



**Committee of Experts on the Transport of Dangerous Goods
and on the Global Harmonized System of Classification
and Labelling of Chemicals****Sub-Committee of Experts on the Transport of Dangerous Goods****Forty-first session**

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Item 3 (a) of the provisional agenda

Listing, classification and packaging:**proposals of amendments to the list of dangerous goods of Chapter 3.2****Introduction of a new entry for ammonia dispensers or
cartridges for ammonia dispensers****Transmitted by the expert from France¹****Introduction**

1. The expert from France has been informed by several automobile equipment manufacturers that a new technology for the prevention of nitrous oxide emissions, based on the generation of anhydrous ammonia, is to be put on the market. The new technology has many advantages in terms of pollution prevention.

2. The new technology utilizes the property, found in certain salts, of absorbing anhydrous ammonia and subsequently rendering it when exposed to a sufficient rise in temperature. The intention is to install cartridges containing such substances in vehicle exhaust systems. When the ammonia dispenser is activated by an increase in temperature, ammonia is released into the exhaust system, thereby reducing nitrous oxide emissions.

3. The most commonly used salt is strontium chloride. Once ammonia has been absorbed into the salt, the resulting product is marketed under the trade name “AdAmmine”. Tests carried out on it by the French National Institute for Environmental Technology and Hazards (INERIS) (an independent French body) have shown the following hazardous properties for the product, once it has absorbed ammonia:

- The solid is hazardous for the aquatic environment (Class 9).

¹ In accordance with the Sub-Committee’s programme of work for 2011–2012, adopted by the Committee at its fifth session (see ST/SG/AC.10/C.3/76, para. 116, and ST/SG/AC.10/38, para. 16).

- The solid is water-reactive; it releases ammonia upon contact with water, in a quantity equivalent to those of packing group III for Class 4.3 (this hazard is not reflected, however, in the classes used for regulating the carriage of dangerous goods, since no flammable gas is released). It was also noted that ammonia is released only when the amount of water is small; being soluble, ammonia dissolves when there is an excessive amount of water and is no longer released.
 - At normal temperatures the substance does not release ammonia.
4. The property of ammonia being released upon an increase in temperature is not assigned to a given class, but it should be noted that one substance currently assigned to Class 9 — UN No. 1841 ACETALDEHYDE AMMONIA — possesses similar properties.
5. It is not the salt containing ammonia that is to be carried, but the cartridges containing the salt, or ammonia dispensing systems, which may contain several cartridges. The cartridges are built to high strength standards, since they are to be installed in vehicle exhaust systems and generate pressurized gas at high temperatures. The properties of the substance itself are therefore unlikely to come into play, since the high strength of the cartridge ensures that it is contained. However, the risk of ammonia being generated inside the cartridge by an increase in temperature must be addressed in a specific manner.
6. These systems are intended for installation on diesel passenger vehicles and heavy goods vehicles, and are therefore likely to be produced in quantities of several million units a year. The cartridges should clean a vehicle's emissions for approximately 20,000 km, and can be recharged. While the recyclable aspect of the system is good for the environment, it entails additional transport requirements.
7. It is proposed that these ammonia dispensing systems and cartridges should be dealt with specifically as an article. The following proposal is submitted to the Sub-Committee for its opinion and for subsequent adoption.

II. Proposal

8. Add a new entry 3XXX to the list of dangerous goods, as follows:

UN No.	Name and description	Class or division	Subsidiary risk	UN packing group	Special provisions	Limited and excepted quantities		Packaging and IBCs		Portable tanks and bulk containers	
						(6)	(7a)	(7b)	(8)	(9)	(10)
3XXX	CARTRIDGE FOR AMMONIA DISPENSERS (heat-activated) or AMMONIA DISPENSER (heat-activated)	9				1 kg	E0	P003	xxx		

9. Add a new special provision to Chapter 3.3, as follows:

“xxx This entry applies to ammonia dispensers containing anhydrous ammonia absorbed in a solid material, for which ammonia generation is activated by an increase in temperature.

The substance absorbing the anhydrous ammonia must be contained in high-strength cartridges made of metal or a composite material, which shall meet the following requirements:

- (a) The cartridges and their means of closure shall be hermetically sealed and shall be able to contain the generated ammonia;
- (b) Each cartridge shall be able to withstand pressure equal to twice the pressure generated at 55° C, with deformation no greater than 0.1%;
- (c) Each cartridge shall be able to withstand pressure of 20 bar without leakage; and
- (d) Each cartridge shall be fitted with a device that allows for gas evacuation once pressure exceeds 20 bar without violent rupture, explosion or projection.

When carried in an ammonia dispenser, the cartridges shall be connected to the dispenser in such a way that the assembly is guaranteed to have the same strength as a single cartridge.

The properties of mechanical strength mentioned in this special provision shall be tested using a prototype of a cartridge and/or dispenser filled to nominal capacity, by increasing the temperature until the specified pressures are reached.

The test results shall be documented, shall be traceable and shall be communicated to the relevant authorities upon request.”

III. Justification

10. The fact that these articles are likely to be carried in large quantities justifies this new entry 3XXX, which addresses specific safety concerns associated with the generation of ammonia above a certain temperature.

11. The special provision sets out requirements for withstanding pressure that guarantee greater mechanical strength than that of the packaging generally used for the carriage of dangerous goods. It is therefore considered unnecessary to provide for further mechanical tests.

12. Given that the articles are built to greater strength than the packagings tested in accordance with Chapter 6.1, packing instruction P003 would appear to be sufficient.

13. Addressing the specific risk associated with heat activation means that operators are warned of the actual risks that exist during carriage of the article and, for modes of transport where this is of particular importance (maritime carriage), means that appropriate measures can be taken to keep the article away from sources of heat.