

**Conditions for access of foreign motive power units (hereinafter as MPU).****THE POSITION OF THE INFRASTRUCTURE MANAGER ON THE OPERATION OF FOREIGN RAILWAY UNDERTAKING'S RAILWAY VEHICLES OR RAILWAY VEHICLES MANUFACTURED IN OTHER MEMBER STATE OR IN A MEMBER STATE OF THE EUROPEAN ECONOMIC AREA ON THE RAILWAY INFRASTRUCTURE OF ŽELEZNICE SLOVENSKEJ REPUBLIKY.**

(The requirements of this document are valid in the extent relevant to the design of railway vehicle also for other types of relevant railway vehicles).

Railway vehicles, according to the provisions of Articles 76, 77 and 78 of the Act of the National Council of the Slovak Republic No. 513/2009 Coll. on Railroads, may be operated on the basis of granting a first authorization or granting an additional authorisation for placing in service of railway vehicles by a safety authority, i.e. Transport Authority.

## Contact details:

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The position of the infrastructure manager - ŽSR on the technical compatibility between the railway vehicle and the rail network managed by ŽSR is one of the statutory determined documents required for administrative procedure at the Transport Authority for granting first or additional authorization on introducing railway vehicles into operation.

The position of the infrastructure manager is issued by Department of Expertise of Directorate General of ŽSR.

## Contact details:

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In order to assess the possibility and conditions of the operation of foreign railway undertaking railway vehicle or railway vehicle placed into service in other Member State or in member state of the European Economic Area on the railway infrastructure of ŽSR, the applicant shall submit the following data and documents to Department of Expertise of Directorate General of ŽSR. In addition to the documents hereunder ŽSR may require

other documents needed for the technical compatibility assessment between the railway vehicle and the railway network and ŽSR regulations:

1. The written application for issuance of an expert statement on possibility and conditions of railway vehicle operation in the railway network of ŽSR in view of compatibility assessment of the railway vehicle and the infrastructure for considered railway vehicle of a particular design series (design group), with specification of the requested mean and extent of operation (entire network, certain track sections, passenger transport, freight transport, operation through the shunting humps, track brakes, etc.). The request shall be sent to the aforementioned address.
2. The documents shall be submitted in the original language of the applicant. ŽSR decides whether a certified translation is necessary. Such a translation will be ensured by the applicant at his own expense.
3. Type drawing of a railway vehicle.
4. Traction characteristics of a motive power unit.
5. Brief description of railway vehicle design.
6. Basic diagram for the electric circuits of a vehicle (main circuit, train power supply circuits).
7. Technical data as per the following table:

**Tab. 1 MPU Technical data** <sup>A)</sup>

Motive power unit design series	
Owner of the motive power unit	
Wheel-set arrangement	e.g. Bo'Bo'
Wheel diameter (mm)	
Maximum velocity (km/h)	
Bogie wheelbase (m)	0.00
Total car wheelbase (m)	00.00
Length over buffers (m)	00.00
Maximum weight per axle (t)	00.0
Weight of fully outfitted car in running order (t) <sup>B)</sup>	00.0
Breaking weight for G regime (t)	
Breaking weight for P regime (t)	
Breaking weight for R regime (t)	
Breaking weight for P + E regime (t)	
Breaking weight for R + E regime (t)	
Breaking weight for R + Mg regime (t)	
Breaking weight of handbrake (or other parking brake) (t)	
Minimum curve radius (m)	
Minimum radius of convex arc of fracture vertical alignment in the vertical plane through which the vehicle may pass through (m)	
Minimum radius of concave arc of fracture vertical alignment in the vertical plane through which the vehicle may pass through (m)	

Maximum lateral force applied by a vehicle to a track (kN)	
Maximum tensile force on the hook (kN)	
Performance (kW) <sup>C)</sup>	
<p>A) For electric and diesel motor units, please provide data separately for power cars, intermediate cars and driving cars and specify in what arrangement is the unit operated.</p> <p>B) For electric and diesel motor cars and units, please provide in the form "empty/occupied (including weight of passengers and luggage).</p> <p>C) For electric motive power units, please insert in the form continuous output/hourly output. For diesel motive power units, please provide the output of the combustion engine.</p>	

8. List of present vehicles by standard designation, European Vehicle Number (EVN) – European number of a railway vehicle.
9. Information regarding what gauge the vehicle fits. If it differs from the one set out in UIC Leaflet 505-1 and STN 28 0312, a detailed drawing of the particular reference vehicle gauge need to be submitted.
10. Protocol on the results of running technical vehicle tests according to UIC Leaflet 518, needed to determine the lateral force Y of a railway vehicle on the railway superstructure in small-radius curves.

11. Data on dimensions and weight parameters (of a fully fitted vehicle, in case of vehicles for passenger and luggage conveying, including consideration of their weights) and data on vertical axle load forces.

Based on the data of points 10 and 11, the vehicle will be incorporated to lateral effects group as defined in the regulations applied at ŽSR and to vertical loading group pursuant to UIC Leaflet 700. According present classification to lateral effects group (in terms of lateral effect on tracks in curves) and loading category (in terms of vertical effects on track) the railway vehicle may only be operated on tracks where the running of vehicles given lateral effects group and loading category is allowed. If the lateral force applied by the vehicle onto the railway superstructure in small-radius curves is greater than 60 kN, it will be allocated to the transitive group 3 according to the lateral effects onto the railway superstructure. The running velocity of vehicles allocated in this lateral effects group is limited on certain track sections pursuant to the regulations of ŽSR.

12. Data confirming that the electrical resistance of each wheel-set measured between the running surfaces of the wheels does not exceed 0.01 Ω.
13. In case of vehicles with unevenly divided weight per axle and where the axle weight is smaller than 5 tons, please provide information on particular weights per axle for the purpose of reviewing the possibility of running through the points in automatic reverse operation.
14. Information on the use of a narrowed flange profile on any of the wheel-set of a vehicle, with a particular drawing of the narrowed flange profile being enclosed. This information needs to be supplied to check compatibility with axle counters.

15. In case of vehicles where some part of the circuit with traction or braking current and/or the current with which the transported vehicles are fed includes rails, please supply a test protocol justifying that irrespective of whether the vehicle is in whatever working condition or in the state of failure, the flow of any of the said currents cannot induce in the frequency ranges of 20 to 30 Hz, 44 to 56 Hz, 64 to 86 Hz, 118 to 132 Hz, 168 to 182 Hz, 219 to 231 Hz, 257 to 282 Hz and 375 to 425 Hz. If the operation of vehicle is required only on some particular lines, the assessment is made only for frequency ranges according to equipment of these lines.

Threshold values of disruptive effect are set in the respective technical specifications or in technical conditions of a track circuit type.

The requirement for delivery of Test Protocols applies also to the case that the railway vehicle has been tested in terms of disruptive effect for other components set for detection of presence of train such as track circuits (wheel sensors, inductive loops, etc.). If such tests have not been performed, the applicant should make a statement on this issue.

The conformity verification of vehicle electric equipment with technical requirements (also in case when tests were carried out in another test laboratory) is made by the Railway Research and Development Centre, Žilina, Žilina based on the authorization from Ministry of Transport and Construction of the Slovak Republic.

Legal entity authorized by the Ministry of Transport, Construction and Regional Development of the Slovak Republic will require for conformity verification of vehicle electric equipment with technical requirements the basic data about the electric equipment of vehicle, as for example:

- a) power, number and type of electric traction motors,
- b) type of electric traction supply,
- c) brief description of electric traction gear regulation,
- d) type, power and other electric parameters of source for hauled vehicles electric supply,
- e) types of auxiliary traction, its performance and regulation method,
- f) block diagram of traction power and auxiliary drive,
- g) type and deployment of the equipment for sanding and lubrication of roundabouts, ensuring the maintenance, regulating its activity, basic technical parameters,
- h) type of sand and lubricant .

It is necessary to attach the assessment of vehicle conformity with above mentioned requirement, worked out by the Railway Research and Development Centre Žilina to the request to issue the infrastructure manager's statement.

16. Information on electrodynamic braking.

Vehicle must be operable without recuperation.

17. Information on pantographs

- a) Pantograph bow dimensions and shape. The width of the bow of a pantograph used on the railway lines of ŽSR is 1,950 mm (UIC Leaflet 608).
- b) Minimum width of the contact strip of a pantograph bow used on the railway lines of ŽSR is 900 mm (UIC Leaflet 608).
- c) The material of contact strip may be carbon, metal ceramic and, in case of a 3 kV DC system, also copper (UIC Leaflet 608).
- d) Static contact force of pantographs used on the railway lines of ŽSR - in case of a 3kV DC system:  $100 \pm 15$  N; 25 kV AC system:  $65 \pm 15$  N (UIC Leaflet 608).
- e) Maximum value of static contact force pursuant to STN IEC 60494 for DC systems is 40 N and for AC system is 80 N (in case of simplified and light structures 40 N)
- f) Dynamic contact force of 160 N for 3 kV DC systems and 120 N for 25 kV AC systems (UIC Leaflet 608).
- g) Maximum value of static contact force pursuant to STN IEC 60494 must not exceed 1.5 x static contact force for velocities up to 100 km/h, 2 x static contact force for velocities up to 140 km/h, and 3 x static contact force for velocities up to 200 km/h.

18. Data on signalling lights and reflectors of a railway vehicle.

Railway vehicle signalling lights should be able to give the following signals:

- a) **front of a train:** three white lights arranged to form a triangle standing on the base,
- b) **end of a train:** two red lights arranged in a vertical line,
- c) **stop for trains running in opposite direction:** one red light in the front of a train.

The signalling lights and headlights must comply with technical requirements under UIC Leaflet 534.

19. Data on acoustic warning devices of a railway vehicle.

Acoustic warning devices of a vehicle must comply with the requirements under UIC Leaflet 644.

Other requirements on the design and equipment of a railway vehicle:

- a) Vehicle must have a speedometer with recording.
- b) Vehicle must be fitted with a key for handling the train power supply cable.
- c) Vehicle must have automatic pressure brakes.
- d) Vehicle with a central coupler must be equipped with an emergency coupler for connection to a car fitted out with a screw coupling and buffers.
- e) If a vehicle is equipped with a device for its control or check alert the driver, depending on the data obtained from the track and the vehicle should be operated on tracks with equipment for such transmission (e.g. track side equipment of LS automatic train control), the following must be documented:

- ea) Method of ensuring its turn-off, if such a device is not used on the railway of infrastructure of ŽSR;
- eb) verification of its compatibility with the track side equipment if such a device is used on the railway of infrastructure of ŽSR with reading data from the track;
- ec) reliable prevention of obtaining data from the track or verification that the reception of data in the course of any operating condition and failure state cannot have adverse effects on traffic safety or smoothness, if such a device is used on the railway of infrastructure of ŽSR without reading data from the track.

Verification of vehicle conformity with requirements of points eb), ec) /also in case when tests were carried out in another test laboratory/ is made by the Railway Research and Development Centre Žilina based on the authorization from the Ministry of Transport and Construction of the Slovak Republic. It is necessary to provide:

- the list of installed train control and devices to check alert the driver of the vehicle
- deployment of sensors to track the transmission of information from various train control
- mutual interconnection, the method of communication and performance of individual train control the railway of infrastructure of ŽSR.

After carrying out an initial review of the submitted documents, ŽSR may decide to either request for additional documents or issue the Position of Infrastructure Manager on the possibility and conditions of a foreign railway undertaking's vehicles operation, or railway vehicle introduced first time into operation in other member state or in the country of the European Economic Area, on the railway of infrastructure of ŽSR. As the reviewing process is rather time-consuming, each request must be submitted sufficiently in advance in order to have enough time to perform tests on the interaction between the vehicle and the railway of infrastructure of ŽSR if necessary.