

**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

Thirty-fifth session
Geneva, 22 - 26 June 2009
Item 5 of the provisional agenda

**MISCELLANEOUS PROPOSALS OF AMENDMENTS TO THE MODEL
REGULATIONS ON THE TRANSPORT OF DANGEROUS GOODS**

Transport of coolant/conditioning units

Comments on ST/SG/AC.10/C.3/2009/23

Transmitted by the expert of the Netherlands

Introduction.

1. In document ST/SG/AC.10/C.3/2009/23 of the United Kingdom and Germany it is proposed to regulate the use of certain dangerous goods, such as dry ice and refrigerated liquefied nitrogen or argon for cooling or conditioning purposes. The expert of the Netherlands supports the principle of this proposal. However, in our view the following issues need to be resolved first.
2. A clear distinction should be made between the substances transported as cargo and the same substances used for cooling or conditioning purposes. In the Dangerous Goods List the transport of these goods as cargo is regulated under UN numbers such as 1845 DRY ICE, 1977 NITROGEN REFRIGERATED LIQUID and 1951 ARGON REFRIGERATED LIQUID together with their conditions of transport.
3. If these substances are used for cooling/conditioning purposes, however, these conditions of transport do not have any meaning and cannot be applied. To avoid confusion between the transport of substances *as cargo* and the *use of the same substances for cooling or conditioning purpose during transport*, it is proposed to delete the reference to UN numbers when used as coolant or conditioning medium during transport.
4. In lign with paragraph 1 we feel that it is appropriate to create a separate section regulating the use of dangerous substances as coolant/conditioner. In this section the regulations for dangerous goods for cooling and conditioning purposes during transport can be found and, where appropriate, a reference can be made to this section.

5. The general principle is that when dangerous goods are shipped cooled or conditioned, the relevant conditions for those goods are applicable and in addition the provisions concerning the cooling/conditioning. This principle is laid down in 5.5.3.1.2 and 5.5.3.1.3 in Annex 1 of this paper.

6. An issue noted when studying the proposal in document -/2009/23, concerns the question which substances are allowed to be used as coolant/conditioner. In practice dry ice, refrigerated liquefied nitrogen and refrigerated liquefied argon are used. In the regulations it is not clear whether or not other refrigerated gases, including flammable and toxic gases may be used. It is proposed to assign a special provision indicating which substances are allowed as coolant/conditioner. The Netherlands suggests to use special provision 297 for this purpose. The present text of SP 297 should be incorporated in 5.5.3. This also highlights the difference between the transport of these substances as cargo and the use as coolant/conditioner (see also paragraph 1 of this paper).

7. In document -2009/23 the packing instructions P620, P650 and P904 contain specific provisions for packagings containing dry ice or other cooling medium but do not require the provisions for coolants/conditioners as proposed in 5.5.3 such as marking the cargo transport unit and the documentation.

8. The Netherlands proposes to have a reference in the packing instructions to the general provisions of 5.5.3, where appropriate, for example in the packing instructions P620, P650 and P904.

9. In addition to paragraph 4, it is noted that the packing instructions P620, P650 and P904 contain provisions for packagings containing dry ice or other cooling medium which are not incorporated in the proposed 5.5.3 in document -/2009/23. It seems logical to concentrate provisions for substances used for cooling in 5.5.3 and to make a reference to 5.5.3 where appropriate, for example in the packing instructions P620, P650 and P904. As a consequence outside 5.5.3 specific texts concerning the transport when cooled/conditioned can be deleted.

The Sub-Committee is invited to decide on this principle.

10. It is recognized that the text in document -/2009/23 as well as the text proposed in this paper does not only concern consignment requirements (of Part 5). The Sub-committee may consider to move this section or parts of it to another section, for example a new section 3.6 could be a possibility.

Proposal

11. The Sub-Committee is invited to consider the text as proposed in Annex 1 on the bases of paragraph 1 to 4 and to decide on the issues raised in paragraph 5 and 6 of this paper.

Annex 1

“5.5.3 Special provisions applicable to packages and cargo transport units containing [dangerous] substances presenting a risk of asphyxiation when used for cooling or conditioning purposes during transport (such as dry ice or nitrogen, refrigerated liquid or argon, refrigerated liquid).”

NOTE: This section is not applicable to substances transported as cargo. When transported as cargo these substances are indicated in the Dangerous Goods List in Chapter 3.2 with the conditions of transport associated with these substances..

5.5.3.1 General

5.5.3.1.1 With the exception of portable tanks, the provisions of this section are applicable to dangerous goods when used for cooling or conditioning purposes during transport..

5.5.3.1.2 Substances used for cooling or conditioning purposes (other than fumigation) are not subject to any provisions of these Regulations other than those of this section.

5.5.3.1.3 When the cooled or conditioned cargo transport unit contains dangerous goods as cargo, all relevant provision of these Regulations relating to these dangerous goods apply in addition to the provisions of this chapter.

5.5.3.1.4 For air transport, arrangements between consignor and operator shall be made for each consignment, to ensure that ventilation safety procedures are followed.

5.5.3.1.5 Persons engaged in the handling of cooled or conditioned cargo transport units shall be trained commensurate with their responsibilities.

5.5.3.2 Packages containing a coolant or conditioner.

5.5.3.2.1.1 Packages shall be designed and constructed to permit the release of gas to prevent a build-up of pressure that could rupture the packaging.

5.5.3.2.2 Packages containing a coolant or conditioner shall be transported in well ventilated cargo transport units.

5.5.3.3 Marking of packages containing a coolant or conditioner

5.5.3.3.1 For packages containing dangerous goods used for cooling or conditioning, the proper shipping name of these dangerous goods shall be marked on the package, in addition to the word “WARNING”. For example packages containing solid carbon dioxide (dry ice) used as a coolant shall be clearly marked with the words “WARNING- CARBON DIOXIDE SOLID (DRY ICE)”.

5.5.3.3.2 The markings shall be durable, legible and placed in such a location and of such a size relative to the packaging as to be readily visible.

5.5.3.3.3 Cargo transport units containing unpackaged coolant or conditioner

5.5.3.3.4 If dry ice or other coolant in unpackaged form is used for cooling purposes, it shall not come into direct contact with the metal structure of a freight container to avoid embrittlement of the metal. Measures shall be taken to provide adequate insulation between the dry ice and the freight container (e.g. by using suitable low heat conducting materials such as timber planks, pallets etc).

5.5.3.3.5 Where dry ice or other coolant is placed around packages, measures shall be taken to ensure that packages remain in the original position during transport after the dry ice or coolant has dissipated.

5.5.3.5 Marking and placarding of cargo transport units

Remark: 5.5.3.5.1 as proposed in doc -/2009/23 can be deleted because it is covered by 5.5.3.1.2

5.5.3.5.1 Cargo transport units containing dangerous goods used for cooling or conditioning shall be marked with a warning mark, as specified in 5.5.3.5.3 affixed at each access point in a location where it will be easily seen by persons opening or entering the cargo transport unit. This mark shall remain on the cargo transport unit until the following provisions are met:

- (a) The cargo transport unit has been ventilated to remove harmful concentrations of coolant or conditioner; and
- (b) The cooled or conditioned goods have been unloaded.

5.5.3.5.2 The warning mark shall be rectangular and shall not be less than 150 mm wide and 250 mm high. The markings shall be red and black print on a white background with lettering not less than 25 mm high. The warning mark shall include:

- (a) The word “WARNING”; and
- (b) If solid carbon dioxide is used, the text “CO₂ SOLID (DRY ICE)” or, if other dangerous goods for cooling or conditioning are used, proper shipping name of these dangerous goods.

Remark : Is it really meant to require CO₂ in this text? It is suggested align with the marking required for packages: CARBON DIOXIDE SOLID (DRY ICE)

An illustration of this mark is given in Figure 5.5.2

Figure 5.5.2:

Remark: amend the reference in the mark to read “Text in accordance with 5.5.3” .

5.5.3.6 Documentation

5.5.3.6.1 Documents (such as a bill of lading or cargo manifest) associated with the transport of cargo transport units which are cooled or conditioned by dangerous goods and have not been completely ventilated before transport shall include the following information:

The proper shipping name and the addition “as coolant” or “as conditioning medium”;

For example: dry ice, as coolant

5.5.3.6.2. The transport document may be in any form, provided it contains the information required in 5.5.3.6.1. This information shall be easy to identify, legible and durable.”.

Consequential amendments

1. In the Dangerous Goods List, for UN 1977 and UN 1951, add special provision “297” in column 6.

2. Amend special provision 297 to read:

297 This substance may be used as coolant/conditioner medium, in which case the conditions of 5.5.3 apply.

Remark: The first paragraph of the present text of special provision 297 is transferred to 5.5.3.1.4. The second paragraph of special provision 297 is more or less incorporated in 5.5.3.5. The third paragraph is contrary to the general provisions in 5.5.3.6 concerning documentation.

3. For SP 219 and SP 319 no amendments are needed as proposed in document - /2009/23. The requirements for cooling/conditioning are referred to in packing instruction P904 and P650 respectively.

4. Amend additional requirement 2, paragraphs (b) and (c), of P620 to read as follows:

“(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. The requirements of 5.5.3 also apply.”

(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.]

Remark: What does this mean?

The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the liquid nitrogen;”

The requirements of 5.5.3 also apply.

5. Amend P650, para 9, to read as follows:

“(9) Refrigerated or frozen specimens: Ice, dry ice and liquid nitrogen

(a) When dry ice or liquid nitrogen is used to keep specimens cold, all applicable requirements of these Regulations shall be met. When used, ice or dry 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 after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack shall be leakproof. [If carbon dioxide, solid (dry ice) is used, the packaging shall be designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packagings.]
Remark: text is already in 5.5.3.2.1.

The requirements of 5.5.3 also apply.”.

6. In P 800, PP 41, Add the following sentence at the end The requirements of 5.5.3 also apply.”.

7. At the end of the additional requirement of P901, add the following sentence: “When carbon dioxide, solid (dry ice) or an other coolant is used, the requirements of 5.5.3 also apply.”.

8. Amend the additional requirement of P904 to read as follows:

“Additional requirement:

Ice, dry ice and liquid nitrogen

When dry ice or liquid nitrogen is used all applicable requirements of these Regulations shall be met. When used, ice or dry 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 after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack shall be leakproof. [If carbon dioxide, solid (dry ice) is used, the packaging shall be designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packagings.] Remark: text is already in 5.5.3.2.1

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. The requirements of 5.5.3 also apply.”.
