

# UN/SCETDG/21/INF.56

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## 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

(Twenty-first session, 1-10 July 2002,  
agenda item 8)

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

### Comments on UN/SCETDG/21/INF.35 - Hydrogen storage systems for fuel cell applications

#### Transmitted by the experts from the United States of America

1. The experts from the United States supports the initiative by the expert from Canada to enlighten the Sub-Committee on the need to introduce requirements for metal hydride fuel cells in the Model Regulations. We support the general principles outlined in Canada's proposal and offer the following comments for consideration by the Sub-Committee:

a. The new entry (or entries) for a hydrogen and metal hydride mixture (under pressure) is necessary to highlight the need for using a properly designed cylinder to prevent localized overpressure in the cylinder walls that may result in a catastrophic failure of the cylinder (burst). Existing cylinder requirements for hydrogen do not address this safety concern. At the moment no consensus performance (or specification) standard is available to address this safety issue. Therefore, it is best to leave it up to the competent authority for the time being to approve the design and packaging for metal hydride fuel cells.

b. Hydrogen storage systems for fuel cell applications comprise hydrogen and metal hydride stored in a cylinder under pressure. The systems are constructed by charging hydrogen into a cylinder that contains metal or metal alloy powders. Metal hydride is formed in the cylinder. During the charging and discharging process the metal hydride expands and contracts rapidly causing localized overpressure. This cycling has the potential to locally weaken the cylinder due to the fact that hydrogen can not be released from the metal hydride quickly and smoothly through the cylinder relief device. Currently, several proprietary design features are being used to eliminate or minimize this safety concern.

c. Although the fuel cell technology is not new the commercial use of fuel cells comprising hydrogen storage systems and the need to transport the hydrogen storage systems alone is gaining momentum. At this juncture it is wise to choose a more generic proper shipping name to avoid the need of frequent changes in the future.

d. We do not feel that there is a need for the subsidiary risk of 4.1 or 4.3 proposed by Canada because in such a storage system the hazard of metal hydride is not a safety issue since the metal powder is adequately contained. In case of an accident, when the hydrogen is released, the metal hydride mostly would be converted into metals which may not have the 4.1 or 4.3 hazard. If the Sub-Committee deems that it is necessary to have a subsidiary risk hazard assignment it may be more appropriate to consider a "4.2 Pyrophoric" subsidiary hazard. However, the expert from the United States would prefer that no subsidiary hazard communication be required for these fuel cells.

e. We suggest creation of only two new entries:

3AAA HYDROGEN AND METAL HYDRIDE, MIXTURE, in a metal hydride storage system, Div. 2.1

3BBB HYDROGEN AND METAL HYDRIDE, MIXTURE, IN EQUIPMENT, in a metal hydride storage system, Div. 2.1

For the present time the packaging assignment should be P099.

- f. We believe that it would be useful to introduce an entry for Hydrogen and metal hydride storage systems in the Model Regulations during this biennium. We have already issued competent authority approvals for these storage systems and believe that it would be useful for competent authorities to have an appropriate entry and UN number to reference in approvals to avoid unnecessary burdens on shippers, users and storage system manufacturers when different shipping descriptions are specified by competent authorities in various countries.

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