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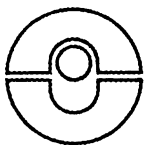
OR

1st edition, 1.1.94

Power Supply Systems for

Passenger Coaches

Type testing



International Union of Railways

OR

Leaflet to be classified in volumes:

- V - Transport stock
- VI - Traction

Amendments

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Preliminary remarks:

Obligatory provisions are preceded by an asterisk: *.

The double vertical line (II) in the margin denotes amendments made on the date shown at the foot of the page.

Enforcement of this leaflet is governed by the provisions listed under "Application" at the end of the document.

Note

This leaflet forms part of a set which also includes:

- Leaflet 550 - Power supply installations for passenger stock
- Leaflet 550-1 - Electrical switch cabinets on passenger stock
- Leaflet 552 - Electric power supply for trains taken from the train cable
- Leaflet 553-1 - Air-conditioning equipment in coaches - Standard tests
- Leaflet 555 - Electric lighting in passenger rolling stock

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0 - General

0.1 - The following test programme is a standard programme for testing the power supply systems of fully-fitted passenger coaches. It does not replace the type testing of sub-systems. Other systems may be tested simultaneously.

0.2 - To enable type testing to proceed without interruption, insulation testing in accordance with the regulations of the railway concerned and comprehensive functional testing of the systems of the vehicle as a whole should be carried out beforehand.

0.3 - Measurements of power consumption at the limits of the required outdoor temperature range should, for practical reasons, be made in a climatic chamber in conjunction with type testing of the air-conditioning system in accordance with Leaflet 553-1.

0.4 - The purpose of type testing is not only to demonstrate correct functioning according to specification under the various operating conditions, but also to check whether the systems are of energy-saving design.

0.5 - The method for providing proof of compatibility with electrical power supply systems for diesel locomotives in accordance with Leaflet 626 has still to be specified.

OR

1 - Conduct of tests and explanatory notes

1.1 - Testing with various train bus voltages

The train bus voltage should be varied within the limits of the range U_{min2} and U_{max2A} as specified in Leaflet 550. The following specific evaluations should be made:

1.1.1 - Function for all U_n , together with the associated voltage forms and frequencies for which the coach systems are designed.

1.1.2 - U_{max2A}

Allowance should be made in accordance with Leaflet 550, §4.2 for the distortion of the curve shape with a.c. voltage.

- Function
- Cos and/or (Leaflet 500, §4.2)
- Heating of the critical design components after an operating period of 1 hour
- Switching on and off of the power supply and loads:
 - . behaviour of the switching elements
 - . voltage peaks in train bus and on-board supply system
 - . starting currents (Leaflet 550, §4.11)

With a.c. voltage, the voltage should be switched on at the zero crossing.

1.1.3 - Umin2

Switching on and off of the power supply and loads (Leaflet 550, §4.11).

1.1.4 - Harmonics

Limit values in accordance with Leaflet 550, section 5.

Measuring procedure in accordance with *APPENDIX 1*.

1.1.5 - Input impedances

Limit values for d.c. voltages in accordance with Leaflet 550, section 5. Measuring procedure in accordance with *APPENDIX 1*.

1.2 - Power requirement and energy consumption

The power requirement and energy consumption of the entire electrical systems of the vehicle and of individual conversion elements and loads shall be determined.

1.2.1 - Extreme outdoor temperature T_e

- Power input on switching on the vehicle power supply for preheating and precooling at U_n with main lighting switched on. The vehicle should have reached beforehand an internal temperature T_i which ensures maximum power when switching on.
- Power requirement of the vehicle systems in normal operation with main lighting switched on for
 - . U_n ,
 - . U_{max2} ,
 - . U_{min1} .

OR

- Efficiency of the inverter connected to the train bus as a function of loading at
 - . U_n ,
 - . U_{max2} ,
 - . U_{min1} .
- Power requirement and energy consumption of individual loads at U_n
 - . air-conditioning system
 - . lighting
 - . clean water heating
 - . effluent heating
- Power consumption at U_n and with lighting switched off for
 - . preheating (switching on until ambient temperature T_i reaches 20°C)
 - . precooling (switching on until ambient temperature has reached the value of the control characteristic)
 - . normal operation (without occupants, all temperature controls in mid-position)
 - . normal operation (with occupants, all temperature controls in mid-position)

1.2.2 - Outdoor temperature T_e between 10°C and 25°C

Energy consumption shall be recorded as a function of T_e with and without occupancy.

1.3 - Battery charging**1.3.1 - Charging voltage with charged battery**

- With battery loads
- With battery loads and with minimum consumption in the three-phase system
- Without battery loads
- Without battery loads and with maximum consumption in the three-phase system

1.3.2 - Harmonic content of the charging current with

- Charged battery
- Discharged battery

1.3.3 - Current limitation with discharged battery**1.3.4 - Residual charging current in float charging mode****1.3.5 - Behaviour of the charging voltage when intended to be dependent on battery temperature****1.4 - Behaviour of the load when dependent on battery voltage****1.4.1 - Rising battery voltage (switching on the power supply)**

Voltage at which loads are connected or are released for connection.

OR

1.4.2 - Falling battery voltage (switching off the power supply)

- After switching off the charging voltage, determining voltage and period of time
 - . at which main loads are disconnected,
 - . at which all main loads are disconnected and only the emergency lighting is still switched on,
 - . at which the emergency lighting is also disconnected.

1.4.3 - Protection of lead-acid batteries against freezing

After 5 hours' discharge with lighting in accordance with Leaflet 555, §9.7 and outside temperature of 20°C, check whether the electrolyte density level reached guarantees protection against freezing.

The minimum value of electrolyte density shall be specified by the supplier.

1.5 - Switching on the power supply systems at minimum battery voltage

1.6 - Other energy conversion components

Behaviour in conformity with contract, as based on specification.

1.7 - Other electro-technical equipment

Behaviour in conformity with contract, as based on specification.