

REGULATION
OF THE MINISTER FOR INFRASTRUCTURE¹⁾

of ... 2023

on the type approval of trams and trolleybuses^{2), 3)}

Pursuant to Article 55(1) of the Act of 14 April 2023 on the approval systems of vehicles and their equipment (Journal of Laws, item 919), the following is hereby decreed:

§ 1. The Regulation lays down:

- 1) the scope of the technical requirements applicable to the national type approval procedures for trams and trolleybuses and the detailed method of carrying out these procedures;
- 2) the detailed activities of the Director of Transportation Technical Supervision, hereinafter referred to as the ‘Director of TDT’, and of the technical services in the national type approval procedure for trams or trolleybuses;
- 3) the conditions and method of selecting a tram or trolleybus for approval tests;
- 4) the scope and method of conducting type approval tests by the technical service and control of conformity of production in connection with the national type approval procedure for trams or trolleybuses;
- 5) model documents used in the national type approval procedure for trams or trolleybuses;
- 6) a model of approval mark and a method of numbering national type approval certificates for trams or trolleybuses.

¹⁾ The Minister for Infrastructure manages the government administration department for transport, pursuant to § 1(2)(2) of the Regulation of the Prime Minister on the specific scope of activities of the Minister for Infrastructure of 18 November 2019 (Journal of Laws of 2021, item 937).

²⁾ This Regulation serves to apply Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC (OJ L 151, 14.6.2018, p. 1, OJ L 325, 16.12.2019, p. 1, OJ L 19, 21.1.2021, p. 2, OJ L 272, 30.7.2021, p. 16, OJ L 313, 6.9.2021, p. 4, OJ L 398, 11.11.2021, p. 29, OJ L 187, 14.7.2022, p. 19, and OJ L 296, 16.11.2022, p. 1).

³⁾ The notification of this Regulation was made to the European Commission on ..., under No ..., pursuant to § 4 of the Cabinet Regulation of 23 December 2002 concerning the manner in which the national notification system of standards and legal acts functions (Journal of Laws, item 2039, and of 2004, item 597), which implements the provisions of Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services (OJ L 241 of 17.9.2015, p. 1).

§ 2. Terms used in this Regulation shall be understood to mean:

- 1) Regulation (EU) 2018/858 – Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC (OJ L 151, 14.6.2018, p. 1, as amended⁴),
- 2) Act – the Act of 14 April 2023 on approval systems for vehicles and their equipment (Journal of Laws, item. 919);

§ 3. 1. The scope of the technical requirements applicable to the national type approval procedure:

- 1) for trams, are set out in:
 - a) the provisions on the technical conditions of trams and trolleybuses and the scope of their necessary equipment pursuant to Article 66(5) of the Road Traffic Act of 20 June 1997 (Journal of Laws of 2023, items 1047, 919 and 1053),
 - b) the provisions of the UN Regulations listed in Annex 1 to the Regulation setting out the list of the required UN Regulations applicable to type approval of trams;
- 2) for trolleybuses, are set out in:
 - a) in the part relating to electrical traction equipment and its control system and electrical auxiliary circuits powered directly or indirectly from the overhead contact line, the provisions issued pursuant to Article 66(5) of the Road Traffic Act of 20 June 1997,
 - b) for the remainder, the provisions of Regulation 2018/858 and the delegated and implementing acts issued pursuant thereto.

2. The requirements set out in paragraph. 1 shall apply to:

- 1) trams of which:
 - a) type – includes vehicles for which all of the following features are common:
 - manufacturer,
 - factory type designation,

⁴) Amendments to the said Regulation were announced in OJ L 325, 16.12.2019, p. 1, OJ L 19, 21.1.2021, p. 2, OJ L 272, 30.7.2021, p. 16, OJ L 313, 6.9.2021, p. 4, OJ L 398, 11.11.2021, p. 29, OJ L 187, 14.7.2022, p. 19 and OJ L 296, 16.11.2022, p. 1.

- main design considerations, including:
 - – the design of the body (obvious and basic differences),
 - – main traction drive (electric mains or autonomous electric),
 - – number of tram sections,
- b) variant – includes vehicles for which all of the following design features are common:
 - type of tram (motor, active trailer, passive trailer),
 - directionality of the tram (uni-directional or bi-directional),
 - nominal supply voltage,
 - track gauge,
 - bogies or chassis (essential design features),
 - driving axles (number, position, kinematic link),
 - axle arrangement,
 - type and sort of electric traction motors (DC, asynchronous or synchronous),
 - number of motors and traction converters,
 - type and sort of traction converters,
 - type and sort of braking systems (electrodynamic, track, disc, shoe or eddy current retarders),
 - type of autonomous driving system (battery, capacitor or capacitor with batteries),
- c) version – includes vehicles for which all of the following features are common:
 - permissible laden mass,
 - nominal traction drive power,
 - the largest number of seats,
 - type and sort of transmission,
 - type and sort of devices operating under traction voltage, current collectors, redundant protection devices for mains circuits,
 - type and sort of basic auxiliary equipment (converters, heating, auxiliary propulsion motors),
 - place of installation of the traction converters, traction motors, converters, auxiliary motors, components of the autonomous propulsion system,
 - power of the additional autonomous drive;

2) trolleybuses of which:

- a) type – includes vehicles for which all of the following features are common:
 - manufacturer,
 - factory type designation,
 - manufacturer of the traction drive,
 - main design considerations, including:
 - – chassis and floor plate (obvious and basic differences),
 - – number of trolleybus sections,
- b) variant – includes vehicles for which all of the following design features are common:
 - type and sort of traction drive (type of motor and traction converter),
 - number of motors and traction converters,
 - driving axles (number, position, kinematic link),
 - steering axles (number and location),
 - nominal supply voltage,
 - type of autonomous driving system (battery, capacitor, capacitor with batteries, diesel-electric, diesel-electric with batteries or diesel-electric with capacitor bank),
- c) version – includes vehicles for which all of the following features are common:
 - permissible laden mass,
 - nominal traction drive power,
 - total transmission ratio,
 - type and sort of devices operating under traction voltage, current collectors, redundant protection devices, electrodynamic braking resistors, linear contactors,
 - type and sort of auxiliary equipment, heaters, auxiliary propulsion motors, insulation status monitoring systems,
 - place of installation of the traction converters, traction motors, converters, auxiliary motors, components of the autonomous propulsion system,
 - power of the additional autonomous drive.

§ 4. 1. When conducting approval tests, the technical service shall:

- 1) verify that the specifications and data contained in the information documents referred to in Annexes 6 and 7 to the Regulation are included in the information package and type approval certificates in respect of the regulatory acts required by the type approval procedure;
- 2) in the absence of certain items in the information documents referred to in Annexes 6 and 7 to the Regulation in the information package of the regulatory acts referred to in Annex 1 to the Regulation which are required for the type being tested, confirm or request the competent technical service to confirm that the specification and technical design of the item of equipment or part concerned conforms to the particulars contained in that information document;
- 3) compare the data and information contained in the information documents referred to in Annexes 6 and 7 to the Regulation, submitted by the manufacturer, with the scope of the requirements applicable to the type approval procedure;
- 4) verify that the type undergoing the approval tests is in conformity with the type shown in the information documents referred to in Annexes 6 and 7 to the Regulation;
- 5) on a tram or trolleybus selected for approval tests, conduct the appropriate checks and controls or ask the competent technical service to conduct the appropriate checks and controls, with regard to the installation of items of equipment or parts, in order to verify that the tram or trolleybus has been manufactured in accordance with the relevant data contained in the information package, in respect of the relevant type approval certificates provided by the manufacturer.

2. Following the type approval test of a tram or trolleybus, the technical service shall draw up in Polish the approval test report referred to in Article 20(3)(2) of the Act, bearing the signature of the head of the technical service or a person authorised by him.

§ 5. 1. In the case of a manufacturer's request for the issue or amendment of a national type approval certificate for a tram or trolleybus, the Director of TDT shall verify:

- 1) the completeness of the documents submitted in accordance with the list of required documents referred to in Article 20(3) of the Act;
- 2) the conformity of the information contained in the application for the issue or amendment of the national type approval certificate with the accompanying documents;

- 3) whether the application for the issue or amendment of the national type approval certificate has been signed by the manufacturer or by a person authorised to act on behalf of the manufacturer;
- 4) the correctness of the preparation of the information documents set out in Annexes 6 and 7 to the Regulation;
- 5) whether the approval tests have been conducted by the technical service;
- 6) whether the documents proving that the approval tests have been conducted have been signed by the head of the technical service or by a person authorised by him.

2. For the issue, amendment, refusal or withdrawal of:

- 1) a national type approval certificate for a tram, the Director of TDT shall use the model national type approval certificate for a tram set out in Annex 3 to the Regulation;
- 2) a national type approval certificate for a trolleybus, the Director of TDT shall use the model national type approval certificate for a trolleybus set out in Annex 4 to the Regulation;

3. For the issue, amendment, refusal or withdrawal of a national type approval certificate for a tram or trolleybus, the Director of TDT shall use the model of approval mark and method of numbering national type approval certificates for trams or trolleybuses set out in Annex 5 to the Regulation.

§ 6. 1. The technical service, having regard to the range of technical parameters specified in the documentation submitted by the manufacturer, shall determine the representative number of trams or trolleybuses that is necessary to verify, during the approval tests, the limit parameters within the type covered by the approval test procedure.

2. The technical service shall determine the conditions for the selection of trams or trolleybuses taking into account the minimum and maximum technical parameters in terms of mass, dimensions and pressures and completion as regards the items of equipment and parts which are set out in the information documents set out in Annexes 6 and 7 to the Regulation.

§ 7. 1. The scope and method of conducting approval tests for trams or trolleybuses and the detailed method of carrying out the national type approval procedure for trams or trolleybuses are laid down in Annex 2 to the Regulation.

2. The scope and method of conducting control of conformity of production in connection with the national type approval procedure for trams or trolleybuses are laid down in Annex 8 to the Regulation.

3. In the case of a control of conformity of production conducted by a technical service authorised to conduct such a control by the Director of TDT in accordance with Article 52(5) of the Act, the provisions of Annex 8 to the Regulation shall apply *mutatis mutandis*.

§ 8. The information documents used in the national type approval procedure for trams or trolleybuses accompanying the application for the issue or amendment of the national type approval certificate for a tram or trolleybus shall be drawn up:

- 1) in the case of type approval of a tram, in accordance with the model set out in Annex 6 to the Regulation – the amendments made to that information document shall be clearly indicated by bold font in the case of an application for amendment of the type approval certificate where the amendment requires new approval tests to be conducted;
- 2) in the case of type approval of a trolleybus, in accordance with the model set out in Annex 7 to the Regulation – the amendments made to that information document shall be clearly indicated by bold font in the case of an application for amendment of the type approval certificate where the amendment requires new approval tests to be conducted.

§ 9. 1. The model certificate of conformity used in the national type approval procedure for trams is set out in Annex 9 to the Regulation.

2. The model certificate of conformity used in the national type approval procedure for trolleybuses is set out in Annex 10 to the Regulation.

3. The model application for a national type approval certificate for a tram or trolleybus is set out in Annex 11 to the Regulation.

4. The model list of persons authorised to sign certificates of conformity for a tram or trolleybus is set out in Annex 12 to the Regulation.

5. The model declaration containing the trolleybus data and information necessary for the registration and records of a trolleybus is set out in Annex 13 to the Regulation.

6. The model list of persons authorised to sign the declaration containing the vehicle data and information necessary for the registration and records of a trolleybus is set out in Annex 14 to the Regulation.

§ 10. This Regulation shall enter into force on the day following the date of its publication ⁵⁾

MINISTER FOR INFRASTRUCTURE

⁵⁾ This Regulation was preceded by the Regulation of the Minister for Transport, Construction and Maritime Economy of 28 May 2013 on the type approval of trams and trolleybuses (Journal of Laws of 2015, item 38), which expires on the date of entry into force of the Act of 14 April 2023 on vehicle approval systems and their equipment (Journal of Laws, item 919).

Annex 1

**LIST OF REQUIRED UN REGULATIONS APPLICABLE TO TYPE APPROVAL OF
TRAMS**

Item	Item of equipment	UN Regulation number
1	Headlamps equipped with filament lamps (R2 and HS1)	1 ⁶⁾
2	Headlamps (sealed beam)	5 ⁷⁾
3	Headlamps equipped with filament lamps (H1, H2, H3, HB3, HB4, H7, and/or H8, H9, HIR1, HIR2 and/or H11)	8 ⁸⁾
4	Headlamps (halogen sealed beam)	31 ⁹⁾
5	Headlamps with gas-discharge light sources	98 ¹⁰⁾
6	Headlamps with halogen lamps (H4)	20 ¹¹⁾
7	Headlamps with filament lamps or LED modules	112 ¹²⁾

⁶⁾ Regulation No 1 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of motor vehicle headlamps emitting an asymmetrical passing-beam and/or a driving beam and equipped with filament lamps of category R2 and/or HS1 (OJ L 177, 10.7.2010, p. 1).

⁷⁾ Regulation No 5 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of power-driven vehicle's sealed beam headlamps (SB) emitting a European asymmetrical passing beam or a driving beam or both (OJ L 162, 29.5.2014, p. 1).

⁸⁾ Regulation No 8 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of motor vehicle headlamps emitting an asymmetrical passing beam or a driving beam or both and equipped with halogen filament lamps (H1, H2, H3, HB3, HB4, H7, H8, H9, HIR1, HIR2 and/or H11) (OJ L 185, 17.7.2010, p. 15).

⁹⁾ Regulation No 31 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of power-driven vehicle's halogen sealed-beam headlamps (SB) emitting an asymmetrical passing beam or a driving beam or both (OJ L 185, 17.7.2010, p. 15).

¹⁰⁾ Regulation No 98 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of motor vehicle headlamps equipped with gas-discharge light sources (OJ L 164, 30.6.2010, p. 92).

¹¹⁾ Regulation No 20 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of motor vehicle headlamps emitting an asymmetrical passing beam or a driving beam or both and equipped with halogen filament lamps (H4 lamps) (OJ L 177, 10.7.2010, p. 170).

¹²⁾ Regulation No 112 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of motor vehicle headlamps emitting an asymmetrical passing-beam or a driving-beam, or both and equipped with filament lamps and/or light-emitting diode (LED) modules (OJ L 230, 31.8.2010, p. 264).

8	Filament lamps for use in approved lamp units	37 ¹³⁾
9	Direction indicators*	6 ¹⁴⁾ alternatively 148 ¹⁵⁾
10	Front and rear position lamps, stop-lamps and end-outline marker lamps	7 ¹⁶⁾ alternatively 148 ¹⁰⁾
11	Side-marker lamps	91 ¹⁷⁾ alternatively 148 ¹⁰⁾
12	Retro-reflecting devices	3 ¹⁸⁾
13	Front fog lamps	19 ¹⁹⁾
14	Rear fog lamps	38 ²⁰⁾ alternatively 148 ¹⁰⁾
15	Reversing lamp	23 ²¹⁾ alternatively 148 ¹⁰⁾
16	Daytime running lamps	87 ²²⁾ alternatively

¹³⁾ Regulation No 37 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of filament lamps for use in approved lamp units of power-driven vehicles and of their trailers (OJ L 213, 18.7.2014, p. 36).

¹⁴⁾ Regulation No 6 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of direction indicators for power-driven vehicles and their trailers (OJ L 213, 18.7.2014, p. 1).

¹⁵⁾ Regulation No 148 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of light-signalling devices (lamps) for power-driven vehicles and their trailers [2021/1719] (OJ L 347, 30.9.2021, p. 123).

¹⁶⁾ Regulation No 7 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of front and rear position lamps, stop-lamps and end-outline marker lamps for motor vehicles (except motor cycles) and their trailers (OJ L 148, 12.6.2010, p. 1).

¹⁷⁾ Regulation No 91 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of side-marker lamps for motor vehicles and their trailers (OJ L 164, 30.6.2010, p. 69).

¹⁸⁾ Regulation No 3 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of retro-reflecting devices for power-driven vehicles and their trailers (OJ L 323, 6.12.2011, p. 1).

¹⁹⁾ Regulation No 19 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of power-driven vehicle front fog lamps (OJ L 177, 10.7.2010, p. 113).

²⁰⁾ Regulation No 38 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of rear fog lamps for power-driven vehicles and their trailers (OJ L 148, 12.6.2010, p. 55).

²¹⁾ Regulation No 23 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of reversing lamps and manoeuvring lamps for power-driven vehicles and their trailers (OJ L 237, 8.8.2014, p. 1).

²²⁾ Regulation No 87 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of daytime running lamps for power-driven vehicles (OJ L 164, 30.6.2010, p. 46).

		148 ¹⁰
17	Safety glazing	43 ²³⁾

*) On bi-directional trams except those features attributed solely to uni-directional characteristics of motion of the vehicle.

²³⁾ Regulation No 43 of the Economic Commission for Europe of the United Nations (UN/ECE) – Uniform provisions concerning the approval of safety glazing materials and their installation on vehicles (OJ L 42, 12.2.2014, p. 1).

Annex 2

SCOPE AND METHOD OF CONDUCTING APPROVAL TESTS FOR TRAMS OR TROLLEYBUSES AND DETAILED METHOD OF CARRYING OUT THE NATIONAL TYPE APPROVAL PROCEDURE FOR TRAMS OR TROLLEYBUSES

1. Scope and method of conducting approval tests for trams or trolleybuses:

1) preliminary assessment:

- a) a detailed examination by the technical service of the technical documentation concerning the type of tram or trolleybus provided by the manufacturer and, in the case of a trolleybus type, verification of the EU/EC type approval certificate of the vehicle or the national type approval certificate of the vehicle on the basis of which the trolleybus was built, together with the annexes,
- b) a detailed analysis of the technical documentation of the tram type or trolleybus type in terms of compliance with the technical regulations referred to in § 3 of the Regulation;

2) approval test:

- a) verification by the technical service that the items of tram equipment or parts covered by the type approval procedure are made in accordance with the technical provisions referred to in § 3 of the Regulation and have the appropriate type approval certificates,
- b) verification by the technical service that the tram or trolleybus submitted for approval tests meets the technical conditions referred to in § 3 of the Regulation,
- c) after the approval tests have been conducted, the technical service shall draw up, in triplicate, an approval test report, of which one copy shall be kept by the technical service in its documentation and two copies shall be issued to the manufacturer.

2. Detailed method of carrying out the national type approval procedures:

1) for trams:

- a) the technical service shall perform the following actions:
 - measurement of the external dimensions of the tram,
 - measurement of the static contact forces exerted on the track by individual axles of a fully loaded tram,
 - measurement of the sound level emitted outside the tram at a standstill,

- measurement of the sound level emitted outside the tram in motion,
- measurement of the sound level of the warning signal,
- measurement of illumination inside the tram, in the doors and in the space in front of the doors,
- measurement of braking distance at a speed of 30 km/h for brakes: service, sudden, emergency and safety,
- parking brake performance test,
- in a trailer tram, checking the braking system in the event of the detachment of the tram from the formation,
- checking the functionality and operation of the manoeuvring dashboard to drive backwards, if applicable,
- checking the operation and performance of available brakes when driving backwards,
- checking that at least the emergency and parking brakes can be applied independently of the electronic controller,
- checking if it is equipped with a device improving the coefficient of adhesion between the wheel and the rail,
- measurement of the location of external lights on the tram,
- checking equipment with external lights, their operation, electrical connections and controls,
- checking the operation of the block on moving with open doors,
- checking the operation of the driver's safety device,
- checking the possibility of driving backwards,
- checking the protection of the electrical installation against access by passengers and bystanders,
- checking the protection of the electrical installation against mechanical damage, corrosion and flooding,
- checking access to the low-voltage electrical circuit breaker,
- checking that the electrical installation is equipped with protection in the event of a short circuit,
- checking the performance of the brakes in the emergency operating conditions of the overhead contact line,

- performing resistance measurements and dielectric insulation strength tests of wiring,
- performing resistance measurements and dielectric insulation strength tests of apparatus,
- checking the protective connections between the electrical mass of the tram body and the rail network and measuring the resistance of these connections,
- checking the connections of the electric masses of individual sections in multi-section trams and the possibility of connecting electric masses of trams intended to work in multiple units,
- measurement of the resistance between exposed elements made of conductive materials in the interior and the protective return circuit or tram structure,
- checking the operation of dependencies in trams with electrical installation with capacitive elements or other energy sources and trams equipped with an autonomous driving system,
- voltage measurement on the power side (on the collector) during actual driving on the urban network – for trams adapted to return energy to the overhead contact line,
- test drive,
- checking the required tram equipment,
- in trams intended to work in multiple units – checking the guard of inter-carriage couplings,
- checking the equipment of the driver's station,
- checking the passenger compartment equipment,
- checking the marking of the edges of the steps,
- checking the number of doors, their location, measuring the length of the passenger space closed on one side, measuring the width of the passageway, checking the required number of passenger flow lines,
- checking the adaptation of at least one door to the needs of persons with disabilities,

- at the entrance doors, checking the operation of the passenger trapping protection systems, mechanical opening and closing, emergency opening, individual opening, buttons for persons with disabilities, warning signal,
 - measurement of the force required for the emergency opening of the door,
 - measurement of the force required to activate the lever mechanism incorporating the safety brakes,
 - measurement of the passenger trapping force in the doors,
 - checking the method of opening the windows and manufacture of the front and rear windows,
 - checking the marking of the glazing,
 - measurement of the light transmission coefficient in windscreens,
 - checking the manufacture, number and method of marking emergency exits and control of access to them by means of an appropriate template,
 - control of the placement of handrails and handles by means of an appropriate check,
 - measurement of the gap dimensions in the floor in the joint area,
 - checking the guards in the joint area,
 - measurement of electromagnetic disturbances radiated into the environment,
 - checking, after the test drives, that there are no leakages of consumables,
- b) the technical service shall carry out an analysis of the following documents:
- information document used in the national type approval procedure for trams in accordance with Annex 6 to the Regulation,
 - technical and movement documentation of the tram, which also includes the limit values of the wear of individual elements,
 - the operating instructions for the tram,
 - instructions for lifting and re-railing the tram,
 - certificates confirming fire safety for compliance with PN-K-02511:2000 or PN-EN 45545-2:2021-01 for non-metallic materials used in the interior of the tram,

- certificates confirming the manufacture of electrical cables in the interior from materials free from halogens,
- calculation of the kinematic gauge of the tram,
- approval certificates for the exterior lights used,
- approval certificates for the glazing used,
- diagrams of protective connections between the electrical mass of the tram body and the rail network,
- description of the operation of the driver's safety device,
- description of the operation of the driving locking system,
- description of the operation of the door mechanisms and the protections used against trapping of the passenger,
- records from the insulation strength tests of electrical sub-assemblies conducted by the manufacturers of these sub-assemblies,
- documents proving the manufacturer's ability to ensure the manufacture of further trams conforming to the approved type;

2) for trolleybuses:

a) the technical service shall perform the following actions:

- measurement of the sound level emitted by the trolleybus at a standstill,
- checking and measuring the dielectric insulation of the handrail and floor in the entrance door area,
- checking the protections used for live electrified parts and parts on which dangerous voltage may occur in the event of failure of the basic insulation, against access to them by passengers, bystanders and the driver,
- checking the protection of the electrical installation against mechanical damage, corrosion and flooding,
- checking the method used to disable the low-voltage control system,
- checking the functioning of the emergency disconnection of the mains electrical installation from the circuit of the current collectors,
- dielectric insulation tests of mains-voltage devices,
- dielectric insulation tests of devices powered by a three-phase auxiliary voltage 400 V and separated 24 V,

- checking the redundant protections used in the mains installation, autonomous, if any, three-phase auxiliary 400 V and separated 24 V,
- checking the operation of the signalling of the presence of dangerous voltage on the body,
- checking the operation of the function that automatically disconnects the mains installation of the trolleybus from the circuit of the current collectors or from the overhead contact line if dangerous voltage is detected on the body for situations where the entrance doors remain open,
- checking the operation of voltage decay signalling in the overhead contact line or in an autonomous power source, where such a source exists,
- checking the functioning of dependencies – autonomous driving, for a trolleybus with an autonomous driving system,
- checking the emergency operation of the steering support pump in the event of a voltage decay in the overhead contact line,
- measurements of the braking deceleration with an electrodynamic service brake of 30 km/h,
- checking the functioning of the electrodynamic brake in the full range of driving speed,
- checking the functioning of the electrodynamic service brake priority over the start-up,
- checking the operation of the drive when driving with overhead contact line power,
- checking the functioning of the propulsion while driving with an autonomous source of energy, if any,
- measurements of voltage levels in the current collector circuit during electrodynamic braking,
- voltage measurements on elements mounted on the roof with a degree of protection less than IP2X when the collectors are disconnected from the mains,
- measurements of electromagnetic disturbances emitted into the environment by the trolleybus at standstill and in motion,

- checking the installation and ventilation conditions of the traction battery, if any,
 - checking the functioning of the dependency resulting in the automatic disconnection of the autonomous power source from the electrical installation when the low-voltage electrical installation is switched off,
 - measurements of static contact force of current collectors on the overhead contact line,
 - checking the freedom of movement of the trolleybus within the limits (+ 4.5 m, – 4.5 m) from the longitudinal axis of symmetry of the overhead contact line,
 - checking the operation of the automatic pulling system of the current collectors in the event of their derailment,
 - checking the system blocking the possibility of the trolleybus moving with any pair of entrance doors open,
- b) the technical service shall carry out an analysis of the following documents:
- information document used in the national type approval procedure for trolleybuses in accordance with Annex 7 to the Regulation,
 - technical and movement documentation of the trolleybus electrical equipment, together with diagrams of electrical circuits powered by mains and auxiliary voltages, including schematic diagrams of the dielectric insulation system of electrical equipment powered by mains and auxiliary voltages,
 - the operating instructions for the trolleybus,
 - documents proving the manufacturer's ability to ensure the manufacture of subsequent trolleybuses conforming to the approved type.

MODEL

NATIONAL TYPE APPROVAL CERTIFICATE FOR A TRAM

(maximum format: A4 (210 x 297 mm))



Dyrektor

Transportowego Dozoru Technicznego

ul. Puławska 125, 02-707 Warszawa

+48 22 490 29 02

info@tdt.gov.pl

Director of

Transportation Technical Supervision

Pulawska Str. 125, 02-707 Warsaw

Stamp of the Director of
Transportation Technical
Supervision

concerning¹⁾:

- the issue of a type approval of a tram,
- amendments to the type approval of a tram,
- refusal of the type approval of a tram,
- withdrawal of the type approval of a tram,

issued pursuant to Art. 15(1)(5) of the Act of 14 April 2023 on approval systems for vehicles and their equipment (Journal of Laws, item 919).

Type approval certificate number:

Reason for the amendment²⁾:

0.1. Brand:

0.2. Type:

¹⁾ Delete as appropriate.

²⁾ Fill in if applicable.

MODEL

NATIONAL TYPE APPROVAL CERTIFICATE FOR A TROLLEYBUS

(maximum format: A4 (210 x 297 mm))



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Transportowego Dozoru Technicznego

ul. Puławska 125, 02-707 Warszawa

+48 22 490 29 02

info@tdt.gov.pl

Director of

Transportation Technical Supervision

Pulawska Str. 125, 02-707 Warsaw

Stamp of the Director of
Transportation Technical
Supervision

concerning¹⁾:

- the issue of a type approval of a trolleybus,
- amendments to the type approval of a trolleybus,
- Refusal of the type approval of a trolleybus,
- Withdrawal of the type approval of a trolleybus,

issued pursuant to Art. 15(1)(6) of the Act of 14 April 2023 on approval systems for vehicles and their equipment (Journal of Laws, item 919).

Type approval certificate number:

Reason for the amendment²⁾:

0.1. Brand:

0.2. Type:

MODEL

APPROVAL MARK AND METHOD OF NUMBERING NATIONAL TYPE

APPROVAL CERTIFICATES FOR TRAMS OR TROLLEYBUSES

1. The national type approval certificate number for trams and trolleybuses shall consist of three sections separated by the ‘*’ mark.

Section 1: the symbol ‘PL’.

Section 2: four-digit approval number (with zeros at the beginning if needed to make it a four-digit number).

Section 3: two-digit extension number (with zero at the beginning if needed to make it a two-digit number), slash (breaking), letter ‘T’.

Example:

Second extension to the fourth national type approval certificate for a tram or trolleybus:
PL*0004*02/T.

2. In the event of amendments to the information package for the type certificate for a tram or trolleybus, when assigning the certificate number, after the amendment number which remains unchanged, the Director of Transportation Technical Supervision shall add the following indication, depending on the number of amendments granted so far:

‘Revision 1, 2, 3 ...’ or the abbreviation ‘Rev. 1, 2, 3 ...’.

3. Where, as part of the type approval procedure for trams or trolleybuses, in addition to the amendments referred to in paragraph 2:

- 1) further controls or tests were required;
- 2) the data or information contained in the type approval certificate for a tram or trolleybus has changed, with the exception of annexes,
- 3) new requirements for the type of tram or trolleybus subject to the approval procedure have entered into force

– when an amendment to a type approval certificate for a tram or trolleybus is issued, in section 3 of the certificate number, the Director of Transportation Technical Supervision shall specify the amendment number corresponding to the number of successive amendments already granted.

INFORMATION DOCUMENT USED IN THE NATIONAL TYPE APPROVAL
PROCEDURE FOR TRAMS

Drawings shall be made in the appropriate scale and degree of detail in A4 format or folded to this format. The photographs should provide appropriate details. If the equipment and parts have electronic control, this shall be described. Where other essential items of equipment that are not mentioned in the document are present, these elements shall be described at the discretion of the approval testing authority.

0. GENERAL DATA

- 0.1. Brand:
- 0.2. Type:
- 0.3. Commercial designation
- 0.4. Name and address of the manufacturer:
- 0.5. Type of tram:
- 0.6. Type of bodywork: single-section/multi-section¹⁾
- 0.7. Places of mounting the statutory plates:
 - 0.7.1. bodywork:
 - 0.7.2. bogie:
 - 0.7.3. engines/motors:
 - 0.7.4. traction apparatus:
- 0.8. Location of tram identification number:
- 0.9. Drawings or photographs of a representative of the type:
- 0.10. Drawing of the tram with basic dimensions:
- 0.11. Adaptation to bi-directional motion:
- 0.12. Adaptation to multiple-unit driving:
- 0.13. Restrictions:

0.13.1. in the use of the tram:

0.13.2. an item of equipment or part of the tram which performs its function only in conjunction with other parts of the tram:

1. DIMENSIONS AND WEIGHTS

1.1. Track gauge: mm

1.2. Length of the tram: mm

1.3. Width of the tram: mm

1.4. Height of the tram to the highest point on the roof with the folded current collector²⁾:
..... mm

1.5. Spacing of the pivot pins: mm

1.6. Distance between the axes of the joints: mm

1.7. Wheelbase of the bogies: mm

1.8. Front overhang: mm

1.9. Rear overhang: mm

1.10. Bumper height²⁾:

1.10.1. at the front: mm

1.10.2. at the rear: mm

1.11. Minimum clearance of non-adjustable elements²⁾:

1.11.1. of the tram body: mm

1.11.2. of the bogie: mm

1.12. Unladen mass of the tram: kg

1.13. Technically permissible maximum laden mass of the tram for the permissible number of places or load capacity: kg

1.14. Maximum axle load on the track for the permissible number of places or load capacity: kN

1.15. Drawings of the kinematic gauge of the tram for the straight section and curve with a radius $R = 25$ m:

2. PROPULSION SYSTEM

2.1. Axle arrangement:

2.2. Number of bogies:

2.2.1. driving:

- 2.2.2. rolling:
- 2.3. Number: driving axles/all axles:/.....
- 2.4. Type of transmission:
- 2.5. Total transmission ratio:
- 2.6. Type of drive: powered by overhead contact line/powered by overhead contact line with autonomous driving system/powered by overhead contact line with autonomous manoeuvring driving system/autonomous¹⁾
- 2.7. Number of converters-propulsion groups:
- 2.8. Number of propulsion motors:
- 2.9. Nominal supply voltage, applies to tram powered by overhead contact line:V
- 2.10. Braking with energy return to the overhead contact line: yes/no¹⁾
- 2.11. Method of implementation of the protection against moving with open doors under normal operating conditions:
- 2.12. Method of implementation of protection against activation by unauthorised persons:

3. ELECTRIC TRACTION MOTORS

- 3.1. Manufacturer:
- 3.2. Type:
- 3.3. Type: series/asynchronous/synchronous¹⁾
- 3.4. Rated power: kW
- 3.5. Rated voltage: V
- 3.6. Rated current: A
- 3.7. Rated rotational speed: rpm
- 3.8. Cooling method:
- 3.9. Insulation strength: kV (50 Hz, 60 s).

4. MOUNTING OF THE TRAM BODY

- 4.1. Method of placing the body on bogies, chassis or axles:
- 4.2. Number of degrees of springing of the body:
- 4.3. Type of components for springing the body:

5. DRIVING AND ROLLING BOGIES (if applicable)

- 5.1. Driving bogie

5.1.1. Manufacturer:

5.1.2. Type:

5.2. Rolling bogie, if applicable

5.2.1. Manufacturer:

5.2.2. Type:

6. WHEELS

6.1. Design features of the wheel:

6.2. Wheel diameter: new/maximum used: mm

7. BRAKING SYSTEM

7.1. Summary table – types of brakes involved during the types of braking mentioned (insertion of the X mark in the table cell means that during the type of braking mentioned in the column header, the brake mentioned in the row title is involved).

Types of brakes	Types of braking				
	service braking	emergency braking	safety braking	parking braking	sudden braking
electrodynamic brake					
passive mechanical brake (spring)					
active mechanical brake					
track brake					

7.2. Additional description and notes for the table, e.g.: during service braking, the passive mechanical brake is activated when the tram reaches a speed of 5 km/h:

7.3. Method of implementation of the braking condition in the event of detachment of the trailer tram:

7.4. Track brake

7.4.1. Manufacturer:

7.4.2. Type:

7.4.3. Type: non-split/segmented¹⁾

7.4.4. Rated supply voltage: V

- 7.4.5. Rated current: A
- 7.4.6. Clamping force at rated supply voltage: kN
- 7.4.7. Operating gap between the brake contact surface and the rail: mm
- 7.4.8. Number of track brakes:
- 7.5. Mechanical brake (indicate separately for each type)
 - 7.5.1. Manufacturer:
 - 7.5.2. Type:
 - 7.5.3. Sort:
 - 7.5.4. Actuator:
 - 7.5.5. Type of release mechanism:
 - 7.5.6. Number of mechanical brakes:
 - 7.5.7. Placement of mechanical brakes:
- 7.6. Braking in the event of the failure of the electronic braking system controller:
 - 7.6.1. Types of braking that can be activated independently of the electronic controller:
 - 7.6.2. Method of implementing the emergency braking types mentioned in paragraph 7.6.1.:
- 7.7. Device for improving the coefficient of adhesion
 - 7.7.1. Manufacturer:
 - 7.7.2. Type:
 - 7.7.3. Brief technical description:
- 8. BODYWORK
 - 8.1. Materials and methods used:
 - 8.2. Passenger entrance doors:
 - 8.2.1. Number:
 - 8.2.2. Effective width: mm
 - 8.2.3. Door drive:
 - 8.2.3.1. Manufacturer:
 - 8.2.3.2. Type:
 - 8.2.3.3. Type of protection against trapping of the passenger:
 - 8.2.3.4. Type of protection against unintentional opening:
 - 8.2.3.5. Description of the control:

- 8.2.4. Individual opening by passengers:
- 8.2.5. Emergency opening method:
- 8.3. Driver entrance doors:
 - 8.3.1. Number:
 - 8.3.2. Effective width: mm
 - 8.3.3. Type of protection against unintentional opening:
 - 8.3.4. Control:
 - 8.3.5. Emergency opening method:
- 8.4. Windscreen and other panes
 - 8.4.1. Windscreen
 - 8.4.1.1. Type of pane: toughened-glass/multi-layered¹⁾
 - 8.4.1.2. Method of attachment to the bodywork:
 - 8.4.1.3. Type approval number(s):
 - 8.4.2. Other panes
 - 8.4.2.1. Type of pane: toughened-glass/multi-layered¹⁾
 - 8.4.2.2. Approval number(s):
 - 8.4.3. Other glazing components
 - 8.4.3.1. Materials used:
 - 8.4.3.2. Type approval number(s):
- 8.5. Windscreen wipers – brief technical description:
- 8.6. Windscreen washer – brief technical description:
- 8.7. Windscreen defrosting – brief technical description:
- 8.7.1. Maximum electric power consumption: kW
- 8.8. Rear-view mirrors or devices performing their functions, indicate for each mirror or device.
 - 8.8.1. Figure(s) showing the position in relation to the bodywork of the tram.
- 8.9. Driver's station – location and marking of controls, tell-tales and indicators, drawings or photographs with a description of:
- 8.10. Additional control panel at the end of the tram – location and marking of controls, tell-tales and indicators, drawings or photographs with a description of:
- 8.11. Surface area for standing passengers: m²
- 8.12. Total permissible number of places or load capacity:

8.13. Number of seats:

8.13.1. for staff:

8.13.2. for passengers:

8.14. Number of standing places, with the standard 0.20 m²/person:

8.15. Number of emergency exits and their location, drawings or photographs:

8.16. Largest and smallest floor height of the unloaded tram²⁾ mm

8.17. Passenger compartment heating system:

8.17.1. manufacturer:

8.17.2. type:

8.17.3. supply voltage: V

8.17.4. maximum power consumption: kW

8.17.5. insulation strength between the mains circuit of the radiator and the housing at the control inputs shorted to the housing: kV (50 Hz, 60 s)

8.18. Driver's station heating system:

8.18.1. manufacturer:

8.18.2. type:

8.18.3. supply voltage: V

8.18.4. maximum power consumption: kW

8.18.5. insulation strength between the mains circuit of the radiator and the housing at the control inputs shorted to the housing: kV (50 Hz, 60 s)

8.19. Passenger compartment ventilation system – brief description:

8.19.1. Maximum power consumption: kW

8.20. Passenger compartment lighting

8.20.1. Basic lighting – description with drawings or additional photographs, in particular type, power, location of light points, mode of activation:

8.20.2. Emergency lighting – description with drawings or additional photographs, in particular type, power, location of light points, mode of activation:

8.21. Combustible properties of materials used to equip the interior

8.21.1. Material(s) used for the ceiling

8.21.1.1. Approval number(s) or test certificates:

8.21.2. Material(s) used for luminaires and lampshades of ceiling lamps

8.21.2.1. Approval number(s) or test certificates:

8.21.3. Material(s) used for the lining of the side and rear walls

8.21.3.1. Approval number(s) or test certificates:

8.21.4. Material(s) used for floor lining

8.21.4.1. Approval number(s) or test certificates:

8.21.5. Material(s) used for upholstery coverings

8.21.5.1. Approval number(s) or test certificates:

8.21.6. Material(s) used for other purposes

8.21.6.1. Approval number(s) or test certificates, if any:

8.21.6.2. For previously unapproved or untested materials

8.21.6.2.1. Basic material(s) and their purpose:

8.21.6.2.2. Single-layer/multi-layer material¹), number of layers¹):

8.21.6.2.3. Type of cover:

8.21.6.2.4. Maximum/minimum thickness:/..... mm

8.21.7. Components approved or tested as complete devices, e.g. seats, partitions

8.21.7.1. Approval number(s) or test certificates:

8.22. Statutory plates

8.22.1. Location of the statutory plates and identification number – description with drawings.

8.22.2. Photographs or drawings of a dimensioned and filled plate:

8.22.3. Photographs or drawings of the identification number indicating the dimensions:

8.22.4. Explanation of the designation of the sections of the identification number:

8.23. Entrance and places for persons with disabilities:

8.23.1. Entrance:

8.23.1.1. location of the entrance for persons with disabilities:

8.23.1.2. entrance height: mm

8.23.1.3. entrance width: mm

8.23.1.4. solutions to facilitate the embarkation and disembarkation of persons with disabilities:

8.23.2. Place for wheelchairs and children's pushchairs:

8.23.2.1. location:

8.23.2.2. number of places:

8.23.2.3. surface area of places for wheelchairs and children's pushchairs: m²

8.23.2.4. method of protecting the wheelchair or pushchair from moving:

8.23.3. Seats for persons with disabilities:

8.23.3.1. number of places:

8.23.3.2. location:

8.23.3.3. marking:

8.24. Technical devices facilitating access to the tram, e.g. ramps, lifts, if any:

8.25. Electrical cables installed in the internal non-combustible structure of the body:

8.25.1. manufacturer:

8.25.2 type:

8.25.3. numbers of test certificates for halogen compounds:

9. EXTERIOR LIGHTING AND SOUND SIGNALING

9.1. Table of all exterior lights, including retro-reflectors: number, make, model, approval mark, maximum intensity of main-beam headlamps, colour, indicator:

9.2. Arrangement of exterior lights, drawings or photographs indicating the dimensions:

9.3. Audible warning signal:

9.3.1. manufacturer:

9.3.2. type:

9.3.3. type of audible warning signal:

9.3.4. number and location of devices:

9.3.5. rated supply voltage:

9.3.6. Sound level A: dB

10. DRIVE AND BRAKING CONVERTER

10.1. Manufacturer:

10.2. Type:

10.3. Type: DC pulse/pulse inverter¹⁾

10.4. Input operating voltage range: V.

10.5. Type of controlled semiconductor devices used:

10.6. Pulse frequency of controlled semiconductor devices: Hz

10.7. Continuous rated power: kVA

10.8. Short-term continuous power: kVA in a time of: s

10.9. Cooling method:

10.10. Place of installation:

10.11. Insulation strength between the mains circuits and the mounting frame or housing of the converter at the control inputs and outputs shorted to the housing: kV (50 Hz, 60 s).

10.12. Braking resistor:

10.12.1. manufacturer:

10.12.2. type:

10.12.3. continuous rated power: kW

10.12.4. maximum power: kW in a time of: s

10.12.5. place of installation:

10.12.6. cooling method:

10.12.7. insulation strength between the current circuit and the resistor mounting frame: kV (50 Hz, 60 s).

10.13. Mains filter choke

10.13.1. manufacturer:

10.13.2. type:

10.13.3. rated current: A

10.13.4. place of installation:

10.13.5. cooling method:

10.13.6. insulation strength between the current circuit of the choke and the mounting frame: kV (50 Hz, 60 s).

11. STATIC CONVERTER

11.1. Manufacturer:

11.2. Type:

11.3. Number of converters installed:

11.4. Input operating voltage: V

11.5. AC output(s), if applicable:

11.5.1. voltage: V

11.5.2. nominal power: kVA.

11.5.3. is used to power:

11.6. DC output(s):

11.6.1. voltage:V

11.6.2. nominal current: A

11.6.3. is used to power:

11.7. Insulation strength between the mains terminals and the mounting frame or the housing of the converter – DC and AC outputs, as well as the control input and output shorted to the housing: kV (50 Hz, 60 s).

11.8. Insulation strength between AC output terminals and DC terminals – DC outputs shorted to the mounting frame, if applicable: kV (50 Hz, 60 s).

11.9. Cooling method:

11.10. Place of installation:

12. ELECTRICAL INSTALLATION OF CIRCUITS POWERED BY THE OVERHEAD CONTACT LINE

12.1. Rated supply voltage: V

12.2. Operating supply voltage:V

12.3. Maximum supply voltage:V

12.4. Pole connected to mass:

12.5. Method of protective earthing of the body, provide a description with a diagram:

12.6. Redundant protections:

12.6.1. functions of redundant protection in the traction circuit shall be performed by:

12.7. Main redundant circuit breaker, where applicable:

- 12.7.1. manufacturer:
- 12.7.2. type:
- 12.7.3. sort:
- 12.7.4. rated voltage: V
- 12.7.5. rated current: A
- 12.7.6. rated short-circuit breaking capacity: kA
- 12.7.7. control voltage: V
- 12.7.8. type of control: electromagnetic/electric servo motor¹⁾
- 12.7.9. insulation strength between the current circuit of the circuit breaker and the control system: kV (50 Hz, 60 s).
- 12.7.10. insulation strength between the current circuit of the circuit breaker and the base or housing: kV (50 Hz, 60 s).
- 12.8. Fuses of the propulsion groups, where applicable:
 - 12.8.1. manufacturer:
 - 12.8.2. type:
 - 12.8.3. sort:
 - 12.8.4. nominal voltage: V
 - 12.8.5. nominal current: A
- 12.9. Circuit breakers or contactors of the propulsion groups, where applicable:
 - 12.9.1. manufacturer:
 - 12.9.2. type:
 - 12.9.3. sort:
 - 12.9.4. function: disconnection of the propulsion group/disconnection and redundant protection of the propulsion group¹⁾
 - 12.9.5. nominal voltage:V
 - 12.9.6. nominal current: A
 - 12.9.7. rated short-circuit breaking capacity, as long as it acts as a redundant protection: kA
 - 12.9.8. control voltage: V
 - 12.9.9. type of control: electromagnetic/electric servo motor¹⁾
 - 12.9.10. insulation strength between the current circuit of the circuit breaker and the control system: kV (50 Hz, 60 s).

12.9.11. insulation strength between the current circuit of the circuit breaker and the base or housing: kV (50 Hz, 60 s).

12.10. Contactors of the auxiliary circuits:

12.10.1. manufacturer:

12.10.2. type:

12.10.3. sort:

12.10.4. nominal voltage: V

12.10.5. nominal current: A

12.10.6. control voltage: V

12.10.7. type of control: electromagnetic/electric servo motor¹⁾

12.10.8. insulation strength between the current circuit of the contactor and the control system: kV (50 Hz, 60 s)

12.10.9. insulation strength between the current circuit of the contactor and the base or housing: kV (50 Hz, 60 s)

12.11. Lightning arrester:

12.11.1. manufacturer:

12.11.2. type:

12.11.3. sort:

12.11.4. continuous operating voltage: V

12.11.5. voltage level of protection: V

12.12. Equipotential electrical bonding between the different body sections, if applicable:

12.13. Protection against continued driving at too low voltage and undervoltage protection:

12.13.1. minimum mains voltage at which the drive can be implemented: V

12.13.2. mains voltage at which the traction circuit is disconnected: V

12.13.3. minimum mains voltage at which auxiliary circuits operate: V

12.13.4. mains voltage at which the auxiliary circuits are disconnected: V

12.14. A system enabling energy return from the tram to the overhead contact line, if applicable:

12.14.1. voltage on the mains filter capacitor at which the resistance braking resistor is activated: V

12.14.2. minimum mains voltage at which energy recovery is carried out: V

12.14.3. method of blocking the energy return in the event of a decrease in the voltage level in the mains below the level defined in paragraph 12.14.2: disconnection with contactor/disconnection with circuit breaker/blocking with semiconductor connector¹⁾

13. ELECTRICAL CONTROL SYSTEM

13.1. Control voltage: V

13.2. Batteries

13.2.1. number, voltage and capacity of batteries: V/Ah

13.2.2. place of installation:

13.3. Control devices: controllers, control panels, etc.

13.3.1. type:

13.3.2. supply voltage:V

13.3.3. place of installation:

13.3.4. cooling method:

13.3.5. voltage strength of the insulation in relation to the controller housing (applies to controllers built in shields made of conductive materials): kV
(50 Hz, 60 s)

14. COUPLING DEVICES

14. Towing coupling:

14.1. manufacturer:

14.2. type

14.3. sort

14.4. maximum tensile/compressive force:/..... kN

14.5. height of the coupling end axle²⁾..... mm

15. CURRENT COLLECTOR

15. Current collector:

15.1. manufacturer:

15.2. type:

15.3. sort:

15.4. control: manual/automatic¹⁾

15.5. nominal voltage:V

15.6. nominal current: A

- 15.7. maximum current: A
- 15.8. operating range²⁾: mm
- 15.9. static contact force on the overhead contact line in the operating range: N
- 15.10. insulation strength between the current circuit (base) of the collector and the mass of the tram: kV (50 Hz, 60 s).

16. OPERATIONAL DATA

- 16.1. Minimum permissible track curve levels: mm
- 16.2. Minimum permissible vertical curve of the track: mm
- 16.3. Average unloaded tram acceleration up to 30 km/h: m/s²
- 16.4. Maximum current consumption during start-up: A
- 16.5. Maximum reverse current flowing into the mains that may occur during a regenerative braking, if applicable: A
- 16.6. Average braking parameters for the unloaded tram at a speed of 30 km/h:
 - 16.6.1. service braking deceleration value: m/s²
 - 16.6.2. emergency braking deceleration value: m/s²
 - 16.6.3. sudden braking deceleration value: m/s²
 - 16.6.4. safety braking deceleration value: m/s²
 - 16.6.5. Sound level A outside while driving at 50 km/h: dB
- 16.7. Sound level A outside at standstill dB
- 16.8. Maximum speed: km/h
- 16.9. Electrodynamic braking traction characteristics for nominal supply voltage:
 - 16.9.1. A diagram of the maximum braking force for the electrodynamic brake as a function of speed, if applicable:
 - 16.9.2. A current diagram as a function of the speed that can be returned by the tram to the mains, with the maximum electrodynamic braking force, if applicable:

17. AUTONOMOUS DRIVING SYSTEM OR ADDITIONAL ENERGY STORAGE SYSTEM, if applicable

- 17.1. Type of autonomous driving system: battery-powered electric motors/capacitor-powered electric motors/battery-and-capacitor-powered electric motors¹⁾

17.1.1. purpose of the autonomous driving system, applies to trams powered by the overhead contact line: for regular passenger service/for auxiliary emergency or manoeuvring operation¹⁾

17.2. Traction batteries, if applicable:

17.2.1. type of batteries:

17.2.2. capacity: Ah

17.2.3. voltage: V

17.2.4. mass: kg

17.2.5. function: energy storage unit for autonomous driving only/energy storage unit used only for network driving/energy storage unit for autonomous driving and energy storage for network driving¹⁾

17.2.6. place of installation:

17.2.7. ventilation method:

17.2.8. redundant protection of the batteries: fuses/fuses and circuit breaker¹⁾

17.2.9. battery overheating protection, if applicable:

17.2.10. protection against too high voltage on the cells:

17.3. Traction capacitor bank, if applicable:

17.3.1. manufacturer:

17.3.2. type:

17.3.3. type of capacitor:

17.3.4. single capacitor bank capacity: F

17.3.5. maximum operating voltage of capacitor bank: V

17.3.6. maximum operating current: charging/discharging the capacitor bank:/..... A

17.3.7. maximum permissible instantaneous current: charging/discharging the capacitor bank:/..... A

17.3.8. number of capacitor banks used:

17.3.9. total capacity of the system: F

17.3.10. maximum operating voltage of the capacitor bank system: V

17.3.11. mass of the system: kg

17.3.12. used: for autonomous driving only/for network driving only/for autonomous driving and as support during network driving¹⁾

- 17.3.13. place of installation:
- 17.3.14. cooling method:
- 17.3.15. redundant protection: fuses/fuses and circuit breaker¹⁾
- 17.3.16. protection against too high voltage level:
- 17.3.17. insulation strength of the capacitor bank between the current circuit and the housing kV (50 Hz, 60 s)
- 17.4. Converter working with the batteries, if applicable:
 - 17.4.1. manufacturer:
 - 17.4.2. type:
 - 17.4.3. nominal power: kVA
 - 17.4.4. type of controlled semiconductor devices used:
 - 17.4.5. pulse frequency of controlled semiconductor devices: Hz.
 - 17.4.6. function: charging the traction battery/increasing the supply voltage of the traction converter during autonomous driving/charging and increasing the supply voltage of the traction converter during autonomous driving¹⁾
 - 17.4.7. maximum battery charging current, if applicable: A
 - 17.4.8. input voltage range during battery charging, if applicable: V
 - 17.4.9. output voltage range during battery charging, if applicable: V
 - 17.4.10. voltage range of the traction system and auxiliary circuits during autonomous driving, if applicable: V
 - 17.4.11. place of installation:
 - 17.4.12. cooling method:
 - 17.4.13. declared insulation strength between the mains circuits and the mounting frame or housing of the converter: kV (50 Hz, 60 s).
- 17.5. Converter working with the traction capacitor bank, if applicable:
 - 17.5.1. manufacturer:
 - 17.5.2. type:
 - 17.5.3. nominal power: kVA
 - 17.5.4. function of the converter: control of current and voltage charging/discharge current/increasing voltage at discharge¹⁾
 - 17.5.5. type of controlled semiconductor devices used:

- 17.5.6. pulse frequency of controlled semiconductor devices:
Hz.
- 17.5.7. maximum current during capacitor bank charging:A
- 17.5.8. maximum current during capacitor bank discharging, if applicable: A
- 17.5.9. maximum charging voltage of capacitor bank: V
- 17.5.10. place of installation:
- 17.5.11. cooling method:
- 17.5.12. insulation strength between the mains circuits and the mounting frame or housing of the converter: kV (50 Hz, 60 s).
- 17.6. Fuses of the autonomous driving circuits, if applicable:
 - 17.6.1. manufacturer:
 - 17.6.2. type:
 - 17.6.3. sort:
 - 17.6.4. nominal voltage: V
 - 17.6.5. nominal current: A
- 17.7. Circuit breaker of the autonomous driving system, if applicable:
 - 17.7.1. manufacturer:
 - 17.7.2. type:
 - 17.7.3. sort:
 - 17.7.4. place of installation of the circuit breaker:
 - 17.7.5. function: disconnection of the autonomous system/disconnection and redundant protection of the autonomous circuit¹⁾
 - 17.7.6. nominal voltage: V
 - 17.7.7. nominal current: A
 - 17.7.8. rated short-circuit breaking capacity, if applicable: A
 - 17.7.9. control voltage: V
 - 17.7.10. type of control:
 - 17.7.11. insulation strength between the current circuit of the circuit breaker and the control system: kV (50 Hz, 60 s)
 - 17.7.12. insulation strength between the current circuit of the circuit breaker and the base or housing: kV (50 Hz, 60 s).

17.8. Hydraulic transmission, if applicable:

17.8.1 type:

17.8.2. manufacturer:

17.8.3. sort:

17.9. Mechanical transmission, if applicable:

17.9.1 type:

17.9.2. manufacturer:

17.9.3. sort:

17.9.4. number and gear ratios of individual gears:

17.10. The operating data of the autonomous driving system shall be reported according to paragraph 16, excluding paragraphs 16.4, 16.5 and, in the case of a propulsion system not using electric motors, excluding paragraph 16.9. In a situation where the tram during autonomous driving does not reach a maximum speed of 50 km/h, the sound level A during the movement shall be measured at an attainable speed close to the maximum speed, whereas in a situation where the tram during autonomous driving does not reach a maximum speed of 30 km/h, the decelerations of the different types of braking shall be measured from an attainable speed close to the maximum speed.

17.11. Indicative range: km.

1) Delete as appropriate.

2) All dimensions refer to the level of the rail head.

INFORMATION DOCUMENT USED IN THE NATIONAL TYPE APPROVAL
PROCEDURE FOR TROLLEYBUSES

Drawings shall be made in the appropriate scale and degree of detail in A4 format or folded to this format. The photographs should provide appropriate details. If the equipment and parts have electronic control, this shall be described. Where other essential items of equipment that are not mentioned in the description are present, these elements shall be described at the discretion of the approval testing authority.

0. GENERAL DATA

0.0.1. Type approval certificate/EU type approval certificate/EC type approval certificate number¹⁾ of the vehicle on the basis of which the trolleybus was built:

0.1. Brand:

0.2. Type:

0.3. Commercial designation

0.4. Name and address of the manufacturer:

0.5. Type of bodywork:

0.6. Places of mounting plates and markings relating to electrical equipment:

0.6.1. bodywork:

0.6.2. chassis:

0.6.3. engines/motors:

0.7. Location of the identification number:

0.8. Drawings or photographs of a representative of the type:

0.9. Drawing with basic dimensions:

0.10. Restrictions:

0.10.1. in the use of the trolleybus:

0.10.2. an item of equipment or part of the trolleybus which performs its purpose only in conjunction with other parts of the trolleybus:

1. DIMENSIONS AND WEIGHTS

- 1.1. Unladen mass: kg
- 1.2. Permissible laden mass: kg
- 1.3. Permissible load capacity: kg
- 1.4. Number of seats for passengers:
- 1.5. Nominal number of places:
- 1.6. Individual axle loads with permissible load capacity: kN
- 1.7. Length of the trolleybus with folded current collectors: mm
- 1.8. Height of the trolleybus to the highest point on the roof with folded current collectors²⁾: mm

2. PROPULSION SYSTEM

- 2.1. Number: driving axles/all axles:/.....
- 2.2. Number of traction motors:
- 2.3. Total transmission ratio:
- 2.4. Wheel diameter:
- 2.5. Type of traction drive: resistance adjustable DC motor/DC motor with pulse adjustment/AC motor with pulse adjustment¹⁾
- 2.6. Nominal mains supply voltage: V
- 2.7. Mains operating voltage: V
- 2.8. Number of drive and braking converters:
- 2.9. Energy return system to the overhead contact line: yes/no¹⁾
- 2.10. Autonomous driving system: yes/no¹⁾

3. TRACTION MOTOR

- 3.1. Manufacturer:
- 3.2. Type:
- 3.3. Type: series/series shunt/asynchronous/synchronous¹⁾
- 3.4. Place of installation of the motors (motor):
- 3.5. Rated power: kW
- 3.6. Rated voltage: V
- 3.7. Rated current: A
- 3.8. Rated rotational speed: rpm
- 3.9. Cooling method:

3.10. Insulation strength between the windings and the motor body: kV (50 Hz, 60 s).

3.11. Insulation strength between the motor body and trolleybus mass (II-degree): kV (50 Hz, 60 s).

3.12. Mass: kg

4. DRIVE AND BRAKING CONVERTER, if applicable

4.1. Manufacturer:

4.2. Type:

4.3. Type: DC pulse/pulse inverter¹⁾

4.4. Input operating voltage of the converter: V.

4.5. Control range of the output voltage of the converter, applies to the inverter: V

4.6. Type of controlled semiconductor devices used:

4.7. Pulse frequency of controlled semiconductor devices: Hz

4.8. Continuous rated power: kVA

4.9. Short-term continuous power: kVA in a time of: s

4.10. Cooling method of the converter:

4.11. Place of installation of the converter:

4.12. Insulation strength between the mains circuits and mounting frame or housing of the converter (I-degree): kV (50 Hz, 60 s)

4.13. Insulation strength between the mounting frame or the housing of the converter and the trolleybus mass (II-degree): kV (50 Hz, 60 s).

4.14. Braking resistor:

4.14.1. type:

4.14.2. continuous rated power: kW

4.14.3. maximum power: kW in a time of: s

4.14.4. place of installation:

4.14.5. cooling method:

4.14.6. insulation strength between the current circuit and the resistor mounting frame (I-degree): kV (50 Hz, 60 s).

4.14.7. insulation strength between the resistor mounting frame and the trolleybus mass (II-degree): kV (50 Hz, 60 s).

4.15. Mains filter choke:

4.15.1. rated current: A

4.15.2. place of installation:

4.15.3. cooling method:

4.15.4. insulation strength between the current circuit of the choke and the mounting frame: kV (50 Hz, 60 s).

4.15.5. insulation strength between the choke mounting frame and the trolleybus mass (II-degree): kV (50 Hz, 60 s).

5. RESISTANCE ADJUSTABLE CONTROL, if applicable

5.1. Type of start-up actuator: electromechanical/electronic¹⁾

5.2. Number of start-ups and dilution rates of the traction motor field:

5.3. Number of braking steps:

5.4. Place of installation of the start-up and braking resistors:

5.5. Method of ventilation of the start-up and braking resistors:

5.6. Contactors for closing resistance sections and shunting:

5.6.1. manufacturer:

5.6.2. type:

5.6.3. sort:

5.6.4. rated voltage: V

5.6.5. rated switching current: A

5.6.6. control voltage: V

5.6.7. insulation strength between the current circuit of the contactors and the control terminals: kV (50 Hz, 60 s)

5.6.8. insulation strength between the current circuit of the contactors and the base or housing: kV (50 Hz, 60 s)

5.7. Start-up contactor(s):

5.7.1. manufacturer:

5.7.2. type:

5.7.3. sort:

- 5.7.4. rated voltage: V
- 5.7.5. rated switching current: A
- 5.7.6. control voltage: V
- 5.7.7. Trigger setting range, if applicable: A
- 5.7.8. insulation strength between the current circuit of the contactor and the control terminals: kV (50 Hz, 60 s)
- 5.7.9. insulation strength between the current circuit of the contactor and the base or housing: kV (50 Hz, 60 s)
- 5.8. Automatic start-up relay:
 - 5.8.1. manufacturer:
 - 5.8.2. type:
 - 5.8.3. type: electromagnetic/electronic¹⁾
 - 5.8.4. function: overload protection during start-up/overload protection and start-up current adjustment¹⁾
 - 5.8.5. operating current of the protection: A
 - 5.8.6. current adjustment range, if applicable: A
 - 5.8.7. rated current circuit voltage: V
 - 5.8.8. rated current: A
 - 5.8.9. control voltage: V
 - 5.8.10. insulation strength between the current circuit of the relay and the control system: kV (50 Hz, 60 s)
 - 5.8.11. insulation strength between the current circuit of the relay and the base or housing: kV (50 Hz, 60 s)

6. CURRENT COLLECTORS

- 6.1. Manufacturer:
- 6.2. Type:
- 6.3. Material from which the bar is made:
- 6.4. Current collector head:
 - 6.4.1. Manufacturer:
 - 6.4.2. Type:
 - 6.4.3. Method of attachment to the bar:

6.5. Control: manual/semi-automatic with automatic lowering/semi-automatic with automatic lowering and lifting at network points adapted for this operation/automatic¹⁾

6.6. Nominal voltage: V

6.7. Nominal current: A

6.8. Maximum current: A

6.9. Pulling mechanism in case of derailment: mechanical drum with a spring drive/mechanical drum with an electric drive/pneumatic actuator/electric servo motor¹⁾

6.10. Lifting mechanism of the collector (if applicable): pneumatic actuator/electric servo motor¹⁾

6.11. Operating range in the vertical plane: m²⁾

6.12. Operating range in the horizontal plane (measured from the longitudinal axis of symmetry of the trolleybus): m

6.13. Static contact force in the operating range: N

6.14. Insulation strength between the current circuit and the mounting base of the collector: kV (50 Hz, 60 s).

6.15. Insulation strength between the mounting base of the collector and the mass of the bodywork: kV (50 Hz, 60 s).

7. MAINS-VOLTAGE AND THREE-PHASE AUXILIARY ELECTRICAL INSTALLATION

7.1. Mains reverser – protection system for proper polarisation of the voltage supplying traction circuits, if applicable:

7.1.1. Type: contactor/power electronic¹⁾

7.1.2. Scope of operation: allows only energy consumption at any mains polarity/enables energy consumption at any mains polarity and brake energy return at one defined mains polarity/enables energy consumption and return at any mains polarity¹⁾

7.1.3. Place of installation:

7.2. Types of circuit breakers to disconnect the electrical installation of the trolleybus from the circuit of the current collectors:

7.2.1. pole (+):

7.2.2. pole (-):

7.3. Redundant protections:

7.3.1. functions of redundant protection in the traction circuit shall be performed by:

7.4. Redundant circuit breaker, if applicable:

7.4.1. manufacturer:

7.4.2. type:

7.4.3. sort:

7.4.4. place of installation of the circuit breaker:

7.4.5. nominal voltage: V

7.4.6. nominal current: A

7.4.7. rated short-circuit breaking capacity: A

7.4.8. triggering: uni-directional (for fixed current direction)/bi-directional¹⁾

7.4.9. control voltage: V

7.4.10. type of control: electromagnetic/electric servo motor¹⁾

7.4.11. insulation strength between the current circuit of the circuit breaker and the control system: kV (50 Hz, 60 s).

7.4.12. insulation strength between the current circuit of the circuit breaker and the base or housing: kV (50 Hz, 60 s).

7.5. Circuit breaker(s) disconnecting the electrical installation of the trolleybus from the circuit of the current collectors:

7.5.1. manufacturer:

7.5.2. type:

7.5.3. sort:

7.5.4. place of installation:

7.5.5. nominal voltage: V

7.5.6. nominal current: A

7.5.7. control voltage: V

7.5.8. type of control:.....

7.5.9. insulation strength between the current circuit of the circuit breaker and the control system: kV (50 Hz, 60 s)

7.5.10. insulation strength between the current circuit of the circuit breaker and the base or housing: kV (50 Hz, 60 s)

7.6. Main fuses(s), if applicable:

7.6.1. manufacturer:

7.6.2. type:

7.6.3. sort:

7.6.4. nominal voltage: V

7.6.5. nominal current: A

7.7. Fuses for propulsion groups, where applicable:

7.7.1. manufacturer:

7.7.2. type:

7.7.3. sort:

7.7.4. nominal voltage: V

7.7.5. nominal current: A

7.8. Circuit breakers or contactors of the propulsion groups, where applicable:

7.8.1. manufacturer:

7.8.2. type:

7.8.3. sort:

7.8.4. function: disconnection of the propulsion group/disconnection and redundant protection of the propulsion group¹⁾

7.8.5. nominal voltage: V

7.8.6. nominal current: A

7.8.7. rated short-circuit breaking capacity, as long as it acts as a redundant protection: kA

7.8.8. triggering, if applicable: uni-directional, for fixed current direction/bi-directional¹⁾

7.8.9. control voltage: V

7.8.10. type of control: electromagnetic/electric servo motor¹⁾

7.8.11. insulation strength between the current circuit of the circuit breaker and the control system: kV (50 Hz, 60 s).

7.8.12. insulation strength between the current circuit of the circuit breaker and the base or housing: kV (50 Hz, 60 s).

7.9. Contactors of the auxiliary circuits:

7.9.1. manufacturer:

7.9.2. type:

7.9.3. sort:

- 7.9.4. nominal voltage: V
- 7.9.5. nominal current: A
- 7.9.6. control voltage: V
- 7.9.7. type of control: electromagnetic/electric servo motor¹⁾
- 7.9.8. insulation strength between the current circuit of the circuit breaker and the control system: kV (50 Hz, 60 s)
- 7.9.9. insulation strength between the current circuit of the circuit breaker and the base or housing: kV (50 Hz, 60 s)
- 7.10. Lightning arrester:
 - 7.10.1. manufacturer:
 - 7.10.2. type:
 - 7.10.3. sort:
 - 7.10.4. continuous operating voltage:V
 - 7.10.5. voltage protection level:V
 - 7.10.6. place and method of installation:
 - 7.10.7. method of obtaining double insulation of the lightning arrester base from trolleybus mass:
 - 7.10.8. voltage strength of the lightning arrester insulation relative to the mounting frame: kV (50 Hz, 60 s).
 - 7.10.9. voltage strength of the lightning arrester mounting frame relative to the trolleybus mass: kV (50 Hz, 60 s).
- 7.11. Mains-voltage system cables:
 - 7.11.1. manufacturer:
 - 7.11.2. type:
 - 7.11.3. nominal voltage:V
 - 7.11.4. insulation strength..... kV (50 Hz, in a time of s).
- 7.12. Passenger compartment heating system
 - 7.12.1. manufacturer:
 - 7.12.2. type:
 - 7.12.3. supply voltage: V
 - 7.12.4. maximum power consumption: kW

7.12.5. insulation strength between the heating element and the radiator mounting frame (I-degree): kV (50 Hz, 60 s)

7.12.6. insulation strength between the radiator mounting frame and the radiator housing (II-degree, applies to radiators powered directly from the overhead contact line): kV (50 Hz, 60 s)

7.12.7. place of installation of the radiators.....

7.13. Heating system for the driver's station

7.13.1. manufacturer:

7.13.2. type:

7.13.3. supply voltage: V

7.13.4. maximum power consumption: kW

7.13.5. insulation strength between the heating element and the radiator mounting frame (I-degree): kV (50 Hz, 60 s).

7.13.6. insulation strength between the radiator mounting frame and the radiator housing (II-degree, applies to radiator powered directly from the overhead contact line): kV (50 Hz, 60 s).

7.14. Passenger compartment ventilation system, brief description, in the case of mains circuit supply, the strength of both degrees of insulation shall be provided:

7.14.1. supply voltage: V

7.14.2. maximum power consumption: kW

7.15. Components used to dampen electromagnetic disturbances, if applicable, the manufacturer, type of filter, capacity of capacitors used in the filter, capacity of additional damping capacitors, location and method of connecting additional damping capacitors, dielectric insulation strength of capacitors.

7.16. List of electrically connected masses of mains-powered intermediate devices, where such connections are present:

7.17. Protection against continued driving at too low voltage and undervoltage protection:

7.17.1. minimum mains voltage at which the drive can be implemented: V

7.17.2. mains voltage at which the traction circuit is disconnected: V

7.17.3. minimum mains voltage at which the auxiliary circuits operate: V

7.17.4. mains voltage at which the auxiliary circuits are disconnected: V

7.18. Energy return system to the overhead contact line, if applicable:

7.18.1. voltage on the mains filter capacitor at which the resistance braking resistor is activated: V

7.18.2. minimum mains voltage at which energy recovery may be carried out: V

7.18.3. method of blocking the energy return in the event of a decrease in the voltage in the mains below the value defined in paragraph 7.18.2: disconnection with contactor/disconnection with circuit breaker/blocking with semiconductor connector1)

7.19. Rated voltage of the three-phase auxiliary system V

7.20. Three-phase auxiliary system cables (if applicable):

7.20.1. manufacturer:

7.20.2. type:

7.20.3. nominal voltage: V

7.20.4. insulation strength: kV (50 Hz, in a time of s)

7.21. Contactors, circuit breakers and fuses used in the three-phase auxiliary system, specify the manufacturer, type, sort, nominal voltage and insulation strength:

7.22. Dielectric insulation strength of the three-phase, galvanically integral auxiliary system relative to the mains voltage system: kV (50 Hz, 60 s).

7.23. Dielectric insulation strength of the three-phase, galvanically integral auxiliary system relative to the trolleybus mass: kV (50 Hz, 60 s).

8. STATIC CONVERTER

8.1. Manufacturer:

8.2. Type:

8.3. Place of installation:

8.4. Input operating voltage: V

8.5. AC output(s):

8.5.1. voltage: V

8.5.2. nominal power: kVA

8.5.3. is used to power:

8.6. DC output(s):

8.6.1. voltage: V

8.6.2. nominal current: A

8.6.3. is used to power:

8.7. Insulation strength between the mains terminals and the mounting frame or housing of the converter – DC and AC outputs shorted to the housing: kV (50 Hz, 60 s)

8.8. Insulation strength between the AC output terminals and the mounting frame or housing at all other terminals shorted to the housing: kV (50 Hz, 60 s).

8.9. Insulation strength between DC output terminals and housing at all other terminals shorted to the housing, if applicable: kV (50 Hz, 60 s)

8.10. Insulation strength between the mounting frame or the housing of the converter and the trolleybus mass: kV (50 Hz, 60 s).

8.11. Insulation between the mains input and AC output/outputs¹⁾: 1-degree/2-degree¹⁾.

8.12. Cooling method:

9. COMPRESSOR UNIT

9.1. Auxiliary compressor drive motor.

9.1.1. Manufacturer:

9.1.2. Type:

9.1.3. Type: DC commutator brush/DC brushless with electronic commutator/asynchronous¹⁾

9.1.4. Place of installation of the motor:

9.1.5. Rated power: kW

9.1.6. Rated voltage: V

9.1.7. Rated current: A

9.1.8. Rated rotational speed: rpm

9.1.9. Cooling method:

9.1.10. Motor body-winding insulation strength: kV (50 Hz, 60 s)

9.1.11. Motor body insulation strength – trolleybus mass, applies to motors powered from a source without double insulation in relation to circuits powered directly by traction voltage: kV (50 Hz, 60 s).

9.2. Compressor.

9.2.1. Manufacturer:

9.2.2. Type:

9.2.3. Sort:

9.2.4. Operating range of rotational speed: rpm

10. POWER STEERING SYSTEM

10.1. Mode of propulsion of the power steering system mechanism: auxiliary electric motor/from the traction motor shaft and auxiliary electric motor¹⁾

10.2. Auxiliary motor

10.2.1. Manufacturer:

10.2.2. Type:

10.2.3. Type: DC commutator brush/DC brushless with electronic commutator/asynchronous¹⁾

10.2.4. Place of installation of the motor:

10.2.5. Rated power: kW

10.2.6. Rated voltage: V

10.2.7. Rated current: A

10.2.8. Rated rotational speed: rpm

10.2.9. Cooling method:

10.2.10. Motor body-winding insulation strength: kV (50 Hz, 60 s)

10.2.11. Motor body insulation strength – trolleybus mass, applies to motors powered from a source without double insulation in relation to circuits powered directly by traction voltage: kV (50 Hz, 60 s).

10.2.12. Method of implementation of emergency operation of the motor of the support pump after the occurrence of voltage decay in the overhead contact line:

10.3. Support pump.

10.3.1. Manufacturer:

10.3.2. Type:

10.3.3. Mode of propulsion: from the auxiliary motor/from the traction motor shaft¹⁾

10.3.4. Operating range of rotational speed: rpm

11. MOTOR FOR THE COOLING FAN OF THE ELECTRIC TRACTION EQUIPMENT SYSTEM (if applicable)

11.1. Manufacturer:

11.2. Type:

11.3. Sort:

11.4. Place of installation of the motor:

11.5. Rated power: kW

11.6. Rated voltage: V

11.7. Rated current: A

11.8. Rated rotational speed: rpm

11.9. Motor body-winding insulation strength: kV (50 Hz, 60 s)

11.10. Motor body insulation strength – trolleybus mass, applies to motors powered from a source without double insulation in relation to circuits powered directly by traction voltage: kV (50 Hz, 60 s).

12. CONTROL SYSTEM OF MAINS-VOLTAGE DEVICES

12.1. Supply method of control circuits: from a separating converter(s) providing galvanic separation from a bus control system not separated from the mass of the trolleybus/mixed with control circuits powered by both the separating converter and the control system of the bus not separated from the mass of the trolleybus/from the bus system not separated from the mass of the trolleybus/from the bus system separated from the mass of the trolleybus (two-wire bus system)¹⁾

12.2. Separate electrical control system, if applicable:

12.2.1. power supply: from the output of the separated electrostatic converter described in paragraph 8/from an additional separate separating converter¹⁾

12.2.2. additional separating converter(s) made as separate from the main static converter, if applicable;

12.2.2.1. manufacturer:

12.2.2.2. type:

12.2.2.3. rated power: kW

12.2.2.4. input voltage: V

12.2.2.5. output voltage: V

- 12.2.2.6. cooling method:
- 12.2.2.7. place of installation:
- 12.2.2.8. insulation strength between the separated input and output terminals, input terminals shorted to the converter frame or housing: kV (50 Hz, 60 s).

12.2.3. Signal separation between the non-separated electric bus system and the separate traction control system:

- 12.2.3.1. type of separators:
- 12.2.3.2. sort of separators:
- 12.2.3.3. number of separators used:
- 12.2.3.4. voltage strength of separators: kV (50 Hz, 60 s)
- 12.2.4. insulation strength of the separated, galvanically integral traction control system in relation to the mains voltage system: kV (50 Hz, 60 s).

12.2.5. insulation strength of the separated, galvanically integral traction control system relative to the mass of the trolleybus: kV (50 Hz, 60 s).

12.3. Control devices: controllers, etc.

- 12.3.1. type:
- 12.3.2. supply voltage: V
- 12.3.3. supply method: from a separated system/from a non-separated bus system¹⁾
- 12.3.4. method of obtaining insulation in relation to the mains installation, if the device is powered by a separate system, the method of obtaining and the voltage strength of at least a single insulation from mains circuits shall be provided, whereas if the device is powered by a non-separated system, the method of obtaining and the voltage strength of at least double insulation from the mains circuits shall be provided:

12.3.5. place of installation:

12.3.6. cooling method:

12.4. Separated control system cables, if applicable:

- 12.4.1. manufacturer:
- 12.4.2. type:.....
- 12.4.3. nominal voltage: V

12.4.4. insulation strength: kV (50 Hz, in a time of s)

13. BUS CONTROL SYSTEM

13.1. Control voltage: V

13.2. Number, voltage and capacity of batteries: V/Ah

13.3. Pole connected to mass:

13.4. Location of the battery switch: V

14. DESCRIPTION OF THE INSULATION OF THE ENTRANCE DOOR AREA

(the description should include how the handrails located in the door area have been insulated from the trolleybus mass, the type and basic parameters of the dielectric liner located in the door area or on the entrance steps)

.....

15. DEVICE FOR DETECTING HAZARDOUS POTENTIAL ON THE BODY OR OTHER ADDITIONAL DEVICES FOR MONITORING THE INSULATION STATUS OF DEVICES OPERATING UNDER MAINS VOLTAGE

15.1. Device for detecting hazardous potential on the body.

15.1.1. Manufacturer:

15.1.2. Type:

15.1.3. Type of measurement system:

15.1.4. Supply voltage: V

15.1.5. The voltage level at which the signalling alerts the appearance of potential between the bodywork and the road surface: V

15.1.6. Method of signalling the occurrence of hazardous potential between the bodywork and the road surface:

15.1.7. Place of installation:

15.2. Additional device for monitoring the insulation status.

15.2.1. Manufacturer:

15.2.2. Type:

15.2.3. Type: intermediate mass insulation status meter/discharge current detector¹⁾

15.2.4. Supply voltage: V

15.2.5. The place of connection to the monitored circuits, in the case of the device for testing the insulation state of intermediate masses, all monitored masses or intermediate circuits shall be provided, in the case of the insulation status meter or voltmeters, the internal resistance of the measuring instrument, the dielectric strength of the insulation of the measuring device, the type and level of the measurement voltage used and the time of the individual measurements shall be provided:.....

15.2.6. Signalling threshold(s) for lowering of the insulation level, discharge current to the ground, setting of permissible minimum insulation values for intermediate masses or permissible voltage levels for intermediate masses in relation to the trolleybus body:

16. OPERATIONAL DATA

16.1. Average declared unloaded acceleration up to 30 km/h: m/s²

16.2. Maximum speed: km/h

16.3. Maximum current consumption from the overhead contact line during start-up: A

16.4. Maximum reverse current flowing into the mains that may occur during regenerative braking, if applicable: A

16.5. Average declared electrodynamic braking deceleration without load at 30 km/h: m/s²

16.6. Sound level A outside at standstill: dB

16.7. Electrodynamic braking traction characteristics for nominal supply voltage:

16.7.1. Diagram of the maximum braking force for the electrodynamic brake as a function of speed:

16.7.2. A current diagram as a function of the speed that can be returned by the trolleybus to the mains, with the maximum electrodynamic braking force, if applicable:

17. AUTONOMOUS DRIVING SYSTEM OR ADDITIONAL ENERGY STORAGE SYSTEM, if applicable

17.1. Power source for autonomous driving, if applicable: batteries/capacitors/batteries and capacitors/generator set driven by a combustion engine¹⁾

17.1.1. Purpose of the autonomous driving system: regular passenger service/emergency passenger service/emergency driving or manoeuvring over a very short distance¹⁾

17.2. Traction batteries, if applicable:

- 17.2.1. type of batteries:
- 17.2.2. capacity: Ah
- 17.2.3. voltage: V
- 17.2.4. mass: kg
- 17.2.5. place of installation:
- 17.2.6. ventilation method:
- 17.2.7. redundant protection: fuses/fuses and circuit breaker¹⁾
- 17.2.8. overheating protection (if applicable):
- 17.2.9. protection against too high voltage level on the cells:
- 17.2.10. Voltage strength of the base insulation on which the batteries are mounted in relation to the trolleybus mass: kV (50 Hz, 60 s).

17.3. Traction capacitor bank, if applicable:

- 17.3.1. manufacturer:
- 17.3.2. type:
- 17.3.3. sort of capacitors:
- 17.3.4. capacitor bank capacity:..... F
- 17.3.5. maximum operating voltage of a single capacitor bank: V
- 17.3.6. maximum operating current: charging/discharging the capacitor bank:/..... A
- 17.3.7. maximum permissible instantaneous current: charging/discharging the capacitor bank:/..... A
- 17.3.8. number of capacitor banks used:
- 17.3.9. capacitor bank total capacity: F
- 17.3.10. mass: kg
- 17.3.11. Capacitor bank used: for autonomous driving only/for network driving only/for autonomous driving and as support during network driving¹⁾
- 17.3.12. place of installation:
- 17.3.13. ventilation method:
- 17.3.14. redundant protection of the capacitors: fuses/fuses and circuit breaker¹⁾
- 17.3.15. protection against too high voltage level:

17.3.16. insulation strength between the current circuit of the capacitor bank and the capacitor housing (I-degree): kV (50 Hz, 60 s)

17.3.17. insulation strength between the capacitor bank housing and trolleybus mass (II-degree)..... kV (50 Hz, 60 s)

17.4. Converter separating and charging the batteries:

17.4.1. manufacturer:

17.4.2. type:

17.4.3. nominal power:

17.4.4. type of controlled semiconductor devices used:

17.4.5. pulse frequency of controlled semiconductor devices: Hz.

17.4.6. maximum battery charging current: A

17.4.7. input voltage range during battery charging: V

17.4.8. output voltage range during battery charging: V

17.4.9. place of installation:

17.4.10. cooling method:

17.4.11. insulation strength between the mains circuits and the housing (mounting frame) of the converter at terminals designed to work with the traction battery shorted to the housing (I-degree): kV (50 Hz, 60 s).

17.4.12. insulation strength between the mounting frame or the housing of the converter and the trolleybus mass (II-degree): kV (50 Hz, 60 s).

17.5. Converter working with the traction capacitor bank, if applicable:

17.5.1. manufacturer:

17.5.2. type:

17.5.3. nominal power: kVA

17.5.4. function of the converter: control of current and voltage charging/discharge current/increasing voltage at discharge¹⁾

17.5.5. type of controlled semiconductor devices used:

17.5.6. pulse frequency of controlled semiconductor devices: Hz.

17.5.7. maximum current during capacitor bank charging: A

17.5.8. maximum current during capacitor bank discharging, if applicable: A

- 17.5.9. maximum charging voltage of capacitors: V
- 17.5.10. place of installation:
- 17.5.11. cooling method:
- 17.5.12. insulation strength between the mains circuits and the mounting frame or housing of the converter: kV (50 Hz, 60 s).
- 17.5.13. insulation strength between the mounting frame or the housing of the converter and the trolleybus mass: kV (50 Hz, 60 s).
- 17.6. Generator set powered by a combustion engine, if applicable:
 - 17.6.1. manufacturer:
 - 17.6.2. type:
 - 17.6.3. place of installation:
 - 17.6.4. combustion engine:
 - 17.6.4.1. manufacturer:
 - 17.6.4.2. type:
 - 17.6.4.3. type of combustion engine: four-stroke petrol/four-stroke diesel¹⁾
 - 17.6.4.4. cylinder capacity: cm³
 - 17.6.4.5. number and arrangement of cylinders:
 - 17.6.4.6. maximum power: kW
 - 17.6.4.7. rotational speed corresponding to the maximum power: rpm
 - 17.6.4.8. maximum torque: Nm
 - 17.6.4.9. rotational speed corresponding to the maximum torque: rpm
 - 17.6.4.10. cooling method: liquid/air¹⁾
 - 17.6.4.11. exhaust emission standard:
 - 17.6.5. Fuel tank
 - 17.6.5.1. manufacturer:
 - 17.6.5.2. type:
 - 17.6.5.3. fuel tank capacity:
 - 17.6.5.4. place of installation of the fuel tank:
 - 17.6.5.5. type approval number:
 - 17.6.6. Generator:
 - 17.6.6.1. manufacturer:

- 17.6.6.2. type:
- 17.6.6.3. sort:
- 17.6.6.4. nominal power: kVA
- 17.6.6.5. nominal voltage: V
- 17.6.6.6. Nominal revolutions: rpm
- 17.6.6.7. Maximum revolutions: rpm
- 17.6.6.8. maximum power: kVA available in the time specified by the manufacturer
- 17.6.6.9. voltage control method:
- 17.6.6.10. output voltage control range: V
- 17.6.6.11. insulation strength of the generator body-winding: kV (50 Hz, 60 s)
- 17.6.6.12. cooling method:
- 17.6.7. sound level A at standstill when the generator set is switched on: dB
- 17.7. Fuses of the autonomous driving circuits, if applicable:
 - 17.7.1. manufacturer:
 - 17.7.2. type:
 - 17.7.3. sort:
 - 17.7.4. nominal voltage: V
 - 17.7.5. nominal current: A
- 17.8. Circuit breaker(s) of the autonomous driving system, if applicable:
 - 17.8.1. manufacturer:
 - 17.8.2. type:
 - 17.8.3. sort:
 - 17.8.4. place of installation of the circuit breaker(s):
 - 17.8.5. function: disconnection of the autonomous system/disconnection and redundant protection of the autonomous circuit¹⁾
 - 17.8.6. nominal voltage: V
 - 17.8.7. nominal current: A
 - 17.8.8. rated short-circuit breaking capacity, if applicable: A
 - 17.8.9. control voltage: V
 - 17.8.10. type of control:

17.8.11. insulation strength between the current circuit of the circuit breaker and the control system: kV (50 Hz, 60 s)

17.8.12. insulation strength between the current circuit of the circuit breaker and the base or housing: kV (50 Hz, 60 s)

17.9. Traction parameters:

17.9.1. Maximum speed of the empty trolleybus: km/h

17.9.2. Average acceleration of the empty trolleybus to 30 km/h: m/s²

17.9.3. Average declared braking deceleration of the empty trolleybus at a speed of 30 km/h: m/s² (where the trolleybus during autonomous driving does not reach a maximum speed of 30 km/h, the measurement of electrodynamic braking acceleration and deceleration shall be carried out according to the speed obtained and at an attainable speed close to the maximum speed).

17.9.4. Indicative range in urban traffic: km

1) Delete as appropriate.

2) All dimensions refer to the surface of the roadway.

Annex 8

**SCOPE AND METHOD OF CONDUCTING CONTROL OF CONFORMITY OF
PRODUCTION IN CONNECTION WITH THE NATIONAL TYPE APPROVAL
PROCEDURE FOR TRAMS OR TROLLEYBUSES**

1. Control of conformity of production referred to in Article 52 of the Act of 14 April 2023 (Journal of Laws, item 919), hereinafter referred to as ‘control’, conducted by the Director of Transportation Technical Supervision, hereinafter referred to as the ‘Director of TDT’, consists of two stages:

- 1) preliminary assessment;
- 2) verification of the projects and methods ensuring the conformity of production of the tram or trolleybus, items of equipment or parts, hereinafter referred to as ‘products’, with the type covered by the approval certificate.

2. As part of the preliminary assessment, the Director of TDT shall verify the existence of a quality management system at the manufacturer.

2.1. When determining the scope of the preliminary assessment, the Director of TDT shall take into account:

- 1) the manufacturer’s documentation confirming compliance with the harmonised standard ISO 9001 or an equivalent harmonised standard that meets the general requirements of the preliminary assessment;
- 2) documentation of the vehicle manufacturer’s assessment of the quality management system of the manufacturer of the products in accordance with one or more industrial specifications meeting the requirements of the standard referred to in subparagraph 1.

2.2. When the Director of TDT takes into account, for the purposes of the preliminary assessment, the documentation submitted by the manufacturer in accordance with the standard referred to in paragraph 2.1(1) during the control, the Director of TDT shall determine with the manufacturer how to communicate any amendments to the scope and validity of that documentation.

2.3. The preliminary assessment carried out prior to the issue of an approval certificate for a tram or trolleybus shall not require a re-assessment carried out for the purpose of issuing a type approval certificate for an item of equipment or part fitted to that type. In such a case,

the scope of the preliminary assessment should cover the manufacturing facilities of the vehicle manufacturer and activities related to the assembly of the tram or trolleybus which were not covered by the preliminary assessments carried out prior to the issue of the type approval certificate for the item of equipment or part of that tram or trolleybus.

3. As part of the verification of the projects and methods put in place by the manufacturer to ensure the conformity of production of the products with the type covered by the approval certificate, the Director of TDT shall:

- 1) check with the manufacturer:
 - a) the method of functioning of the production process of the products:
 - production planning,
 - keeping and storing production records,
 - overseeing the various stages of the production process,
 - storage and transport of finished products,
 - b) the mode of operation of the product delivery system:
 - the existence of a supplier assessment system,
 - warehousing and control of deliveries,
 - the use of product markings for effective and timely delivery,
 - procedures for product complaints,
 - c) the existence of a system of testing and internal controls of manufactured products, ensuring:
 - checking the conformity of the vehicle's completion with the data contained in the type approval certificate for the tram or trolleybus,
 - access to R & D and control equipment, including the method of identification and verification of such equipment,
 - documenting and making available the results of tests and internal controls of products, inter alia through control plans,
 - analysing the results of internal tests and controls with a view to verifying and ensuring that the manufacturer maintains the same level of product production, while taking into account advances in technology and industrial production,
 - an effective process to eliminate non-conformities identified as a result of internal tests and controls,

— an effective process to eliminate and withdraw defective devices from production, including the use of the markings of such devices;

2) determine with the manufacturer the period of storage of the results of tests and internal controls on devices conducted by that manufacturer.

4. The Director of TDT shall agree on the date of the control with the entity being controlled, hereinafter referred to as ‘the controlled entity’.

5. The Director of TDT shall, no later than 14 days before the date of commencement of the control activities, notify the controlled entity of:

- 1) the scope of the control;
- 2) the estimated duration of the control.

6. Controls shall be conducted in the presence of a representative of the controlled entity.

7. After conducting the control, the Director of TDT shall draw up a record which shall include:

- 1) the name and registered office of the controlled entity;
- 2) date of the control;
- 3) a list of the representatives of the controlled entity containing their personal data: name, surname and position held;
- 4) personal data of the persons conducting the control: name, surname and position held;
- 5) a list of the documents, procedures, production processes, facilities, premises or equipment controlled;
- 6) a description of the observations;
- 7) non-conformities found;
- 8) comments about the control submitted by the controlled entity and preventive or corrective actions proposed by the controlled entity;
- 9) the deadline for the implementation and verification of preventive or corrective actions;
- 10) annexes indicating the name of each of them, including written declarations, explanations, calculations and other documents provided by the controlled entity;
- 11) the date and place of drawing up the record, signatures of the persons conducting the control and of the controlled entity.

8. The record shall be drawn up in triplicate, of which:

- 1) one copy is intended for the controlled entity;

- 2) one copy is intended for the Director of TDT;
- 3) one copy is intended for the technical service as part of its type approval documentation.

MODEL

CERTIFICATE OF CONFORMITY USED IN THE NATIONAL TYPE APPROVAL
PROCEDURE FOR TRAMS

maximum format: A4 (210 x 297 mm) or folded to this format

(company stamp or letterhead)

I, the undersigned,

.....

(surname and first name)

certify that the tram:

0.1. Brand:

0.2. Type:.....

Variant¹⁾:

Version²⁾:

0.3. Commercial designation

0.4. Name and address of the manufacturer:

0.5. Type of tram:

0.6. Type of bodywork:

0.7. Places of mounting the statutory plates:

0.7.1. bodywork:

Tram identification number:

0.8. Location of tram identification number:

0.9. Restrictions³⁾:

1.12. Unladen mass of the tram: kg

1.13. Technically permissible maximum laden mass of the tram for the permissible number of places or load capacity: kg

1.14. Maximum axle load on the track for the permissible number of places or load capacity: kN

2.6. Type of drive: powered by overhead contact line/powered by overhead contact line with autonomous driving system/powered by overhead contact line with autonomous manoeuvring driving system/autonomous⁴⁾

8.12. Total permissible number of places or load capacity:

8.13.2. Number of seats for passengers⁵⁾:

12.1. Rated supply voltage: V

corresponds to the type described in type approval certificate No of

.....

(place)

(date)

.....

(signature of the manufacturer's authorised representative)

(position)

- 1) Certificates of conformity shall be issued on paper with security in the form of at least coloured graphics or a watermark corresponding to the manufacturer's identification mark.
- 2) On the first page of the duplicate certificate of conformity, the word 'duplicate' shall be added.
- 3) Fill in if applicable.
- 4) Fill in if there are restrictions on the use of the tram or when the item of equipment or part of the tram performs its function only in conjunction with other parts of the tram.
- 5) Delete as appropriate.

MODEL

CERTIFICATE OF CONFORMITY USED IN THE NATIONAL TYPE APPROVAL
PROCEDURE FOR TROLLEYBUSES

maximum format: A4 (210 x 297 mm) or folded to this format

(company stamp or letterhead)

I, the undersigned,

.....

(surname and first name)

certify that the trolleybus:

0.1. Brand:

0.2. Type:.....

Variant¹⁾:

Version²⁾:

0.3. Commercial designation

0.4. Name and address of the manufacturer:

0.5. Type of bodywork:

0.6. Places of mounting plates and markings relating to electrical equipment:

0.6.1. bodywork:

Vehicle identification number:

0.7. Location of the identification number:

0.8. Restrictions³⁾:

1.1. Unladen mass: kg

1.2. Permissible laden mass: kg

1.4. Number of seats for passengers:

1.5. Nominal number of places:

1.6. Individual axle loads with permissible load capacity: kN

2.6. Nominal mains supply voltage:V

2.10. Autonomous driving system: yes/no⁴⁾

17.1. Power source for autonomous driving (if applicable): batteries/capacitors/batteries and capacitors/generator set driven by a combustion engine⁵⁾

corresponds to the type described in type approval certificate No of

.....

(place)

(date)

.....

(signature of the manufacturer's authorised representative) (position)

¹⁾ Certificates of conformity shall be issued on paper with security in the form of at least coloured graphics or a watermark corresponding to the manufacturer's identification mark.
²⁾ On the first page of the duplicate certificate of conformity, the word 'duplicate' shall be added.
³⁾ Fill in if applicable.
⁴⁾ Fill in if there are restrictions on the use of the trolleybus or when the item of equipment or part of the trolleybus performs its function only in conjunction with other parts of the trolleybus.
⁵⁾ Delete as appropriate.

MODEL

APPLICATION FOR A NATIONAL TYPE APPROVAL CERTIFICATE FOR A
TRAM OR TROLLEYBUS

.....
(place, date)
.....

.....
(name and address of the
manufacturer)

.....
(the authority competent to issue the type approval certificate)

I apply for the issue/amendment¹⁾ of a national type approval certificate:

– for a tram¹⁾

– for a trolleybus¹⁾

1. Type approval test report
number

2. Vehicle
type
.....

3. Name and address of the
manufacturer
.....
.....

.....
(legible manufacturer's signature)

1) Delete as appropriate.

Annex 12

MODEL

LIST OF PERSONS AUTHORISED TO SIGN CERTIFICATES OF CONFORMITY
FOR A TRAM OR TROLLEYBUS

name and surname	position	specimen signature

.....

(legible manufacturer's signature)

MODEL

DECLARATION CONTAINING THE TROLLEYBUS DATA AND INFORMATION
NECESSARY FOR THE REGISTRATION AND RECORDS OF A TROLLEYBUS

Declaration containing the trolleybus data and information necessary for the registration and records of a trolleybus¹⁾

I declare the additional data and information on the vehicle necessary for registration and records under the regulations in force in the Republic of Poland, which corresponds in all respects to the type described in the EC vehicle type approval certificate/EU vehicle type approval certificate/national vehicle type approval certificate²⁾ No of, which was recognised by the authority competent to recognise this certificate by means of decision No of

Item	Vehicle data and information	Specification
1	VIN or bodywork, chassis or frame number	
2	Type	
3	Subtype	
4	Purpose ³⁾	
5	Year of manufacture	
6	Unladen mass [kg]	

¹⁾) Not applicable to an incomplete vehicle.

²⁾) Delete as appropriate.

³⁾) If applicable.

7	Permissible load capacity [kg]	
8	Maximum permissible axle load [kN]	
9	Permissible laden mass of the vehicle [kg]	
10	Permissible laden mass of the unit of vehicles [kg]	
11	Technically permissible maximum laden mass of the trailer with brake [kg] ⁴⁾	
12	Other ⁵⁾	

.....

(place)

.....

(date)

.....

(legible manufacturer's signature)

.....

(position)

⁴) Not applicable to tractor unit.

⁵) Refers to other data and information deemed relevant by the vehicle manufacturer.

MODEL

LIST OF PERSONS AUTHORISED TO SIGN THE DECLARATION CONTAINING
THE VEHICLE DATA AND INFORMATION NECESSARY FOR THE
REGISTRATION AND RECORDS OF A TROLLEYBUS

name and surname	position	specimen signature

.....

(legible manufacturer's signature)