Alternative Approach to UN R13 Type-IIA for Battery Electric Vehicles

OICA – CLEPA
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**Technical background**

UN R13 - Type-II and IIA tests

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**Type-II**

**Downhill Behaviour Test**

- **Scope**
  - M3 and N3
  - Except vehicles submitted to Type-IIA

- **Service brake**: no restriction

- **Pass criteria**: Hot-stop performance after Type-II
  - N3: 3.3 m/s²
  - M3: 3.75 m/s²

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**Type-IIA**

**Endurance Braking Performance Test**

- **Scope**
  - M3 class II, III & B
  - N3 ADR and/or authorized to tow cat. O4

- **Service brake**: prohibited

- **Pass criteria**: Average speed of 30km/h (+/- 5 km/h)
2.21.4. “Electrical state of charge” means the instantaneous ratio of electric quantity of energy stored in the traction battery relative to the maximum quantity of electric energy which could be stored in this battery;
Technical background
Description of the issue

General:
UN R13 Type-IIA test is not adapted to Battery Electric vehicles (BEV) technology.

Technical issue:
- Technical Services requires Type-IIA to be conducted with a **fully charged** traction battery (i.e. the worst case).
- In these conditions:
  - The kinetic energy of the vehicle cannot be converted and stored in the traction battery,
  - No endurance braking is available.
  - **Type-IIA cannot be passed** without complex technical solutions highly impacting weight, packaging and cost, e.g. resistors and high-temp cooling system, extra batteries.

  ➔ **Such solutions kill the economical interest of BEV technology.**

An alternative approach is needed for BEVs
Alternative to Type IIA

**Principles**

* M3 class II, III & B + N3 ADR and/or authorized to tow cat. O4, equipped with an ERB system of cat A or B

**Current way**

- **Type-IIA**
  - $30 \pm 5 \text{km/h}$
  - $100\%$

**Alternative approach**

- **Type-II**
  - $30 \pm 5 \text{km/h}$
  - $100\%$

- **Type-IIA**
  - $30 \pm 5 \text{km/h}$
  - $<100\%$

**Brake estimator**

Warn the driver if performance is below Type-II hot-stop requirements:

- $N3 = 3.3 \text{ m/s}^2$
- $M3 = 3.75 \text{ m/s}^2$

No change for vehicles not equipped with an ERB system