

**Comments and proposals on ECE/TRANS/WP.29/GRSG/2014/19  
(UN Regulation No. 107 on M<sub>2</sub> and M<sub>3</sub> vehicles)**

The text reproduced below includes comments and proposals made by expert from the Russian Federation, in regards to modification of additional safety prescriptions for trolleybuses introduced in the document ECE/TRANS/WP.29/GRSG/2014/19. The comments refer to the underlined text of the document.

1.3.2. Trolleybuses may be designed for special environmental conditions, which exceed the rated climatic conditions on the request of the type approval authority. Those special environmental conditions shall be indicated in the type-approval documentation (Annex 1, Part 1, Appendices 1 to 3) and certification (Annex 1, Part 2, Appendices 1 to 3).

**Comment:** *The type approval authority cannot prescribe climatic conditions.*

3.7. Electrical components energized at the line voltage shall have additional insulation from the vehicle connected to the line voltage shall have, in addition to their basic insulation, a supplementary insulation from the trolleybus body, the onboard power supply and signal interfaces. For protection of current conducting parts and metallized intermediate layers inside the passenger compartment or luggage compartment, the protection degree IPXXD shall be provided.

**Comment:** *Reference to protection degree standard shall be provided.*

For protection of current conducting parts and metallized intermediate layers in areas other than the passenger compartment or luggage compartment and not on the roof, the protection degree IPXXB shall be satisfied.

**Comment:** *Reference to protection degree standard shall be provided.*

3.7.1. They shall maintain their hydrophobic features over their lifetime. For this reason they shall be mounted with shelter from weather or be designed as umbrella insulators or insulators with drip edge or another methods having equivalent effect. Silicon as material or covering is recommended. In this case, the minimum creepage distance shall be 20 mm.

**Comment:** *Method for inspection hydrophobic features to be maintained over components lifetime shall be provided. Another methods having equivalent effect shall be allowed.*

With other materials or designs or mountings or extreme operation conditions, a greater creepage distance shall be chosen. Documentation of the layout is part of the approval.

**Comment:** *Method for inspection of documentation of the layout and its content shall be provided.*

3.10.12. The test voltage (U<sub>Test</sub>) for wiring and components at the trolleybus shall be:

$$\text{Basic Insulation: } U_{\text{Test}} = 2 \times U_{\text{Nm}} + 1,500 \text{ V}$$

$$\text{Supplementary Insulation: } U_{\text{Test}} = 1.6 \times U_{\text{Nm}} + 500 \text{ V}$$

**The values for basic and supplementary insulations may be reversed.**

**Comment:** *This statement shall be justified and explained.*

For circuits double insulated from overhead line voltage, the test voltage (U<sub>Test</sub>) shall be at least 1,500 V, or:

$$\text{Basic Insulation: } U_{\text{Test}} = 2 \times U_{\text{Nm}} + 1,000 \text{ V}$$

The equivalent DC test voltage is  $\sqrt{2}$  times the AC value.

**Components that have already been tested at their time of manufacture shall be excluded. The factory tests may be performed with the voltages or durations according to EN/IEC product standards.**

**Comment:** *It is not clear exactly what the components shall be excluded from. Recognition of factory tests could not be allowed in framework of the 1958 Geneva Agreement.*

4.3. On trolleybuses with no means of connection to the protective conductor of the fixed installation when stationary, all electrical equipment shall be double insulated. Any failure of either level of insulation shall be detectable either by procedure or by the use of monitoring devices.

*Comment: It is not clear exactly what “procedure” means. It can happen that it is out of the 1958 Geneva Agreement framework.*

The monitoring device, or at least the relevant optical and/or acoustic alarm device, if any, shall be mounted in a location to permit it to be easily visible or audible, as appropriate, to the driver”.

*Comment:*

*The trolleybuses shall be mandatory (but not optionally) equipped with an onboard device for permanent monitoring of body voltage or leakage current.*

*UN Regulation № 107 (see paragraph 4.2 of Annex 12) prescribes two independent protections from electric shock. One of them is a device, disconnecting the high voltage circuits from the source of power if the leakage current (or voltage on the body) exceeding the limit. This device is mandatory for both single and double insulation.*

*There are no any reasons to make this requirement optional, whereas:*

- *this requirement was work out on the base of the standard IEC 61140-97 “Protection against electric shock. Common aspects for installation and equipment” (see: part 4 “Main guidance for protective provisions against electrical hazard”, part 5 “Protective elements”, and paragraph 6.1 concerning protective from electric shock with assistance of automatically disconnect from the source of power);*

- *according to the part 5 of the standard IEC 61140-97 at the design of protective devices a special attention shall be drawn to external influence factors: temperature, climatic conditions, availability of water and contact of the humans with the ground;*

- *double insulation (even with increase resistance) cannot guarantee absence the leakage current (or voltage) on the body of trolleybus, especially at high humidity (for example, rain, snow with rain, tight fog) or application of road chemical reagents;*

- *reference to the standard IEC 61991:2000 (made in the document ECE/TRANS/WP.29/GRSG/2013/16) is not allowed, since this standard covers railway transport. Trolleybus body contrary to electrical train or tram is ungrounded, and can be subject to dangerous voltage at high humidity in spite of operable main and additional insulation.*

*Proposals:*

A. Taking into consideration the above, the paragraph 4.3 shall be read:

“4.3. The trolleybus ~~must~~ **shall** be equipped with an onboard device for permanent monitoring of leakage current or voltage between the chassis and the road surface.

The device shall **automatically** disconnect the high voltage circuits from the contact system (**when trolleybus is stationary**) if the leakage current exceeds 3 mA at a line voltage of 600 V DC, or if the leakage voltage exceeds 40 V.”

B. Following the above proposed wording of paragraph 4.3, paragraph 5.2.5 of Annex 12 should not be deleted.