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Translation

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Heating, ventilation and air-conditioning in coaches

Ventilation, chauffage et climatisation des voitures

Lüftung, Heizung und Klimatisierung der Reisezugwagen



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Summary

"Climate control installations" include ventilation, heating and cooling equipment as well as, in some instances, devices to humidify/dehumidify the air. This term is also used in cases where no cooling, humidifying or dehumidifying equipment is provided.

This leaflet distinguishes between areas for use by passengers and ancillary areas.

Areas for passenger use may be either compartments or open saloons.

Ancillary areas include side corridors, entrance vestibules, sanitary facilities, catering facilities, baby changing rooms, staff rooms, telephone boxes, etc.

Different comfort standards apply for passenger accommodation and the various ancillary areas.

Key terms and definitions in respect of air treatment in railway vehicles are listed in Appendix A or the Glossary.

1 - Scope

1.1 - This leaflet lays down the conditions governing the climate control equipment fitted in seating, dining, couchette and sleeping cars (henceforth called coaches) authorised for unrestricted use in international traffic, irrespective of their design.

UIC Leaflet 553-1 sets out the tests and measurement procedures required or recommended for type testing climate control equipment.

1.2 - The provisions of this leaflet and *UIC Leaflet 553-1* shall also apply to climate control equipment fitted in:

- high speed vehicles as defined in *UIC Leaflet 660*,
- all passenger vehicles used in cross-border traffic.

1.3 - In addition to complying with the provisions of this leaflet, the design of climate control equipment on coaches shall take account of the k-value (heat transfer coefficient) and window transmission factor τ , described in *UIC Leaflet 567*.

2 - Equipment of coaches

2.1 - Coaches shall be fitted with climate control equipment that can run on electrical power from the train cable defined in *UIC Leaflet 552*.

2.2 - The permissible wattage drawn by coaches, including on-board climate control installations, is set out in *UIC Leaflet 550*.

2.3 - Coaches shall be fitted with heating and ventilation equipment capable of guaranteeing the comfort standards laid down in Appendix **B - page 14** for passenger accommodation and ancillary areas at the outdoor temperatures stipulated for the climate zones listed in Appendix **C - page 18**.

Coaches authorised for speeds of >160 km/h shall also be fitted with a cooling system.

3 - Performance of heating and cooling equipment

3.1 - Depending on the conditions governing the use of a coach, the performance of its heating and cooling equipment shall be compatible with the three climate zones defined in Appendix **C** - page 18.

3.2 - Passenger areas shall be supplied with the volumes of fresh air per seat or berth stipulated in Appendix **H** - page 23 depending on the outside temperature but irrespective of speed.

3.3 - Heating equipment

3.3.1 - Pre-heating

At an outside temperature of 0°C and with the coach at a standstill, a minimum ambient temperature of +18°C shall be attained within a period of not more than 70 minutes in all areas reserved for the use of passengers, irrespective of the setting of the different temperature regulators.

3.3.2 - Normal operation

At maximum permissible speed, the minimum outside temperature for the selected climate zone from Appendix **C** and the specified rate of fresh air intake, a mean ambient temperature of 22°C shall be maintained in all passenger areas (Lighting = 0, Occupation level = 0, Solar heating equivalent = 0).

3.4 - Cooling equipment

3.4.1 - Pre-cooling

Under the outdoor conditions described in point **3.1** and with the individual temperature regulators at the lowest setting, an ambient temperature of no more than 2 K above the theoretical mean ambient temperature shall be attained within a period of 100 minutes in all passenger areas in coaches at a standstill.

3.4.2 - Normal operation

With the coach at a standstill (maximum air velocity, for example, in a climate chamber of 10 km/h) and at the maximum outdoor temperature and solar heating values for the selected climate zone listed in Appendix **C** as well as the specified rate of fresh air intake, the ambient temperature limits set out in Appendix **E** - page 20 shall be complied with in all unlit passenger areas filled to capacity (see Appendix **D** - page 19 for heat emitted by individuals), with the temperature regulator set to "medium".

3.5 - Extreme conditions

3.5.1 - Minimum and maximum outdoor temperatures

The equipment must remain operational under the following extreme temperatures:

- 5 K below the minimum values (10 K for Poland, Romania, Slovakia, the Czech Republic and Hungary) and 5 K above the maximum values laid down in point **3.1**,
- 15 K above the maximum values stipulated in point **3.1**, where equipment is fitted under the vehicle underframe.

At the above-listed extreme temperatures, compliance with the comfort standards stipulated in Appendix B - page 14 is no longer required.

3.5.2 - Fresh air supply

If damage to a piece of equipment in the coach means that the volumes of fresh air stipulated in Appendix H - page 23 cannot be provided, a back-up ventilation system with reduced air supply shall be available. Emergency ventilation systems powered by the coach battery shall be capable of operating for 30 minutes.

○ **4 - Centralised operating, control, safety and monitoring devices**

4.1 - It shall be possible to switch the climate control equipment in a coach on or off by means of a switch located on the control panel defined in *UIC Leaflet 550-1*. This switch shall also be used to shut down the climate control equipment, including the air supply fan, in an emergency.

4.2 - The climate control equipment shall be designed to switch on automatically as soon as the train cable is live, the coach power supply system is activated and the switch described in point **4.1** is on.

Similarly, it shall stop automatically when the power supply is cut off. In addition, the loads connected to the battery shall also switch off in line with the conditions set out in *UIC Leaflet 550* and thus ensure that the battery cannot be flattened.

Passengers should not be subject to any unpleasant warm or cold air movements when equipment starts up again after short power outages.

4.3 - All electrical heater units shall be fitted with a safety device to prevent any unacceptable degree of overheating. Functioning of this safety device shall be completely independent of the control regulator and power supply source and ensure failsafe cut-off of the current supply to the heater unit.

4.4 - The cooling equipment shall be fitted with safety devices to prevent an unacceptable increase in refrigerant pressure.

4.5 - The design of the control panel, the arrangement of the fuses and the markings and inscriptions on the components are governed by the provisions of *UIC Leaflet 550 and 550-1*.

4.6 - Centralised operation of climate control equipment throughout the entire train (heat chain).

Pending.