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**Economic Commission for Europe****Inland Transport Committee****Working Party on the Transport of Dangerous Goods****113th session**

Geneva, 15-19 May 2023

Item 5 (a) of the provisional agenda

**Proposals for amendments to annexes A and B of ADR:  
construction and approval of vehicles****Section 9.2.2.8 – Battery master switch****Transmitted by the Government of the Netherlands on behalf of the  
informal working group on electrified vehicles\****Summary*

<b>Executive summary:</b>	Electrified vehicles require different measures to de-energize the electrical systems than vehicles with internal combustion engines. To reflect this, a revised wording is proposed for 9.2.2.8.
<b>Action to be taken:</b>	Amend ADR 9.2.2.8.
<b>Related documents:</b>	Informal document INF.16 from the 109 <sup>th</sup> session, informal documents INF.14 and INF.20 from the 110 <sup>th</sup> session, document ECE/TRANS/WP.15/2022/5 and informal documents INF.12, INF.14, INF.18 and INF.23 from the 111 <sup>th</sup> session and informal document INF.6 from the 112 <sup>th</sup> session.

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\* A/77/6 (Sect. 20), table 20.6

## Introduction

1. Discussions on safety of battery electric vehicles for category FL are ongoing. The two major topics for discussion are on the Rechargeable Electrical Energy Storage System (REESS) and the safety in zones where explosive atmospheres may occur. The last topic has led to a text reproduced below that is felt ready for adoption. For more details on the background of these amended wording please read the justification section.

## Proposal

2. Replace the existing text of 9.2.2.8 by the text reproduced below:

**“9.2.2.8     *De-energizing electrical circuits***

*NOTE: The feature shall only be used when the vehicle is in standstill.*

9.2.2.8.1     Features to enable the de-energization of the electrical circuits for all voltage levels shall be placed as close to the energy sources as practicable. In the case the feature interrupts only one lead from the energy source, it shall interrupt the supply lead.

9.2.2.8.2     A control device to facilitate the de-energizing shall be installed in the driver's cab. It shall be readily accessible to the driver and be distinctively marked. It shall be protected against inadvertent operation either by adding a protective cover, by using a dual movement control device or by other suitable means. Additional control devices may be installed provided they are distinctively marked and protected against inadvertent operation. If the control devices are electrically operated, the circuits of the control devices are subject to the requirements of 9.2.2.9.

9.2.2.8.3     The de-energization shall be completed within 30 seconds after the activation of the control device.

9.2.2.8.4     The feature shall be installed in such a way that protection IP65 in accordance with IEC 60529 is complied with.

9.2.2.8.5     *Cable connections on the feature*

Systems with a voltage that exceed 25 V A.C. or 60 V D.C. and systems under the scope of UN Regulation No. 100, shall comply with the requirements of the said regulation.

Systems with a voltage up to 25 V A.C. or 60 V D.C. shall have a protection degree IP 54 in accordance with IEC 60529. However, this does not apply if these connections are contained in a housing which may be the battery box. In the case it is sufficient to insulate the connections against short circuits, for example by a rubber cap.”

## Justification

3. To de-activate electrical circuits takes a certain period of time so that all energy is properly released from the components. This de-activation is expected to be possible within 30 seconds but certainly not within the 10 seconds now mentioned in 9.2.2.8.3 in ADR 2023.

4. Subsection 9.2.2.8 is seen as a measure to provide safety in an area where an explosive atmosphere may occur. These situations in particular occur when filling or discharging the (load) tank of the vehicle with flammable substances. Spilled flammable substances may create an explosive atmosphere that can be ignited by a hot surface or sparks, for example by electric conductors or components.

5. When providing safety in an explosive atmosphere the de-energizing of the electrical system is to be done in a controlled way as described above. It is felt that 30 seconds is an appropriate period as the driver will stop the vehicle at the filling point, uses the control device and steps out of the vehicle to start to connect filling or discharge connections. This

will take at least 30 seconds in which the system is de-energized. In the future a longer period may be needed to shut down a hydrogen fuel cell.

6. In previous reports from the informal working group it was suggested to have separate sections for the battery master switch function for high and low voltage. However, certainly at this stage of vehicle development, electric vehicles are equipped with both high and low voltage systems, where in some cases the low voltage system controls the high voltage (drive) system. For this reason, it was felt beneficial to have one single section.

7. It was decided to strive for design neutral descriptions. For this reason, the wording “switch” is replaced by “feature” to indicate that it may be any system that will give the required effect. To reflect also that more than one power source may be applied (high voltage-low voltage batteries) this also includes hydrogen fuel cells and solar panels that are installed on trucks. As far as possible common wording is used for all systems but where necessary differences are made between high and low voltage based on their hazards.

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