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Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

Sub-Committee of Experts on the Transport of Dangerous Goods

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Item 6 (b) of the provisional agenda
Miscellaneous proposals for amendments to the Model Regulations on the Transport of Dangerous Goods: packagings, including the use of recycled plastics material

Refrigerated transports: reference to 5.5.3 in the special provisions affected

Transmitted by the expert from Spain*

Introduction

1. Chapter 5.5 of Model Regulations was introduced in the seventeenth edition in 2012. It was dedicated to "Special provisions applicable to packages and cargo transport units containing substances presenting a risk of asphyxiation when used for cooling or conditioning purposes (such as dry ice (UN 1845) or nitrogen, refrigerated liquid (UN 1977) or argon, refrigerated liquid (UN 1951) or nitrogen)".

2. Nevertheless, when 5.5.3 was introduced, many packing instructions existed that referred to cooling with dry ice, nitrogen or other substances, but they were not reviewed systematically when introducing 5.5.3. Amendments linking the packing instructions with 5.5.3. were only introduced to packing instructions P650 and P904 at that moment.

3. At the recent Joint Meeting sessions, Spain presented documents ECE/TRANS/WP.15/AC.1/2019/33, ECE/TRANS/WP.15/AC.1/2020/40 and ECE/TRANS/WP.15/AC.1/2021/15, drawing the attention on the fact that special provision 593 (RID/ADR only), which references to P203, is not fully in line with 5.5.3, making this special provision difficult to apply.

4. When discussing ECE/TRANS/WP.15/AC.1/2021/15 the Joint Meeting adopted the amendments proposed as alternative A in ECE/TRANS/WP.15/AC.1/2021/15 (see ECE/TRANS/WP.15/AC.1/160, para. 24 and its annex II).

5. Nevertheless, this proposal triggered a more general discussion on the different packing instructions existing referring to cooling, and it was said that perhaps it would be desirable to review these packing instructions introducing a uniform approach to referencing 5.5.3. Therefore, Spain was invited to follow up on this question raised, with a document for

* A/75/6 (Sect.20), para. 20.51.

consideration at a future session of the Sub-Committee on the Transport of Dangerous Goods (see report ECE/TRANS/WP.15/AC.1/2021/160, para. 24).

6. Therefore, Spain has done a detailed revision of all packaging instructions of the Model Regulation where a coolant or conditioner is mentioned, to check if in all of them the reference to 5.5.3 is included. At the following, all relevant packing instructions have been analysed one by one.

7. Introducing a clear cross reference to 5.5.3 into all packing instructions where a coolant or conditioner is mentioned clarifies the provisions in regards to the coolant; it has to be avoided that the provisions for the cooling substances are not applied at all, or applied as if transported as a load (full provisions of the Model Regulations applied). Also, having this cross reference existing in some cases, and not in others, does not help to have clear provisions in place. Therefore, Spain has proposed to add text in different packing instructions (see paragraphs18 to 21 below).

Analysis

Packing instructions P650, P904, P911 and LP906

8. Packing instructions P650, P904, P911 and LP906 include the reference to paragraph 5.5.3 when referencing to dry ice or liquid nitrogen used as coolant or conditioner of the shipment. A clear reference to 5.5.3 is included, making further amendments unnecessary.

9. The relevant texts are:

> "P650 This packing instruction applies to UN No. 3373, BIOLOGICAL SUBSTANCE, CATEGORY B.
>
> …
>
> (9) Refrigerated or frozen specimens: Ice, dry ice and liquid nitrogen
>
> (a) When dry ice or liquid nitrogen is used as a coolant, the requirements of 5.5.3 shall apply. When used, ice shall be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports shall be provided to secure the secondary packagings in the original position. If ice is used, the outside packaging or overpack shall be leakproof;
>
> (b) The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost."
>
> "P904 This instruction applies to UN No. 3245, GENETICALLY MODIFIED MICROORGANISMS OR GENETICALLY MODIFIED ORGANISMS.
>
> …
>
> Additional requirement:
>
> <u>Ice, dry ice and liquid nitrogen</u>
>
> When dry ice or liquid nitrogen is used as a coolant, the requirements of 5.5.3 shall apply. When used, ice shall be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports shall be provided to secure the secondary packaging in the original position. If ice is used, the outside packaging or overpack shall be leakproof."

10. Packing instructions P911 and LP906 apply to damaged or defective cells and batteries of UN Nos. 3090, 3091, 3480 and 3481 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage.

11. Both include the reference to 5.5.3 (item (3)) when the dry ice or liquid nitrogen is used as coolant and conditioner. The text used is the same in the two packaging instructions:

> "(3) When dry ice or liquid nitrogen is used as a coolant, the requirements of section 5.5.3 shall apply. The inner packaging and outer packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost."

Packing instruction P520

12. This instruction applies to organic peroxides of Division 5.2 and self-reactive substances of Division 4.1. The text used to refer to section 5.5.3 is different from the previous ones, but nevertheless no amendment seems to be needed:

> Special packing provisions:
>
> "**PP94**: …
>
> 5. When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, the requirements of 5.5.3 are complied with. Interior supports shall be provided to secure the inner packagings in their original position. The inner and outer packagings shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.
>
> **PP95**: …
>
> 6. When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, the requirements of 5.5.3 are complied with. Interior supports shall be provided to secure the inner packagings in their original position. The inner and outer packagings shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost."

Packing instructions P620, P800, P901

13. There are three packaging instructions in which dry ice or liquid nitrogen can be used as a coolant or refrigerant, but there isn't any reference to section 5.5.3. It may be convenient to include this reference.

14. These are the relevant texts of the mentioned packing instructions:

> **"P620** This instruction applies to UN Nos. 2814 INFECTIOUS SUBSTANCE, AFFECTING HUMANS and 2900 INFECTIOUS SUBSTANCE, AFFECTING ANIMALS ONLY.
>
> **…**
>
> Additional requirements:
>
> 1. Inner packagings containing infectious substances shall not be consolidated with inner packagings containing unrelated types of goods. Complete packages may be overpacked in accordance with the provisions of 1.2.1 and 5.1.2: such an overpack may contain dry ice.
>
> …
>
> 2.(b) Substances consigned refrigerated or frozen. Ice, dry ice or other refrigerant shall be placed around the secondary packaging(s) or alternatively in an overpack with one or more complete packages marked in accordance with 6.3.3. Interior supports shall be provided to secure secondary packaging(s) or packages in position after the ice or dry ice has dissipated. If ice is used, the outer packaging or overpack shall be leakproof. If dry ice is used, the outer packaging or overpack shall permit the release

of carbon dioxide gas. The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used;

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

"**P800** This instruction applies to UN Nos. 2803 and 2809, GALLIUM and MERCURY respectively.

Special packing provision:

PP41 For UN 2803, when it is necessary to transport Gallium at low temperatures in order to maintain it in a completely solid state, the above packagings may be overpacked in a strong, water-resistant outer packaging which contains dry ice or other means of refrigeration. If a refrigerant is used, all of the above materials used in the packaging of gallium shall be chemically and physically resistant to the refrigerant and shall have impact resistance at the low temperatures of the refrigerant employed. If dry ice is used, the outer packaging shall permit the release of carbon dioxide gas."

"**P901** This instruction applies to UN No. 3316, CHEMICAL KIT OR FIRST AID KIT.

Maximum quantity of dangerous goods per outer packaging: 10 kg excluding the mass of any carbon dioxide, solid (dry ice) used as a refrigerant."

Packing instruction P203

15. **P203** applies to Class 2 refrigerated liquefied gases, and the second part of this packing instruction is dedicated to requirements for open cryogenic receptacles:

"Only the following non oxidizing refrigerated liquefied gases of classification code 3A may be carried in open cryogenic receptacles: UN Nos. 1913, 1951, 1963, 1970, 1977, 2591, 3136 and 3158."

16. In this case, as refrigerated liquefied gases are used, and all of them are non-toxic, non-flammable asphyxiant gases falling into the scope of application of 5.5.3, it would be recommended to make a reference to section 5.5.3 when these gases are used as coolant of other goods.

Proposals

17. Taking into consideration the above, Spain considers it necessary to include into those packing instructions mentioning cooling the reference to 5.5.3, if this is not yet included. Therefore, Spain suggests the following amendments to be made to the UN Model Regulations (new text underlined):

Proposal 1: P620

18. Amend the additional requirements 1, 2.(b) and 2.(c) to read as follows:

"1. Inner packagings containing infectious substances shall not be consolidated with inner packagings containing unrelated types of goods. Complete packages may be overpacked in accordance with the provisions of 1.2.1 and 5.1.2: such an overpack may contain dry ice. When ice, dry ice or other refrigerants are used as a coolant, the requirements of 5.5.3 shall apply.

…

2.(b) Substances consigned refrigerated or frozen. Ice, dry ice or other refrigerant shall be placed around the secondary packaging(s) or alternatively in an overpack with one or more complete packages marked in accordance with 6.3.3. Interior supports shall be provided to secure secondary packaging(s) or packages in position after the ice or dry ice has dissipated. When ice, dry ice or other refrigerants are used as a coolant, the requirements of 5.5.3 shall apply. If ice is used, the outer packaging or overpack shall be leakproof. If dry ice is used, the outer packaging or overpack shall permit the release of carbon dioxide gas. The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used**.**

2.(c) Substances consigned in liquid nitrogen. When liquid nitrogen is used as a coolant, the requirements of 5.5.3 shall apply. Plastics primary receptacles capable of withstanding very low temperature shall be used. The secondary packaging shall also be capable of withstanding very low temperatures, and in most cases will need to be fitted over the primary receptacle individually. Provisions for the consignment of liquid nitrogen shall also be fulfilled. The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the liquid nitrogen."

Proposal 2: P800

19. Amend the special packing provision PP41 to read as follows:

"PP41 For UN 2803, when it is necessary to transport Gallium at low temperatures in order to maintain it in a completely solid state, the above packagings may be overpacked in a strong, water-resistant outer packaging which contains dry ice or other means of refrigeration. When dry ice or other means of refrigeration are used as a coolant, the requirements of 5.5.3 shall apply. If a refrigerant is used, all of the above materials used in the packaging of gallium shall be chemically and physically resistant to the refrigerant and shall have impact resistance at the low temperatures of the refrigerant employed. If dry ice is used, the outer packaging shall permit the release of carbon dioxide gas."

Proposal 3: P901

20. Modify P901 adding at the end the sentence as follows (before the additional requirement):

"If dry ice is used as a coolant, the requirements of 5.5.3 shall apply.**"**

Proposal 4: P203

21. Amend the requirements for open cryogenic receptacles adding an additional sentence after the first one (rest unchanged):

"Only the following non oxidizing refrigerated liquefied gases of Division 2.2 may be transported in open cryogenic receptacles: UN Nos. 1913, 1951, 1963, 1970, 1977, 2591, 3136 and 3158. For these gases, when used as coolant, the requirements of 5.5.3 shall apply."