



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 4 (f) of the provisional agenda

Electric storage systems:

Miscellaneous

Electric power generation and storage systems installed in cargo transport units

Transmitted by the expert from Switzerland*

I. Introduction

1. UN No. 3536, LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT, has been created to take account of new products available on the market. It applies to energy storage systems designed solely to supply energy outside the cargo transport unit.
2. There are also solutions that combine a generation system and a storage system in a single cargo transport unit. When these hybrid systems contain two dangerous goods of different hazard classes, it is not easy to determine the primary hazard or the classification and conditions of carriage.
3. Switzerland presents two examples of hybrid systems installed in trailers, below. It wishes to discuss the best way to classify these cargo transport units and determine whether the current provisions are sufficient to do so.

II. Lithium-ion batteries and combustion machinery containing diesel

4. The cargo transport unit is designed to supply power to the local electricity distribution network when maintenance work is being carried out on it. It contains several lithium-ion batteries with a total capacity of 60 kWh and a diesel-powered generator with a 120-litre fuel tank. When needed, the generator produces electricity and recharges the batteries, ensuring a longer life.¹
5. At first glance, it seems appropriate to classify this equipment under UN No. 3536, since its main use is to supply electricity outside the cargo transport unit by means of lithium

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

¹ Illustrations and further information can be found at <https://www.hnea.ch/en>.



batteries. However, special provision 363 of Chapter 3.3 states that “dangerous goods not necessary for the safe and proper operation of the cargo transport unit shall not be carried within the cargo transport unit”. It is not clear whether the equipment containing diesel can be considered necessary for the operation of the unit.

6. Another possible classification is UN No. 3528, MACHINERY, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED. Special provision 363 corresponding to this number states that “engines or machinery may contain other dangerous goods than fuels required for their functioning or safe operation without being subject to any additional requirements for these other dangerous goods, unless otherwise specified in these Regulations”. In this case, lithium batteries must only meet the requirements of 2.9.4. However, lithium batteries are not actually required for the functioning of the diesel-powered generator.

7. This shows how difficult it is to classify this type of cargo transport unit. The principle of special provision 388, according to which hybrid electric vehicles should be assigned to UN No. 3166, VEHICLE, FLAMMABLE GAS POWERED, or UN No. 3166, VEHICLE, FLAMMABLE LIQUID POWERED, is a good starting point, as the choice of entry should be based on the major hazard and not on the use of the equipment. However, the total capacity of lithium batteries and the quantity of flammable liquid must also be taken into account when assessing hazards.

8. Lastly, an entry should be used to indicate the presence of both dangerous goods, so that the combined effect of the two hazards can be taken into account. This does not seem possible under the current UN Model Regulations.

III. Lithium-ion batteries and fuel cell machinery containing hydrogen

9. The cargo transport unit is also used to provide electric power outside the transport unit, but the electricity is generated from a fuel cell containing hydrogen. The cargo transport unit also contains a lithium-ion battery for storing excess electricity.² There are currently several models available. One model, for example, has a built-in tank for 16 kg of hydrogen at a pressure of 700 bar and a battery capacity of 15 kWh.

10. In this case, it seems clear that the hydrogen contained in the tank represents the major hazard. The equipment could be classified under UN No. 3529, MACHINERY, FUEL CELL, FLAMMABLE GAS POWERED, and the lithium battery partially exempted under special provision 363. However, the battery is not actually required for the functioning of the fuel cell.

IV. Discussion

11. Switzerland invites participants in the Subcommittee of Experts on the Transport of Dangerous Goods to indicate how these two types of cargo transport units would be classified in their country and whether partial exemptions apply depending on the mode of transport concerned. Additional examples are welcome.

12. The ensuing discussion should make it possible to determine whether the current provisions of the UN Model Regulations sufficiently cover these cases or whether new provisions need to be introduced.

13. Clarifying the provisions applicable to electric power generation and storage systems installed in cargo transport units contributes to Sustainable Development Goal 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all). The development of more environmentally-friendly energy solutions is a way of pursuing Goal 3 (Ensure healthy lives and promote well-being for all at all ages).

² Illustrations and further information can be found at <https://www.ruag.ch/en/autonomy-and-sustainability>.