



**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-seventh session**

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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****Transmitted by the experts from Germany, Netherlands and the United
Kingdom¹****Introduction**

1. The Sub-Committee adopted a new text for section 5.5.2 covering the transport of fumigated units for inclusion in the sixteenth revised edition of the Recommendations on the Transport of Dangerous Goods, Model Regulations (see ST/SG/AC.10/36/Add.1), but the experts could not agree on a similar text for Cargo Transport Units (CTUs) containing dangerous goods for cooling and conditioning purposes as proposed by the expert of the United Kingdom in ST/SG/AC.10/C.3/2008/9 and ST/SG/AC.10/C.3/2008/90. Units containing substances for cooling and conditioning purposes can pose a safety risk to personnel handling the units. Though the text for a new section 5.5.3 could not be agreed during the last biennium, many experts expressed general support for the approach.

2. The issue was discussed again on the basis of several documents presented during the thirty-fifth session of the Sub-Committee in June 2009 (see ST/SG/AC.10/C.3/2009/23 (Germany and United Kingdom), informal document INF.26 (Netherlands) and informal document INF.48 (Switzerland)), but text was not adopted. The experts from United Kingdom, Netherlands and Germany have prepared the new document taking into consideration the previous discussions.

¹ In accordance with the programme of work of the Sub-Committee for 2009-2010 approved by the Committee at its fourth session (refer to ST/SG/AC.10/C.3/68, para. 118 (d) and ST/SG/AC.10/36, para. 14).

3. The proposals' intention is a clear differentiation between substances transported as consignment of dangerous goods and substances that are added to other cargo for cooling and conditioning purposes. In the latter case, this other cargo may consist of dangerous goods as well as of non dangerous goods. Especially if coolants and conditioners are added to non dangerous goods (e.g. food) the personnel usually is unfamiliar with dangerous goods regulations or unaccustomed to handling dangerous goods. Therefore any text relevant to dangerous goods used for cooling and conditioning purposes during transport should be summarised in a single section in order to have the possibility to provide the personnel in a simple way with the relevant provisions, means by a copy of section 5.5.3. As a consequence, the text for the new section 5.5.3 has been drafted comprehensively, including some explanatory text.
4. The UN number respectively the proper shipping name on the marking of CTUs and on the documentation should be supplemented by the words "AS COOLANT" or "AS CONDITIONER", as appropriate, in order to clarify that the cooling or conditioning substances are not the transported cargo. This is in particular important for sea mode, as the documentation is used as the basis for the stowage and segregation planning.
5. As the scope and application of the UN Model Regulations is laid down in section 1.1.1 it is suggested to incorporating a new section 1.1.1.7 "Transport of dangerous goods used as a coolant or conditioner" and limit the scope to asphyxiant dangerous goods. The definition of asphyxiant is copied from 2.2.2.1. Substances known to be used as coolants are dry ice (UN 1845) or nitrogen, refrigerated liquid (UN 1977) or argon, refrigerated liquid (UN 1951), further dangerous goods may be used as well, but the scope should be limited to substances with a risk of asphyxiation, which is also pictured in the proposed warning mark.
6. The packing instructions P620, P650, P800, P904 and P901 contain requirements for packages containing UN 1845 or 1977 for cooling purposes. But it is also possible that dangerous goods assigned to other packing instructions are cooled or conditioned by addition of such substances. Equivalent requirements are needed for these other packages, too, in particular to ensure that the package is capable of withstanding the low temperatures and is not weakened by the coolant or conditioner and that measures are taken to prevent a build-up of pressure. Furthermore the dangerous goods should be packed in such a way to prevent movement after the dissipation of any coolant or conditioner. Appropriate text can be found in the proposed new subsection 5.5.3.2.2.
7. There was a discussion if the transport of dry ice in unpackaged form is allowed as there is no BK entry in column 13 for any of the mentioned substances (UN 1845, UN 1977 and UN 1951). Unpacked dry ice has a temperature of -78.5°C. When the dry ice comes into direct contact with the structure of a standard freight container, it will render the material brittle and impair the structural safety of the container. Therefore, bulk transport of dry ice should not be authorized. Nevertheless, the use of UN 1845 (dry ice) as a coolant for other goods loaded in the container seems acceptable if appropriate measures are taken to avoid a negative impact on the container. An appropriate measure would be insulation e.g. by planks with a thickness of at least 30 mm.
8. As the requirements of SP297 have been incorporated in the proposed 5.5.3, SP297 has to be deleted.
9. According to special provisions SP319 and SP219 in Chapter 3.3, substances packed and marked in accordance with packing instruction P650 or P904 are not subject to any other requirements in the Regulations. Therefore it has to be decided whether:
 - a) This exemption should be maintained; or

b) The provisions of 5.5.3 should apply additionally to substances packed and marked in accordance with packing instruction P650 or P904.

The authors of the document could not agree on a unanimous opinion on this question and decided to request for a decision of the Sub-Committee.

If the experts of the Sub-Committee are in favor to keep the existing exemption, the marking requirements of P650 or P904 should be aligned with the proposed 5.5.3.3 and an additional requirement that packages containing a coolant or conditioner shall be transported in well ventilated cargo transport units should be included. Appropriate text has been included in the proposal below, but the amendment has been put in square brackets.

If the experts of the Sub-Committee are of the opinion that the proposed requirements in 5.5.3 - in particular with regard to the marking and ventilation of CTUs and information included in a transport document - should be applicable to P650 and P904 packagings, too, a reference to the new section has to be incorporated in P650 or P904 to clarify, that the provisions of 5.5.3 apply additionally.

10. Apart from dangerous goods, ice is used as coolant as well. As it is not a dangerous good it should not be regulated by 5.5.3, but nevertheless the use of ice in a packaging can impact the integrity of the package. P620, P650, P800 and P904 contain provisions on the use of ice, but as it may be used as well in other types of packages, a general provision should be included in part 4.

11. Below are revised proposals from the experts from Germany, Netherlands and the United Kingdom for consideration by the Sub-Committee.

Proposal

12. The following new section 5.5.3 should be included in Chapter 5.5 of the Model Regulations:

"5.5.3 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))"

Note: This section is not applicable to substances transported as a consignment of dangerous goods. When they are transported as a consignment 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 Dangerous goods used for cooling or conditioning in portable tanks during transport are not subject to these Regulations.

5.5.3.1.2 Cargo transport units containing substances used for cooling or conditioning purposes (other than fumigation) during transport are not subject to any provisions of these Regulations other than those of this section.

5.5.3.1.3 When dangerous goods are loaded in cooled or conditioned cargo transport units any provisions of these Regulations relevant 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 Packaged dangerous goods requiring cooling or conditioning assigned to Packing Instructions P203, P620, P650, P800, P901 or P904 shall meet the appropriate requirements of that Packing Instruction.

5.5.3.2.2 For packaged dangerous goods assigned to other Packing Instructions the packages shall be capable of withstanding very low temperatures and shall not be affected or significantly weakened by the coolant or conditioner. Packages shall be designed and constructed to permit the release of gas to prevent a build-up of pressure that could rupture the packaging. The dangerous goods shall be packed in such a way to prevent movement after the dissipation of any coolant or conditioner.

5.5.3.2.3 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 Packages containing solid carbon dioxide (dry ice) used as a coolant shall be clearly marked with the words "WARNING - UN 1845 CARBON DIOXIDE SOLID (DRY ICE)". For packages containing other dangerous goods used for cooling or conditioning, the UN number preceded by the letters "UN" and the proper shipping name of these dangerous goods shall be marked on the package, in addition to the word "WARNING".

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.

5.5.3.4 Cargo transport units containing unpackaged dry ice

5.5.3.4.1 If dry ice in unpackaged form is used, 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 by providing a minimum of 30 mm separation (e.g. by using suitable low heat conducting materials such as timber planks, pallets etc).

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

5.5.3.5 Marking of cargo transport units

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 5.5.3.5.2 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 warning mark shall include:

- (a) The word "WARNING" in red or white with lettering not less than 25 mm high; and

(b) The UN number preceded by the letters UN followed by the words "AS COOLANT" or "AS CONDITIONER" as appropriate shall be shown below the symbol in black letters on a white background with lettering not less than 25 mm high.

For example: UN 1845 AS COOLANT
[UN XXXX AS CONDITIONER]

An illustration of this mark is given in Figure 5.5.2

Figure 5.5.2



*insert UN number preceded by the letters UN followed by the words "AS COOLANT" or "AS CONDITIONER" as appropriate

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 that have been cooled or conditioned and have not been completely ventilated before transport shall include the following information:

- (a) The UN number preceded by the letters "UN"; and
- (b) The proper shipping name followed by the words "AS COOLANT" or "AS CONDITIONER" as appropriate.

For example: UN 1845, CARBON DIOXIDE (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

13. Insert a new 1.1.1.7 as follows:

"1.1.1.7 Transport of dangerous goods used as a coolant or conditioner

Dangerous goods, that are asphyxiant (which dilute or replace the oxygen normally in the atmosphere) only, when used in cargo transport units for cooling or conditioning purposes are only subject to the provisions of section 5.5.3."

14. Insert a new 4.1.1.11 as follows:

"4.1.1.11 Where ice is used as a coolant it shall not affect the integrity of the packaging."

15. In the Dangerous Goods List, for UN 1845 delete "297" in column 6 and delete Special provision 297 in chapter 3.3.

16. Amend P650 as follows:

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

(a) When dry ice or liquid nitrogen is used as a coolant, 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 and the package (the outer packaging or the overpack) shall be marked [with the words "WARNING - UN 1845 CARBON DIOXIDE SOLID (DRY ICE)"]."

Add a second sentence at the end of the additional requirement:

["Packages containing a coolant or conditioner shall be transported in well ventilated cargo transport units."] [The requirements of 5.5.3 shall also apply.]

17. 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 as a coolant 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 and the package (the outer packaging or the overpack) shall be marked [with the words "WARNING - UN 1845 CARBON DIOXIDE SOLID (DRY ICE)"].

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.

["Packages containing a coolant or conditioner shall be transported in well ventilated cargo transport units."] [The requirements of 5.5.3 shall also apply.]"