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## **Proposal for amendments to document GRSG/2023/8 [Supplement 7 to the Original Version of UN Regulation No. 122 (Heating systems)]**

The text reproduced below was prepared by the expert from the Republic of Korea to adapt the proposal by the Republic of Korea (ECE/TRANS/WP.29/GRSG/2023/8) to introduce radiant warmer in the Regulation 122. The modifications are the outcome of a technical seminar on radiant warmer organised by the Republic of Korea and are marked in blue bold for new, blue strikethrough for characters deleted from Regulation 122 and bold blue strikethrough for characters deleted from the proposal GRSG/2023/8.

### **I. Proposal**

*Insert new paragraph 2.10., to read:*

**~~"2.10. "Radiation warmer" means a device that is mounted on the surface of the interior of the vehicle and transmits heat to the human body in the way which radiates heat without direct contact with the human body and without an intermediate medium."~~**

*Paragraph 6.1.1., amend to read:*

6.1.1. "Heating system" means any type of device which is designed to increase the temperature of the interior of a vehicle, including any load area **and/or the perceived temperature of occupants.**

*Paragraph 6.1.5., amend to read:*

"6.1.5. "Electric heater" means a device using electric energy from an on-board or external source to increase the temperature of the interior of the vehicle **and/or the perceived temperature of occupants.** Electrical devices which are installed in addition to the main heating system and whose main function is not to heat the interior of the vehicle are not considered as electric heaters according to this Regulation. For example, electric devices installed in components for the sole purpose of heating that component, **~~or a device that uses radiant heat to warm the human body, such as radiation warmer,~~** are not considered as electric heaters according to this Regulation."

*Paragraph 6.2., the specification: General, amend to read:*

"6.2. Specifications: General

The requirements for heating systems are that:

- The heated air entering the passenger compartment shall be no more polluted than the air at the point of inlet to the vehicle,
- The driver and passengers, during road use, will not be able to come into contact with part of parts of the vehicle or heated air liable to cause burns, **especially for radiation warmer, it must be turned off immediately if any part of the skin comes into contact with the surface of the radiation warmer,**
- The exhaust emissions from combustion heaters are within acceptable limits.

The test procedures for verification of each of these requirements are set out in Annexes 4, 5 and 6."

*Annex 5, Paragraph 2, amend to read:*

2. The surface temperature of any part of the heating system likely to come into contact with any ~~driver~~ **occupant** of the vehicle during normal road use shall be measured with a contact thermometer. No such part or parts shall exceed a temperature of 70°C for uncoated metal or 80°C for other materials **unless the manufacturer can show to the technical service in agreement with the type approval authority, that his safety concept covers for higher temperatures without the risk for occupants to get burns.**

## **II. Justification**

1. As part of a plan to respond to climate change such as carbon neutrality, the sales of electric vehicles are gradually increasing. However, electric vehicles, unlike internal combustion engine vehicles, have a structural problem that requires separate energy consumption to warm the interior of the vehicle since they have no heating source.

2. Currently, Positive Temperature Coefficient heater (PTC) or heat pump, which converts electric energy into a heat source to warm the air in the vehicle inside are mainly used as heating systems for electric vehicles. As a result, AER reduces sharply.

3. To overcome this problem, some automobile manufacturers and research institutes around the world are actively researching the application of radiant warmer as the way to increase heating energy efficiency, and it is shown that they are already achieving tangible results. To understand the benefit of this device, informal document GRSG-124-05 was introduced at the 124th GRSG session.

4. However, considering the characteristics of the radiant warmer, to achieve the best efficiency, the surface temperature of the device must be raised above a certain level. Therefore, in this way it is not possible to meet the non-metallic material limit temperature mentioned in annex 5 of this UN Regulation.

~~5. — Therefore, the above text proposes to exclude the radiation warmer, which is clearly helpful in increasing AER in an electric vehicle, from the category of the electric heater. Moreover, it introduces new a safety requirement to turn off the radiation warmer immediately if there is contact with the human body.~~

**5. Reflecting feedback from the 124th GRSG, the Radiant Warmer tech seminar was organised by the Republic of Korea to give interested GRSG experts the possibility to get knowledge and experience with such new heating concepts. It was recognised by the experts that the maximum surface temperature of radiant warmer could be increased above current thresholds from Regulation 122 without increasing the risk that the occupant gets burned. The underlying parameters (e.g. the heat transmission rate of the surface, material, etc.) cannot be exactly defined in the regulation and it was decided that the vehicle manufacturer - deciding to increase the surface temperature - has to show his safety concept that the risk for the occupant to get burned is not higher in comparison to a metal surface with a temperature of 70°C or a plastic one with 80°C. In conclusion, the modification of Annex 5 was included.**

**6. The experts also decided to amend the definition of heater systems in 6.1.1. to clarify that radiant warmer is covered by Regulation 122.**

**7. With the changes described in 5. and 6. above, the changes proposed by the Republic of Korea with GRSG/2023/8 are not anymore needed.**

8. Lastly, in addition to continuous efforts to improve the performance of electric vehicles, which are environmentally friendly, it is expected that this UN Regulation can be quickly amended to maximize energy efficiency by applying new technologies such as radiant warmer.