



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 3 of the provisional agenda

Listing, classification and packing

Refrigerating machines or heating machines

Transmitted by the expert from Germany*

I. Introduction

1. Refrigerating machines transported under UN Nos. 2857 or 3358 may be fully exempted from the dangerous goods regulations if they comply with the requirements of special provision 119 or 291. Heat pumps work on exactly the same principle as refrigerating machines, except that in this case it is not the aim to produce cold but, as the name suggests, heat. Therefore, it would be logically to apply the same transport conditions to these articles since the hazards during transport are identical.

II. Discussion

2. Documents addressing this issue have already been submitted to the RID/ADR/ADN Joint Meeting on its autumn 2021 session by the International Association of Dangerous Goods Safety Advisors (IASA) (see document ECE/TRANS/WP.15/AC.1/2021/25 and informal document INF.45 of the March 2021 session). The discussion at that session of the RID/ADR/ADN Joint Meeting led to the adoption of amendments to special provision 119 and 291 in RID, ADR and ADN for entry into force on 1 January 2023 (see document ECE/TRANS/WP.15/AC.1/162).

3. At the sixty-first session of the Sub-Committee an informal document INF.34 was submitted proposing similar amendments to special provisions 191 and 291 in chapter 3.3 of the *Model Regulations*. While the proposal received general support, a preference for the introduction of a new UN number with a proper shipping name as well as corresponding special provisions was expressed to address this issue in the *Model Regulations*.

4. The discussion was continued at the sixty-third session on the basis of document ST/SG/AC.10/C.3/2023/38 and it showed a general preference for the integration of heat pumps into the existing UN entries instead of the introduction of new UN entries. However,

* A/78/6 (Sect. 20), table 20.5

different views were presented. Among others, it was suggested to introduce new proper shipping names or to modify the existing entry into “machines containing refrigerating gas”.

5. During the discussion of informal document INF.25 by the Netherlands, the idea of the incorporation of heat pumps under a more generic UN number of “machines containing refrigerating gas” was expanded to include magnetic resonance imaging (MRI) scanners. The experts from Germany and the Netherlands volunteered to join their efforts to work on a more generic entry for “machines containing refrigerating gas”.

6. Since the last session of the Sub-Committee, the experts from Germany and the Netherlands took a closer look at ways in which to join their efforts to include heat pumps and MRI scanners under a modified UN entry of “machines containing refrigerating gas”. The analysis of both machines first of all showed that different refrigerating machines and heat pumps can contain gases of either division 2.2 or 2.1 as opposed to MRI scanners which contain refrigerating gases of division 2.2 exclusively. In addition, there were fundamental technical differences to be considered. While refrigerating machines and heat pumps use the refrigerating gas in a refrigerating cycle (refrigerating system) to perform heating and cooling functions, MRI scanners are not equipped with a refrigerating system and the refrigerating gas (helium) is only used as a coolant. In the light of these differences the experts from Germany and the Netherlands decided to work on separate proposals that more adequately reflect these technical differences.

7. The following proposals intend to integrate heat pumps by introducing a new proper shipping name under the UN entries for refrigerating machines. Most notably, it is proposed to introduce “HEATING MACHINES” instead of “HEAT PUMPS” as the new proper shipping name in UN 2857 and UN 3358 to ensure that all “heat pumps” available on the market are included.

8. The proposed amendments to special provision 119 were guided by a variety of different aspects. First of all, the description of heating machines should be aligned with that of refrigerating machines to provide overall consistency. Therefore, heating machines are described according to their specific design purpose of producing heat. Furthermore, special provision 119 should also recognize existing machines on the market that can perform both heating and cooling functions by allowing these machines to be transported either under REFRIGERATING MACHINES or HEATING MACHINES. Taking into account that “heat pumps” are currently transported under REFRIGERATING MACHINES the inclusion of a note at the end of the special provision aims at limiting the effects on existing transport practices.

9. While the proposed amendments to special provision 291 are less elaborate, these amendments ensure that heating machines with flammable refrigerating gases of division 2.1 conform with those safety requirements applied to refrigerating machines currently transported under UN 3358. In contrast to special provision 119, special provision 291 requires that the flammable liquefied gas is contained during normal transport conditions by adequate design and testing of their components. However, this proposal is open to reducing the overall amount of flammable gas permitted under UN 3358 and special provision 291 to reflect possible safety concerns from an increase in transport volume.

10. In addition, this working document supports sustainable development goal 13 (climate action) as heating machines can provide an energy-efficient and eco-friendly form of heating by reducing carbon dioxide emissions.

III. Proposal

11. Amend the Dangerous Goods List in chapter 3.2 as follows (new text is underlined):

UN No.	Name and description	Class or division	Subsidiary hazard	UN packing group	Special provisions	Limited and excepted quantities		Packagings and IBCs		Portable tanks and bulk containers	
						(7a)	(7b)	Packing instruction	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
2857	REFRIGERATING MACHINES <u>or HEATING MACHINES</u> containing non-flammable, non-toxic, gases or ammonia solutions (UN 2672)	2.2			119	0	E0	P003	PP32		
3358	REFRIGERATING MACHINES <u>or HEATING MACHINES</u> containing non-flammable, non-toxic, gases or ammonia solution (UN 2672)	2.1			291	0	E0	P003	PP32		

12. Amend special provisions 119 and 291 in chapter 3.3 as follows (deleted text is ~~stricken through~~, new text is underlined):

“119 Refrigerating machines include machines or other appliances which have been designed for the specific purpose of keeping food or other items at a low temperature in an internal compartment, and air conditioning units. Heating machines include machines or other appliances which have been designed for the specific purpose of heating. Refrigerating or heating machines and ~~refrigerating machine~~ their components are not subject to these Regulations if they contain less than 12 kg of gas in Division 2.2 or less than 12 litres ammonia solution (UN 2672). Machines or other appliances that are used to perform heating and cooling functions may be transported either under REFRIGERATING MACHINES or HEATING MACHINES.”

NOTE: Heating machines which until now have been transported under REFRIGERATING MACHINES may continue to be transported under this proper shipping name.”

“291 Flammable liquified gases shall be contained within refrigerating or heating machine components. These components shall be designed and tested to at least three times the working pressure of the machinery. ~~The r~~ Refrigerating or heating machines shall be designed and constructed to contain the liquified gas and preclude the risk of bursting or cracking of the pressure retaining components during normal conditions of transport. Refrigerating or heating machines and ~~refrigerating machine~~ their components are considered not subject to these Regulations if they contain less than 12 kg of gas.”

13. Add the following new entries to the alphabetical index of substances and articles:

HEATING MACHINES containing non-flammable, non-toxic, gases or ammonia solutions (UN 2672)	2.2	2857
HEATING MACHINES containing, flammable, non-toxic, liquified gas	2.1	3358