 (7a)	3.5.1.2 (7b)	3.2.1 (8)	8.1.5 (9)	7.1.6 (10)	7.1.5 (11)	3.2.1 (12)
0450	TORPEDOES, LIQUID FUELLED with inert head	1	1.31	1	0	E0	0	PP		L001	HA01, HA03	3
0451	TORPEDOES with bursting charge	1	1.1D	1	0	E0	0	PP		L001	HA01, HA02, HA03	3
0452	GRENADES, PRACTICE, hand or rifle	1	1.4G	1.4	0	E0	0	PP		L001	HA01, HA03	1
0453	ROCKETS, LINE-THROWING	1	1.4G	1.4	0	E0	0	PP		L001	HA01, HA03	1
0454	IGNITERS	1	1.4S	1.4	0	E0	0	PP		L001	HA01, HA03	0
0455	DETONATORS, NON-ELECTRIC for blasting	1	1.4S	1.4	347	0	E0	PP		L001	HA01, HA03	0
0456	DETONATORS, ELECTRIC for blasting	1	1.4S	1.4	347	0	E0	PP		L001	HA01, HA03	0
0457	CHARGES, BURSTING, PLASTICS BONDED	1	1.1D	1	0	E0	0	PP		L001	HA01, HA03	3
0458	CHARGES, BURSTING, PLASTICS BONDED	1	1.2D	1	0	E0	0	PP		L001	HA01, HA02, HA03	3
0459	CHARGES, BURSTING, PLASTICS BONDED	1	1.4D	1.4	0	E0	0	PP		L001	HA01, HA03	3
0460	CHARGES, BURSTING, PLASTICS BONDED	1	1.4S	1.4	347	0	E0	PP		L001	HA01, HA03	0
0461	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1	1.1B	1	178	0	E0	PP		L001	HA01, HA02, HA03	3
0462	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1C	1	178	0	E0	PP		L001	HA01, HA03	1
0463	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1D	1	274	0	E0	PP		L001	HA01, HA02, HA03	3
0464	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1E	1	178	0	E0	PP		L001	HA01, HA03	3
0465	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1F	1	178	0	E0	PP		L001	HA01, HA02, HA03	3
0466	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2C	1	178	0	E0	PP		L001	HA01, HA03	3
0467	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2D	1	274	0	E0	PP		L001	HA01, HA03	3
0468	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2E	1	178	0	E0	PP		L001	HA01, HA03	3
0469	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2F	1	178	0	E0	PP		L001	HA01, HA02, HA03	3

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(1)	3.1.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	3.2.1	8.1.5	7.1.6	7.1.6	7.1.5	3.2.1 (13)
0470	ARTICLES, EXPLOSIVE, N.O.S.	(2)	(3a)	(3b)	(4)	(5)	(6)	(7b)	(8)	(9)	(10)	(11)	(12)
0471	ARTICLES, EXPLOSIVE, N.O.S.	1	1.3C		1	178	0	E0	PP		L001	HA01, HA03	3
0472	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4E		1.4	178	0	E0	PP		L001	HA01, HA03	1
0473	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4F		1.4	178	0	E0	PP		L001	HA01, HA02, HA03	1
0474	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1C		1	178	0	E0	PP		L001	HA01, HA02, HA03	3
0475	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1D		1	178	0	E0	PP		L001	HA01, HA02, HA03	3
0476	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1G		1	178	0	E0	PP		L001	HA01, HA02, HA03	3
0477	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.3C		1	178	0	E0	PP		L001	HA01, HA02, HA03	3
0478	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.3G		1	178	0	E0	PP		L001	HA01, HA03	3
0479	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4C		1.4	178	0	E0	PP		L001	HA01, HA03	1
0480	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4D		1.4	178	0	E0	PP		L001	HA01, HA03	1
0481	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4S		1.4	178	0	E0	PP		L001	HA01, HA03	0
0482	SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI) N.O.S.	1	1.5D		1.5	178	0	E0	PP		L001	HA01, HA03	3
0483	CYCLOTRIMETHYLENETRINITRAMINE (CYCLOLONITE; HEXOGEN; RDX), DESENSITIZED	1	1.1D		1	274	0	E0	PP		L001	HA01, HA02, HA03	3
0484	CYCLOTETRAMETHYLENETRINITRAMINE (HMX; OCTOGEN), DESENSITIZED	1	1.1D		1	0	0	E0	PP		L001	HA01, HA02, HA03	3
0485	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4G		1.4	178	0	E0	PP		L001	HA03	1
0486	ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EED)	1	1.6N		1.6	274	0	E0	PP		L001	HA01, HA03	3
0487	SIGNALS, SMOKE	1	1.3G		1	0	0	E0	PP		L001	HA03	3
0488	AMMUNITION, PRACTICE	1	1.3G		1	0	0	E0	PP		L001	HA01, HA03	3