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Classification and code of dangerous goods

危险货物分类和品名编号

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Classification and code of dangerous goods

1 Scope

This document specifies the general requirements for the classification of dangerous goods, the classification of dangerous goods and the code of dangerous goods.

This document applies to the transport of dangerous goods and related activities.

This document does not apply to dangerous goods transported in bulk by water.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 261, Determination of flash point - Pensky-Martens closed cup method

GB/T 3536, Petroleum products - Determination of flash and fire points - Cleveland open cup method

GB/T 5208, Determination of flash point - Rapid equilibrium closed cup method

GB/T 6536, Standard test method for distillation of petroleum products at atmospheric pressure

GB/T 7534, Volatile organic liquids for industrial use - Determination of boiling range

GB 11806, Regulations for the safe transport of radioactive material

GB 12268-2025, List of dangerous goods

GB 14371, Dangerous goods - Requirements of the hazard classification procedure and compatibility for explosives

GB 19452, Safety code for inspection of hazardous properties for dangerous goods of oxidizing substances

GB 19521.4, Safety code for inspection of hazardous properties for dangerous good of substances which in contact with water emit flammable gases

UN, Manual of Tests and Criteria (Rev. 8)

3 Terms and definitions, abbreviations and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions defined in the UN, *Recommendations on the Transport of Dangerous Goods: Model Regulations* (Rev.23) (hereinafter referred to as the *Model Regulations*) and the following terms and definitions apply.

3.1.1

dangerous goods

Substances and articles, listed in "Table 1 - List of dangerous goods" of GB 12268-2025 (hereinafter referred to as the List of dangerous goods), with dangerous characteristics such as explosion, combustion, combustion-supporting, poisoning, infection, corrosion, radioactivity, and environmental hazards.

3.1.2

UN number

The four-digit Arabic numeral number used to identify one type or one class of specific dangerous goods specified in the *Model Regulations*.

3.2 Abbreviations

For the purposes of this document, the following abbreviated terms apply.

BCF: Bioconcentration Factor

NOEC: No observed effect concentration, in milligrams per liter (mg/L)

3.3 Symbols

The following symbols apply to this document.

EC_x: effect concentration, in milligrams per liter (mg/L).

EC_{50}: median effect concentration, in milligrams per liter (mg/L).

E_rC_{50}: EC_{50} based on reduction in growth, in milligrams per liter (mg/L).

K_{ow}: octanol-water partition coefficient.

4 General requirements

4.1 Dangerous goods class, division and packing group

4.1.1 Dangerous goods are divided into 9 classes according to their dangers or main hazards, of which Class 1, Class 2, Class 4, Class 5 and Class 6 are further divided into different divisions.

Class 1 Explosives

Division 1.1 Substances and articles with a mass explosion hazard;

Division 1.2 Substances and articles with a projection hazard but without mass explosion hazard;

Division 1.3 Substances and articles with a combustion hazard and either a local explosion hazard or a local projection hazard or both, but without a mass explosion hazard;

Division 1.4 Substances and articles not presenting a significant hazard;

Division 1.5 Very insensitive substances and articles with a mass explosion hazard;

Division 1.6 Extremely insensitive substances and articles without a mass explosion hazard.

Class 2 Gas

Division 2.1 Flammable gas;

Division 2.2 Non-flammable and non-toxic gas;

Division 2.3 Toxic gas.

Class 3 Flammable liquid

Class 4 Flammable solids, substances liable to spontaneous combustion, substances which emit flammable gases when in contact with water

Division 4.1 Flammable solids, self-reactive substances, solid desensitized explosives and polymerizable substances;

Division 4.2 Substances liable to spontaneous combustion;

Division 4.3 Substances which, in contact with water, emit flammable gases.

Class 5 Oxidizing substances and organic peroxides

Division 5.1 Oxidizing substances;

Division 5.2 Organic peroxides.

Class 6 Toxic and infectious substances

Division 6.1 Toxic substances;

Division 6.2 Infectious substances.

Class 7 Radioactive materials

Class 8 Corrosive substances

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

Note: The order of class and division numbers is not an order of degree of hazard.

4.1.2 Dangerous goods other than Class 1, Class 2, Class 7, Divisions 5.2 and 6.2, as well as Division 4.1 self-reactive substances, are divided into three packing groups according to their degree of danger:

-- Packing group I: substances with high hazard;

-- Packing group II: substances with medium hazard;

-- Packing group III: substances with slight hazard.

The packing groups of each substance division are listed in the “List of dangerous goods”.

4.2 Dangerous goods classification requirements

4.2.1 Dangerous goods shall be classified according to their primary hazards in accordance with the classes in Chapter 5.

4.2.2 A mixture or solution meeting the classification criteria of this document, whose single major hazardous ingredient is a substance listed in the “List of dangerous goods” and which also contains one or more substances not restricted by this document and/or contains trace amounts of one or more substances listed in the “List of dangerous goods”, shall be transported according to the UN number and proper shipping name of the major ingredient substance listed in the “List of dangerous goods”, unless any of the following conditions is met:

a) The mixture or solution is specifically listed in the “List of dangerous goods”;

4.3.2 For goods with multiple hazards and whose names are not included in the “List of dangerous goods”, regardless of the order of their hazards in Table 1, the most stringent packing group related to the hazard takes precedence over other packing groups.

4.3.3 The following substances and articles always have a higher priority in terms of hazard, and their order of hazard is not listed in Table 1:

a) Class 1 substances and articles;

b) Class 2 gases;

c) Class 3 liquid desensitized explosives;

d) Division 4.1 self-reactive substances and solid desensitized explosives;

e) Division 4.2 pyrophoric substances;

f) Division 5.2 substances;

g) Division 6.1 substances with inhalation toxicity of packing group I;

h) Division 6.2 substances;

i) Class 7 articles.

4.3.4 Radioactive materials with other hazardous properties shall be classified in Class 7 and the subsidiary hazard shall be identified (except for radioactive materials in excepted packages).

4.3.5 For gases and gas mixtures with more than two divisions of hazard, the order of hazard is as follows:

a) Division 2.3 takes precedence over all other divisions;

b) Division 2.1 takes precedence over Division 2.2.

4.4 Sample transport classification requirements

4.4.1 When the hazard class of a substance is not determined but it is necessary to transport the substance for further testing, the hazard class, proper shipping name and UN number shall be provisionally assigned based on the shipper's understanding of the substance, in accordance with the classification criteria of this document and the principle of priority of hazard in 4.3, and the most stringent packing group of the selected proper shipping name shall be used.

4.4.2 Samples shall be transported in accordance with the requirements of the provisional proper shipping name when they meet the following conditions:

containing one or more dangerous goods (or their residues) which are an integral part of the article and are essential to its use or operation and cannot be removed for transport. The inner packaging shall not be a single article.

4.5.3 Such articles may also contain batteries. Lithium batteries that are part of articles shall be of a type that has been demonstrated to comply with the test requirements of Part 3, Section 38.3 of the *Manual of Tests and Criteria*. Articles containing pre-production prototype lithium batteries for testing, or articles containing lithium batteries manufactured in production batches of not more than 100 batteries, shall be subject to the requirements of Special Provision 310 in the "List of dangerous goods".

Note: In this document, battery cells and battery packs are collectively referred to as batteries.

4.5.4 This does not apply to articles which have a specific proper shipping name in the "List of dangerous goods".

4.5.5 This does not apply to articles containing dangerous goods belonging to Class 1, Division 6.2, Class 7 or radioactive materials, but does apply to articles containing explosives excluded from Class 1.

4.5.6 Articles containing dangerous goods shall apply Table 1 as appropriate, and for each type of dangerous goods contained in the article, determine its hazard and assign the article to a class or division. If an article contains dangerous goods classified as Class 9, all other dangerous goods contained in the article shall be considered to constitute a higher hazard.

4.5.7 The subsidiary hazard shall represent the primary hazard of other dangerous goods contained in the article. When an article contains only one type of dangerous goods, the subsidiary hazard shall be the subsidiary hazard listed in Column 5 of the "List of dangerous goods". If an article contains more than one type of dangerous goods and a dangerous reaction may occur during transportation, each dangerous good shall be packaged separately.

5 Classification of dangerous goods

5.1 Class 1 Explosives

5.1.1 General provisions

5.1.1.1 This Class includes the following.

a) Explosive substances (substances which are not explosive in themselves but which can form a gas, vapour or dust explosive atmosphere, not included in Class 1), excluding those which are too dangerous to be transported or whose primary hazard falls within another class.

b) Explosive articles, excluding devices where the quantity or characteristics of the explosive substances contained are such that they will not cause any effects on the outside of the device due to projection, fire, smoke, heat or loud noise if accidentally or accidentally ignited or triggered during transportation.

c) Substances or articles not mentioned in a) and b) manufactured with a view to producing explosive or pyrotechnic effects.

5.1.1.2 Explosive substances are solid or liquid substances (or mixtures of substances) which are capable of producing gases by chemical reaction, the temperature, pressure and velocity of which are high enough to cause damage to the surroundings, and also include pyrotechnic substances.

5.1.1.3 Pyrotechnic substances are explosive substances used to produce heat, light, sound, gas or smoke effects or a combination of effects through a self-sustaining exothermic chemical reaction that does not detonate.

5.1.1.4 Explosive articles are articles containing one or more explosive substances.

5.1.1.5 Desensitization is the process of adding one or more desensitizing agents to explosives to increase safety during handling and transportation. Desensitizing agents desensitize explosives or reduce their sensitivity to heat, vibration, impact, shock or friction.

5.1.1.6 Explosive or pyrotechnic effects refer to effects produced by self-sustaining exothermic chemical reactions, including impact, explosion, fragmentation, projection, heat, light, sound, gas, smoke, etc.

5.1.2 Divisions

5.1.2.1 Division 1.1 Substances and articles with a mass explosion hazard (a mass explosion is one which can affect almost the entire load instantly).

5.1.2.2 Division 1.2 Substances and articles with a projection hazard but without mass explosion hazard.

5.1.2.3 Division 1.3 Substances and articles with a combustion hazard and either a local explosion hazard or a local projection hazard or both, but without a mass explosion hazard.

This division includes substances and articles that meet any of the following conditions:

a) Substances and articles that can generate a large amount of thermal radiation;

b) Substances and articles which, by successive combustion, produce a localized explosion or projection effect or a combination of these effects.

5.1.2.4 Division 1.4 Substances and articles not presenting a significant hazard.

This Division includes substances and articles which, if ignited or triggered during transport, present only a minor hazard; the effects are mainly confined to the package itself and the fragments ejected are not expected to be large or far-reaching, and external fire is unlikely to cause an instantaneous explosion of substantially all the contents of the package.

5.1.2.5 Division 1.5 Very insensitive substances and articles with a mass explosion hazard.

This division includes substances which have a mass explosion hazard but are so insensitive that the probability of initiation or of transition from combustion to explosion under normal conditions of transport is extremely small.

Note: When a large amount of this substance is loaded in a ship's hold, the possibility of combustion turning into explosion is high.

5.1.2.6 Division 1.6 Extremely insensitive substances and articles without a mass explosion hazard.

This division includes articles containing only extremely insensitive explosive substances and the probability of accidental explosion or propagation of which is negligible.

Note: The hazard of this article is limited to the explosion of a single article.

5.1.3 Compatibility groups and combinations of explosives

5.1.3.1 Among explosives, if two or more substances or articles can be safely stowed or transported together without significantly increasing the probability of accidents or, in certain quantities, without significantly increasing the degree of accident hazard, they may be considered as the same compatibility group.

5.1.3.2 Class 1 dangerous goods are classified into one of six divisions and one of 13 compatibility groups according to their hazard type. Various explosive substances and articles that are considered compatible are listed in one compatibility group. Tables 2 and 3 show the method of assigning packing groups and the possible combinations of hazard divisions associated with each compatibility group.

a) Articles of compatibility group D and compatibility group E may be fitted with or packed with an initiation device, provided that the initiation device is equipped with at least two effective protective functions to prevent explosion if the initiation device is accidentally activated. Such articles and packages shall be assigned to compatibility group D or compatibility group E.

b) Articles of compatibility group D and compatibility group E may be packed with an initiator which, although not equipped with two effective protective functions, will not cause an explosion if accidentally activated under normal

a) Substances with a vapor pressure greater than 300 kPa at 50 °C;

b) Substances which are completely gaseous at 20 °C and under a standard pressure of 101.3 kPa.

5.2.1.2 This Class includes compressed gases, liquefied gases, dissolved gases, refrigerated liquefied gases, adsorbed gases, vapour mixtures of one or more gases with one or more substances of other classes, gas-filled articles, aerosols and chemicals under pressure.

5.2.1.3 Gases are transported in the following five states.

a) Compressed gas refers to gas that is completely gaseous when it is packaged under pressure at -50 ℃ for transportation, including all gases with a critical temperature less than or equal to -50 ℃.

b) Liquefied gas refers to gas that is partially liquid when it is packaged under pressure and delivered for transportation at a temperature greater than -50 °C. It can be divided into:

1) High-pressure liquefied gas: gas with a critical temperature at -50 ℃ ~ 65 ℃;

2) Low-pressure liquefied gas: gas with a critical temperature greater than 65 °C.

c) Dissolved gas refers to the gas dissolved in the liquid solvent when the pressurized package is delivered for transportation.

d) Refrigerated liquefied gas refers to gas which is partially in liquid form due to its low temperature when packaged for transport.

e) Adsorbed gas refers to the gas adsorbed in the solid porous material when it is packaged for transportation, where the pressure generated in the container is less than 101.3 kPa at 20 ℃ and less than 300 kPa at 50 ℃.

5.2.2 Divisions

5.2.2.1 Division 2.1 Flammable gas

Flammable gas refers to gas that meets any of the following conditions at 20 °C and 101.3 kPa standard pressure:

a) Gas with a lower explosion limit less than or equal to 13%;

b) Gas whose explosion limit range or flammability limit range is greater than or equal to 12%, regardless of its lower explosion limit.

5.2.2.2 Division 2.2 Non-flammable and non-toxic gas

5.2.2.2.1 This Division includes gases that meet any of the following conditions.

a) Asphyxiating gas: gas that dilutes or replaces oxygen in the air.

b) Oxidizing gas: gas that is more likely than air to cause or promote the combustion of other materials.

c) Gases not included in other divisions.

5.2.2.2.2 This Division does not include gases transported at a pressure below 200 kPa at a temperature of 20 °C, either unliquefied or refrigerated liquefied.

5.2.2.2.3 Gases of Division 2.2 contained in substances or articles that meet any of the following conditions shall not be transported as dangerous goods:

a) Food, including carbonated beverages (except UN 1950);

b) Sports balls;

c) Tires (except for air transport).

5.2.2.3 Division 2.3 Toxic gas

This Division includes gases that meet any of the following conditions:

a) Gas whose toxicity or corrosiveness may be harmful to human health;

b) Toxic or corrosive gas with LC_{50} value less than or equal to 5 000 mL/m^3.

Note 1: LC_{50} refers to the concentration of gas that is most likely to cause half of the test animals to die within 14 days if male or female adult rats (referred to as rats) inhale it continuously for 1 hour.

Note 2: Gas whose corrosiveness reaches the above criteria a) or b) is classified as toxic gas with a subsidiary hazard of corrosiveness.

5.2.3 Determination of hazard divisions for gas mixtures

5.2.3.1 The flammability shall be determined by tests or calculations in accordance with the requirements of GB/T 27862.

Note: If insufficient data are available to use GB/T 27862, a similar method may be used for testing.

5.2.3.2 The toxicity of the mixture is expressed as LC_{50} value, which is determined by test or calculated according to Formula (1):

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